LiRE25

Linköping University Research Evaluation 2025

LINKÖPING UNIVERSITY

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Research Evaluation 2025

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VICE-CHANCELLOR'S PREFACE

It is my privilege to have received the LiRE25 report – an essential milestone in our ongoing commitment to research excellence. The intention has been to foster a culture of reflection, learning, and continuous improvement across our diverse academic community.

A comprehensive university such as ours has the responsibility not only to generate new knowledge but also to ensure the highest standards in research quality. Regular evaluation processes are indispensable to this endeavor. They enable us to identify our strengths, address areas for development, and remain responsive to the expectations of society and the academic environment. Many people at our divisions, defined as 91 evaluation units constituting the LiRE25 exercise, have invested hours of discussion and writing as demonstrated in the self-evaluations. Furthermore, the 22 panels have delivered an impressive amount of recommendations to the evaluation units as well as thoughtful messages to the departments, faculties, and university management.

The reports from the panels will provide good guidance for our future work and they offer each division a valuable opportunity for critical self-reflection. By openly examining our practices and outcomes, we can learn from one another, share best practices, and support each other in the pursuit of even higher standards. I encourage all evaluation units, departments, and faculties, as well as the joint university services, to embrace the insights provided in this report and to translate them into concrete actions.

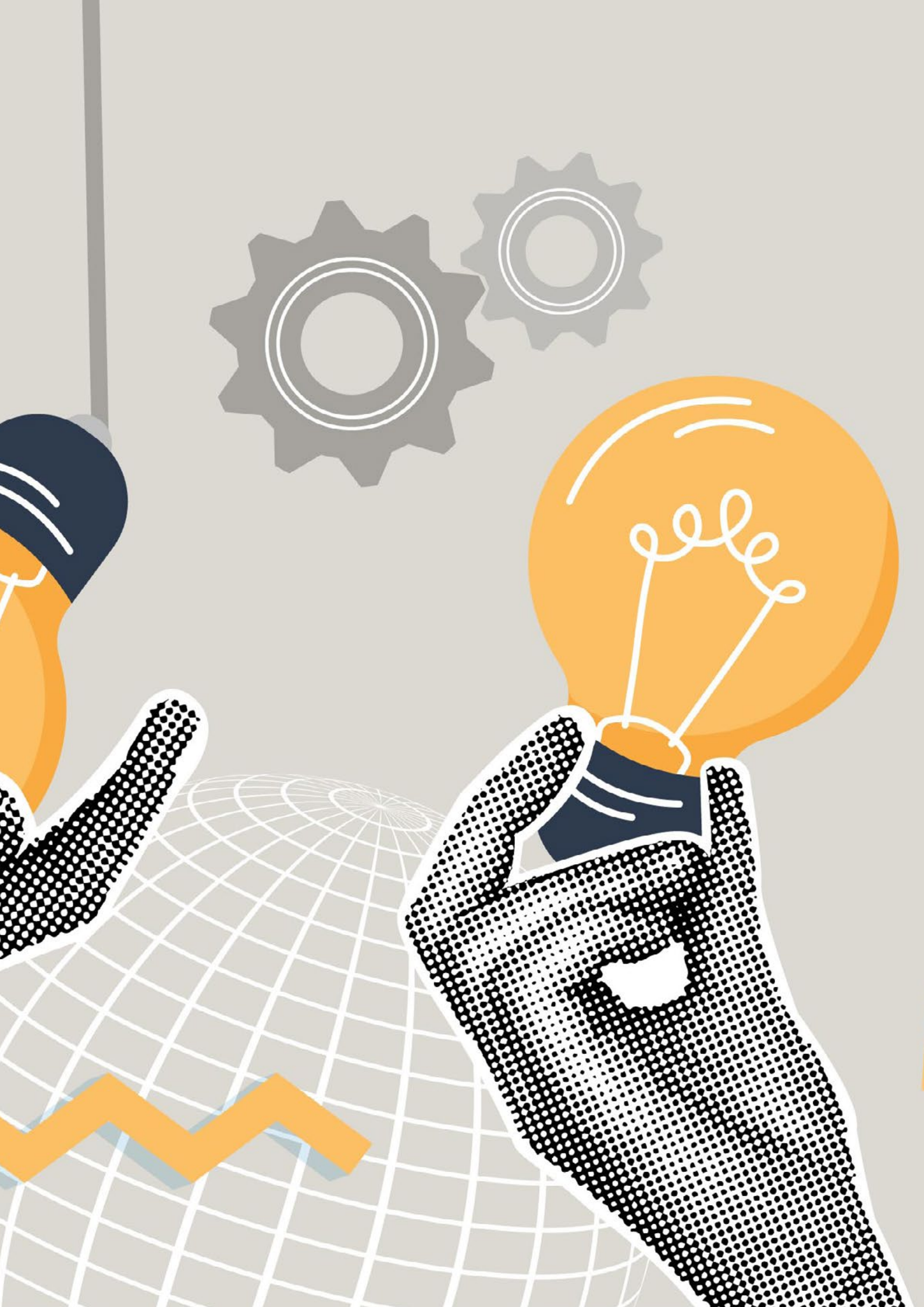
My deepest gratitude goes to Professor Sven Stafström and the whole LiRE25 office, to everyone who has contributed to the successful implementation of the evaluation, and to all panel members for their extensive work with providing feedback and recommendations. Thank you for your commitment to advancing the quality of our research and supporting the Linköping University's mission.

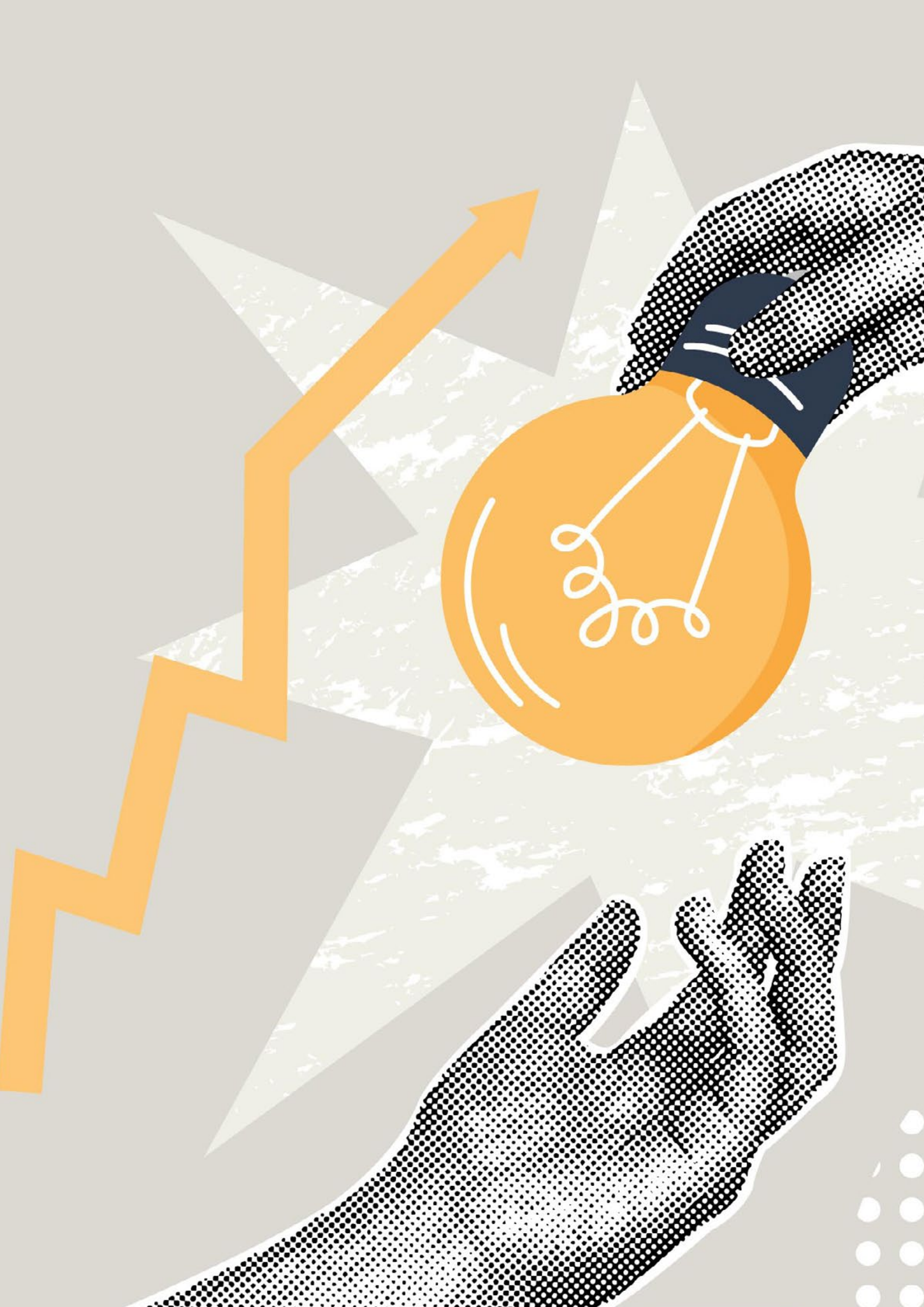
Jan-Ingvar Jönsson
Vice-Chancellor


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1. REPORT OVERVIEW AND SUMMARY

1.1 Summary in English

LiRE25 is a comprehensive evaluation of research at LiU. The core of the evaluation is the quality of research, but it also addresses research culture and the conditions for research. The purpose is to provide a basis for future quality work. The focus of LiRE25 is the evaluation units, which in most cases correspond to divisions at LiU's twelve departments, and where Malmstens at Campus Lidingö also constituts an evaluation unit.

LiRE25 is commissioned by the Vice-Chancellor. The design of the evaluation method and the planning and implementation of the evaluation have mainly been handled as a project in which the project group, the LiRE25 office, has done most of the work, but where several other parts of LiU's organisation have also participated.

The evaluation was carried out in two stages, a self-evaluation that each evaluation unit carried out in the autumn of 2024 followed by an external expert review in the spring of 2025. The external review was carried out by panels and resulted in recommendations aimed at both the evaluation units and other parts of LiU's organisation. This final report is based on the self-evaluations and the panels' reports.

The self-evaluations have been the most important basis for the external review, but they have also had the dual purpose of providing the divisions with inspiration for how future quality work can be conducted. In addition, it has given LiU's researchers the opportunity to express their views on how the university as a whole can be developed. As a side effect, the self-evaluations also contain many examples of successful quality work that other divisions can be inspired by.

The panel reports contain recommendations that, for example, highlight the need for an expanded strategic thinking regarding future research directions, recruitments and scientific publication. Several of the panels have also identified the care of young researchers as an area that can be developed, as well as the mobility of LiU's researchers. Increased international engagement is also highlighted as important by the panels. This applies to research collaborations as well as co-publication and to making better use of opportunities for EU funding. At the university level, the panels raise issues concerning LiU's organisation and how the LiU strategy work can have a greater impact at the department and division level.

This final report aims to provide an overview of the results of the evaluation. It can be read by all LiU employees, and particularly those who are in some way involved in research or research-supporting activities. The panels' reports are also published on LiU's website, and it will also be possible to interact with these texts via a chatbot. However, further work on using the results of LiRE25 at division

level should primarily be based on the panels' specific recommendations to each evaluation unit and the evaluation unit's own self-evaluation.

The Vice-Chancellor's decision (Dnr LiU-2023-04517) to implement LiRE25 states: *The research evaluation is an important part of the work on research quality, but also in LiU's strategy work. As part of Vision 2030 within the target area of Excellence and Benefit, the research evaluation is an important piece of the puzzle in how LiU can strategically develop its research going forward.* It is a statement that signals that the results of LiRE25 will be used both for immediate efforts and for long-term strategic work. It is a strong hope that this report, together with other documentation produced by the evaluation, will not only inspire quality work but also lead to an actual quality increase in the research at LiU!

1.2 Svensk sammanfattning

LiRE25 är en heltäckande utvärdering av forskning vid LiU. Utvärderingens kärna är forskningens kvalitet, men den tar också upp forskningskultur och forskningens förutsättningar. Syftet är att ge underlag för framtida kvalitetsarbete. I fokus för LiRE25 finns de utvärderade enheterna, som i de flesta fall överensstämmer med avdelningar vid LiU:s tolv institutioner och där också Malmstens vid Campus Lidingö utgjorde en utvärderad enhet.

LiRE25 är beställd av rektor. Utformningen av utvärderingsmetod samt planering och genomförande av utvärderingen har i huvudsak hanterats som ett projekt där projektgruppen, LiRE25-kansliet, gjort det mesta av arbetet men där också flera andra delar av LiU:s organisation medverkat.

Utvärderingen genomfördes i två steg, en självvärdering som varje utvärderad enhet genomförde under hösten 2024 följt av en extern expertgranskning under våren 2025. Expertgranskningen genomfördes av paneler och resulterade i rekommendationer riktade till såväl de utvärderade enheterna som till andra delar av LiU:s organisation. Denna slutrapport baseras på självvärderingarna samt panelernas rapporter.

Självvärderingarna har varit det viktigaste underlaget för expertgranskningen men de har också haft det dubbla syftet att ge avdelningarna inspiration till hur framtida kvalitetsarbete kan bedrivas. Dessutom, har det gett LiU:s forskare möjligheten att framföra synpunkter på hur universitetet i sin helhet kan utvecklas. Lite som en sidoeffekt finns i självvärderingarna också många exempel på framgångsrikt kvalitetsarbete som andra avdelningar kan inspireras av.

Panelrapporterna innehåller rekommendationer som till exempel lyfter behovet av ett utökat strategiskt tänk kring framtida forskningsinriktningar, rekryteringar och vetenskaplig publicering. Flera av panelerna har också identifierat omhändertagandet av unga forskare som ett område som kan utvecklas liksom mobiliteten bland LiU:s forskare. Även ett utökat internationellt engagemang framhålls som viktigt av panelerna. Det gäller såväl forskningssamarbeten som sampublicering och att bättre utnyttja möjligheter till EU-finansiering. På det

universitetsövergripande planet lyfter panelerna frågor kring LiU:s organisation samt hur det LiU-gemensamma strategiarbetet kan få större påverkan ut på avdelningsnivå.

Denna slutrapport syftar till att ge en översiktlig bild av utvärderingens resultat. Den kan med fördel läsas av alla LiU-medarbetare men särskilt de som på något sätt är inblandade i forskning eller forskningsstödjande verksamhet. Panelernas rapporter finns också publicerade på LiU:s webbplats och det kommer även att vara möjligt att interagera med dessa texter via en chattbot. Det fortsatta arbetet med att använda resultaten från LiRE25 på avdelningsnivå bör dock främst utgå från panelernas enhetsspecifika rekommendationer och den utvärderade enhetens egen självvärdering.

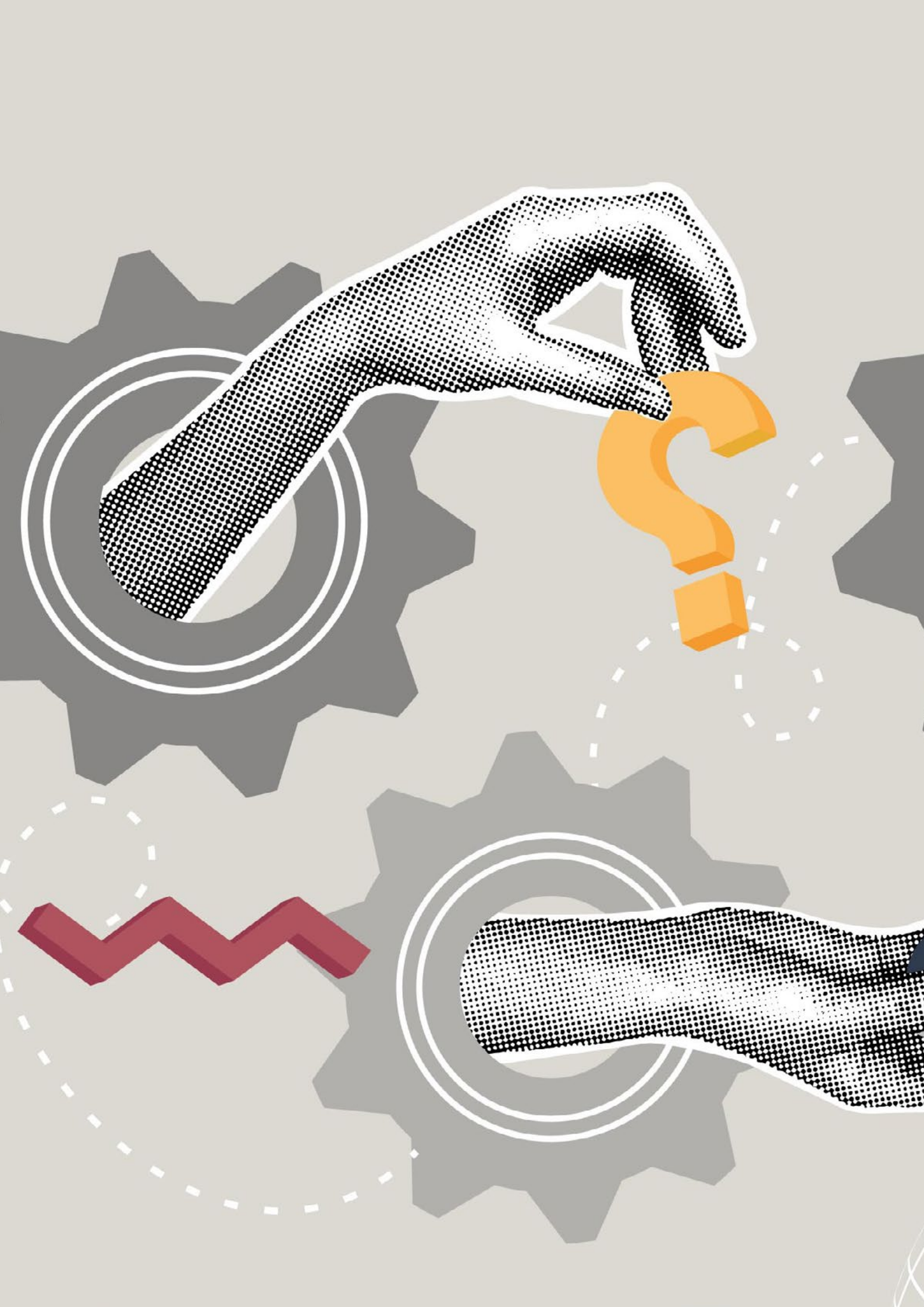
I rektors beslut (Dnr LiU-2023-04517) att genomföra LiRE25 står: *Forskningsutvärderingen är en viktig del i arbetet med forskningskvalitet men också inom LiU:s strategiarbete. Som en del av Vision 2030 inom målområdet Excellens och nytta är forskningsutvärderingen en viktig pusselbit i hur LiU strategiskt kan utveckla sin forskning framåt.* Det är en formulering som signalerar att resultatet av LiRE25 ska användas både för omedelbara insatser och för ett långsiktigt strategiskt arbete. Det är en stark förhoppning från alla inblandade i LiRE25 att denna rapport tillsammans med annat underlag som utvärderingen producerat inte bara inspirerar kvalitetsarbetet utan också leder till en faktisk kvalitetshöjning av forskningen vid LiU!




TEMAHUSET




MALMSTENS LINKÖPINGS UNIVERSITET





2. INTRODUCTION

Research quality plays a central role for all higher education institutions (HEIs). First and foremost, high research quality results in the most useful knowledge both for the scientific community and for society. The quality of research has also consequences for those involved. For researchers, their careers are largely determined by their ability to produce high-quality research results. For universities, faculties and departments the research quality is crucial for attracting new research talent and funding. A research evaluation must therefore include both the individual researchers or research groups and all levels in the HEI's organisation.

The Swedish quality assurance and enhancement system for research leaves much freedom to individual HEIs. However, there is a joint framework developed by the members of the Association of Swedish Higher Education Institutions (SUHF) with the following guidelines:

- The HEIs ensure that they continuously collect, analyse and use information with a bearing on research quality and relevance, to serve as a basis for quality development, prioritisation and strategic decisions.
- The HEIs ensure that their research environments and projects regularly undergo detailed assessments, in both a national and an international perspective, through peer review. This is done in a way that the HEI finds appropriate, to identify strengths, weaknesses and development opportunities.
- The HEI has systems for capturing and responding to the recommendations to which such assessments give rise.

Thus, the combination of making use of information related to research quality and performing peer review-based assessments is generally accepted. Furthermore, it is our impression that most HEIs appreciate that there is no mandatory national evaluation system. Instead, the possibility to develop methods that address the specific need of a particular HEI is very much appreciated. Some of the larger universities in Sweden have recently performed major research evaluations essentially following the SUHF-framework. Extensive reports from, for example Uppsala University [1], University of Gothenburg [2] and Lund University [3] are available on the web.

1 KoF17 Quality and Renewal 2017 Research Environment Evaluation at Uppsala University
2 RED 19, Research Evaluation for Development, 2019
3 RQ20 – Lund University's research quality evaluation 2020

During the fall 2022 the Vice-Chancellor of Linköping University (LiU) took the initiative to conduct a feasibility study aimed at finding ways to perform an evaluation of all research performed at LiU [4]. The study was performed by Professor Sven Stafström, LiU. The main conclusions from this study were:

- The evaluation should have three main components: a collection of relevant data, a self-evaluation and external peer review of research.
- The evaluation should be carried out based on the current organisation in which the divisions within the departments constitute the evaluation unit. evaluation unit.
- The evaluation should be forward-looking and include observations, analysis and recommendations from expert reviewers in the panels.
- The evaluation should not include direct comparison between the divisions and consequently not be used as a basis for (re)distribution of funding within or between faculties.

Based on the feasibility study, discussions were held in the LiU Board, in the university's Management Group and with faculty and department managements regarding the implementation of the evaluation. A decision by the Vice-Chancellor to carry out an evaluation of the kind described in the feasibility study and to appoint an evaluation office was made on November 13, 2023 [5]. The decision also included a budget and an implementation plan. The evaluation was named Linköping University Research Evaluation 2025 (LiRE25).

The goal of LiRE25 was described in the Vice-Chancellor decision as follows: "to increase the quality of research and further promote the development of strong research environments, and to provide an overall picture of the research and the conditions for research". LiRE25 will form the basis for strengthening the quality of research throughout the university. The evaluation must therefore be comprehensive and result in analyses and recommendations that each evaluation unit can use in its subsequent quality assurance work.

Following the recommendations in the feasibility study, the evaluation is primarily forward-looking; the reviewers will, based on a self-evaluation and a data package, give the evaluating unit recommendations to improve the quality of research. Furthermore, LiRE25 takes place in three stages: collection of data, a self-evaluation, and an external evaluation. All research and researchers are grouped into evaluation units, which in most cases are identical to the divisions that are part of the department's line organisation. Data collection, self-evaluation and external evaluation are carried out for each of the evaluation units.

4 Dnr LiU-2022-03220
5 Dnr LiU-2023-04517



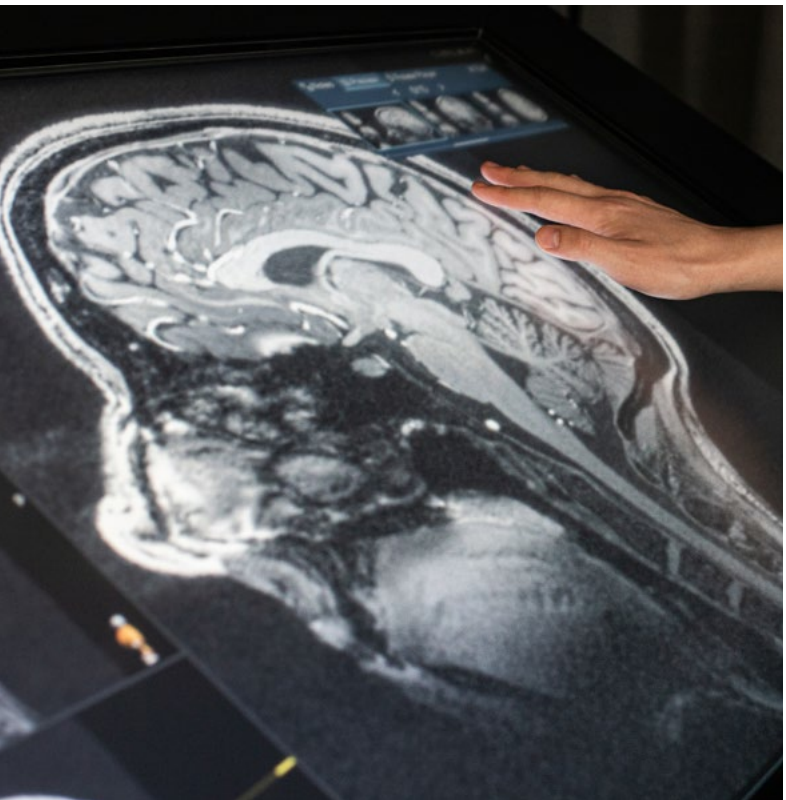


3. DESCRIPTION OF LiRE25

This chapter contains an overview of how LiRE25 is designed. The design work and the implementation of the evaluation itself was managed by the LiRE25 office (see section 3.7). A timeline of the work is presented in Figure 1. The figure outlines LiRE25s key phases and milestones from early 2023 to the closing phase in 2025. The timeline begins with the initiation phase, where the feasibility study was delivered and the formal decision to proceed with LIRE25 was taken. This phase also included the establishment of the LIRE25 office. The planning phase in spring 2024 focused on activities such as formation of evaluation units, the preparation of data packages and instructions for the evaluation and nominating and recruitment of reviewers. This was followed by the preparation and internal viewpoint phase, which emphasised departmental workshops, reviewer's engagement, and the writing and submission of self-evaluations by the evaluation units.

A key milestone was the transition into the external viewpoint phase, where panels assess the materials sent out to the reviewers, the site visits were held, and the panel reports were written and submitted to the LiRE5 office. At Malmstens at Campus Lidingö the site visit was planned separately and took place during June 2025. The LiRE25-timeline concludes with the closure phase, which includes writing the final report and evaluation of the LiRE25 process.

This structured approach ensures transparency, broad participation, and a robust foundation for evaluating and enhancing research quality at LiU.





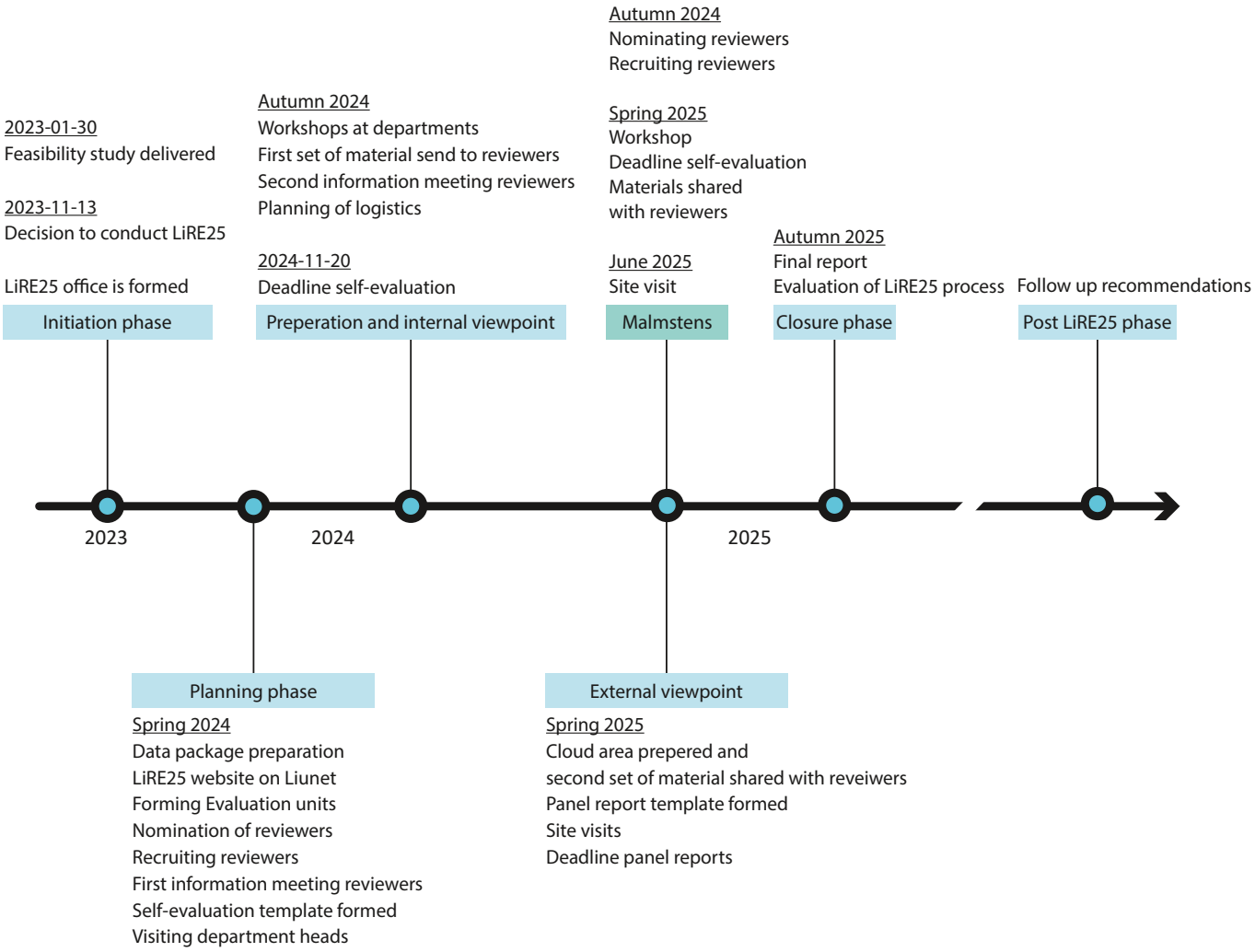


Figure 1. Timeline for LiRE25: planning, preparation, execution and reporting.

3.1 Composition of evaluation units

The first step in preparing for LiRE25 was to define the evaluation units (is written "UE" in this report, the abbreviated Swedish term for "utvärderad enhet"). It was generally agreed that LiU's existing organisation should be the starting point for this work. More specifically, the divisions at LiU's twelve departments would constitute the UEs. However, it was clear from the beginning that this cannot be done without looking into the character of each division and to find the best possible mapping of these divisions onto the UEs. In this work, the LiRE25 office (is also written as "we" in this report) had very constructive dialogues with the department heads as well as with the divisions that requested another constellation for the evaluation. Finally, we identified 91 UEs (see Appendix 1). The main principle be-

hind the divisions into UEs is to follow the existing organisation as far as possible since it facilitates the compilation of data and gives a clear ownership of the results of the evaluation to facilitate the follow-up process. However, it is also important to identify divisions that perform very similar research and therefore gain by being evaluated together.

In the final proposal there is still a rather large spread in the size of the UEs. This could be experienced as a problem in relation to the LiRE25 process which essentially is the same for all UEs. Since we tried to avoid too many exceptions from using divisions as UEs we allowed for separation into sub-groups within some of the largest and less homogeneous UEs, for instance the self-evaluation can be answered based on sub-groupings. Some research environments have grown very large but are still quite homogeneous in terms of the scientific focus. They themselves expressed clearly that they wanted to be evaluated as one UE.

An important aspect regarding the formation of UEs is that virtually all continued activities within LiRE25 are dependent on this partitioning. This, together with the fact that the dialogue around the formation is also important for all research groups to feel confident that the partitioning enables constructive evaluation work, meant that the work on the division had to start early in the process.

We noticed that the discussion related to forming UEs also initiated discussions concerning the present organisation at some of the departments. Since science evolves and the personnel changes with time it is reasonable, from time to time, to consider such changes. LiRE25 has obviously had this side effect to review the organisation, which is indirectly related to the quality of the research.

3.2 Composition of panels and recruitment of panel members

Shortly after the UEs were identified the LiRE25 office started to form groups of UEs with similar research specializations. One such group should be evaluated by one panel, i.e., a group of experts in the UE's research specialization. In total 22 groups of UEs were formed and related to 22 panels. The groups and the corresponding panels are shown in Appendix 1.

It is important to point out the scientific content is the main criterion when we form the groups of UEs. Because of this criterion, the number of UEs within the groups vary from one (in the case of Malmstens) up to seven UEs within a group. Naturally, this variation is also reflected in the size of the panels. Most, but far from all groups and panels include UEs within one department.

It should be noted that although there is a scientific basis for forming the groups and panels, we did not name them according to the scientific content. Instead, they were named from A to V. The main reason for this is that some of the groups of UEs are quite wide in their scientific content and it is therefore difficult to give these groups and the panels associated with a science-based name. In order

to have the same naming system for everyone, we introduced the letter designation.

After the groups of UEs and the panels have been formed the next step in the preparation was to staff the panels. Early in the process we referred to the panel members (reviewers) as "critical friends". Partially this follows from one of the cornerstones of LiRE25, namely that we expect the panels to give recommendations for future quality work within the UEs and not compare or grade the UEs with respect to each other. The panel members must therefore be familiar with the research area of the UEs that the panel will evaluate.

The best way to find the most suitable reviewers is to ask each UEs for candidates. The LiRE25 office sent out a request to the UEs to propose reviewers but with certain restrictions concerning conflicts of interest as well as gender balance and the relation between Swedish and non-Swedish candidates. (Part of the request: *The panel consists typically of six experts including one chairperson but, in some cases, it can be either larger or smaller panels depending on the number and the size of evaluation units assign to each panel. One panellist should have a professional background from another Swedish university. The non-Swedish experts should come from the Nordics, or other European countries. A balanced gender distribution is sought. To avoid partiality and conflicts of interest the nominees should not be previous employees at Linköping University and, preferably, not have co-published with any researcher in the (present) evaluation unit. However, it is possible to nominate experts with whom you have previously co-published if the publications are at least five years old.).*

We also asked the UEs to, among the candidates, point at those they regarded as suitable to chair a panel. Because the number of UEs in the groups of UEs varies, the number of external experts also varies between panels. With one panel chair and as many panel members as there are UEs assigned to the panel the total number of reviewers in LiRE25 would be 112 (21 chairs and 91 members including the panel that evaluated Malmstens at Campus Lidingö).

The LiRE25 office received extensive lists of both panel chairs and panel candidates and started contacting them, mainly according to the priority proposed by the UEs, but with some additional conditions on gender balance and nationalities. Altogether 245 candidates were contacted, and we ended up with 112 accepting reviewers, 46 women and 66 men (see Appendix 2). The nationalities of the reviewers are shown in Table 1.

Nationalities	Number	Proportion
Sweden	37	33 %
United Kingdom	14	12,5 %
Finland	11	9,8 %
Denmark	11	9,8 %
Norway	11	9,8 %
Germany	10	8,9 %
France	4	3,6 %
Netherlands	3	2,7 %
Belgium	3	2,7 %
Austria	2	1,8 %
Spain	2	1,8 %
Ireland	1	0,9 %
Portugal	1	0,9 %
Sweden, Finland	1	0,9 %
Sweden, Germany	1	0,9 %
Total	**112**	**100 %**

Table 1. Nationalities of the reviewers.

3.3 Self-evaluation

Each UE was asked to conduct a self-evaluation consisting of a set of questions related to research and research quality. The purpose of the self-evaluation is threefold. It is the main document from which the panels get the information needed to do their evaluation work. In addition, it is also a document which the UEs themselves can use in their coming strategy and quality work. Part of the content of the self-evaluations should also be of interest to all levels of the university leadership.

The LiRE25 office wrote the instructions for self-evaluation which can be found in Appendix 3. According to the instructions, each evaluation unit was expected to analyse their present performance based the information presented in the data package and present strategies for their future research work. The instructions were developed in collaboration with the faculty leaderships. The LiRE25 office also visited all twelve departments at LiU and discussed during workshops in some detail the instructions with the department heads and in most cases also with contact persons for each UE.

The instructions and a template for the self-evaluation were sent out by the LiRE25 office to the UEs in mid-August 2024, and the data packages were distributed in mid-September (see section 3.4 below). The deadline to hand in the self-evaluation was set to November 20, 2024. The data packages and the self-evaluations were then sent out to the panels in January 2025.

3.4 Data package

The data package had the same basic structure for all UEs but different research traditions and conditions were taken into account. The data package content was decided by the LiRE25 office after dialogue with representatives from the Planning and Controlling Office (PLE) and LiU's Bibliometric Team. Basic data was extracted from databases during late spring 2024 and provided a basis for the UEs self-evaluation and for the panels preparation prior to the site-visit..

For personnel, finance and doctoral degrees, data were collected and structured from central databases (Primula, Raindance and Ladok, respectively), the data content was collected by personnel at PLE. An application was also developed in Qlik Sence by PLE to enable the departments to explore the data material themselves, as well as to facilitate follow-ups. To obtain information on doctoral degrees at evaluation unit level department heads were requested to provide the relevant data. The Bibliometric Team retrieved publication records from LiU's institutional repository DiVA and subsequently enriched them using data from several additional sources. The method for data collection was adjusted in order to retrieve data that represent the UE in the most appropriate way.

Five heads of department were selected and asked to give feedback and validate the data packages during individual meetings in April and May 2024. Data packages were sent out for a final check to all the twelve department heads in June 2024. Information about the data packages, structure and content, was presented at a Head of Department Advisory Council meeting on the 11th of September 2024.

Content of the data package:

- **Personnel, data collection 31 dec 2023**
  - gender distribution
  - positions and position categories
- **Finance, between years 2018–2023**
  - total income and expenses
  - income sources
  - personnel costs
- **Doctoral degrees, between years 2018–2023**
  - number of doctoral degrees for the department
  - number of doctoral degrees awarded to women and men for the department
  - key indicators in doctoral studies for the department
  - doctoral degrees awarded by subject area and for each evaluation unit
- **Bibliometric analysis, between years 2018–2022**

Some variation in the time intervals may have occurred due to department or division restructuring during the period 2018–2023. If the UE consisted as a "break out" from a division, thus being smaller than a division, the data package was based on the whole division due to difficulties to break out data to an individual level. The UEs had the opportunity to complement the data packages by adding any missing information to the self-evaluation.

3.5 Review process

3.5.1 Panel instructions

In parallel with the recruitment of reviewers, the LiRE25 office developed an overview with information about LiU and the Swedish research system and instructions for the panels review work. The basis for these instructions followed the feasibility study, namely that no grading system is used and no comparison is made between UEs. Instead, the instructions focused on forward looking recommendations related to important aspects of research and research quality. The instruction, which are shown in Appendix 4, includes three areas related to the evaluation of UEs: 1) Research and research quality, 2) Research culture, and 3) Conditions for research.

For each area we have listed several topics, most of them corresponding to topics in the self-evaluation. We also listed a few guiding questions for each topic. Note that we specifically wrote that it is not necessary to cover all topics and that the guiding questions are provided to help approaching the topics, it is not expected that the panels provide explicit answers to these questions.

In addition to the three areas mentioned above, we introduced a fourth area where we asked for observations and recommendations that go beyond the individual evaluation units including combined impressions from all units in the panel as well as departmental-, faculty- and/or the university management levels.

The instructions were developed in close collaboration with the faculty leadership. The LiRE25 office had a common workshop with the deans and the vice deans during which the basic structure of the instructions was discussed. Later, when we had a draft ready, this was sent out to the deans and vice deans for comments.

The LiRE25 office welcomed all panel members to a first information meeting in October 2024. Both practical issues and instructions how to carry out the evaluation were discussed at this meeting. The LiRE25 office also presented information about LiU based in an overview that had been written by the LiRE25 office and sent out prior to this meeting. The self-evaluations and the data packages were sent out to the panels in mid-January 2025 together with the review instructions. A second information meeting was held shortly after the panels received these documents. The aim of this meeting was to introduce the review instructions as well as to present all practical details related to the site-visits. We also had a sep-

arate meeting with the chairs of the panels during which we discussed the LiRE25 process in more detail and also opened for comments that were considered in the final compilation of the panel instructions.



Figure 2. Vice-Chancellor's welcome session during a site visit.

3.5.2 Practicalities

The implementation of LiRE25 required efforts from support divisions at LiU. The data packages were collected and produced in close collaboration with the Bibliometrics Team and PLE. In order to share material with external reviewers, support and technical assistance from the Digitalisation Department was provided during the whole LiRE25 process.

The reviewers' site visits required careful and extensive preparations to make the logistics work as desired in terms of travel, transport, food and accommodation. The office enlisted the help of experienced administrators and panel coordinators. Economists assisted with support regarding remuneration, travel reimbursements, invoice management and representation.

When it came to logistics during the panel visit weeks, the panel coordinators did a large part of the support work by being on site guiding the panel correctly.

3.5.3 Site visit

The LiRE25 panel visits were divided so one fourth of the panels visited LiU at the same time. The site visits were held during four weeks in March/April 2025. Each panel stayed for about a week at LiU and conducted interviews with the UEs assigned to the panels and did most of the report writing. Each UEs had one half-day together with the panel according to a schedule that was first distributed by the LiRE25 office in October 2024. The LiRE25 office also instructed both the UEs and the panels to divide the time for the interviews in three parts, one with senior research leaders within the UE, one with young researchers and one with PhD students. Post-doctoral fellows could be included in either the young researcher group or the PhD student group. A typical evaluation week for the panel is shown in Figure 3. The leadership of the units decided who should represent the UE during the interviews.

The panels had some time for internal discussion during the days. But the LiRE25 office had also arranged for meeting rooms at the hotels where they stayed to make internal panel discussions possible after the interviews, and especially after they met with all the UEs.

Monday	Tuesday	Wednesday	Thursday	Friday
• Welcome address by the Vice-Chancellor • Introduction and mingle • Preparations for the visits and interviews	• Evaluation unit visits and interviews including time for the panel to summarise	• Evaluation unit visits and interviews including time for t he panel to summarise • Dinner and activities	• Evaluation unit visits and interviews including time for the panel to summarise • Panel work/ Goodbye	• Panel work • Goodbye

Figure 3. Structure of the panels site visit at LiU.

3.5.4 Report

As stated, several times in this report, the main aim of LiRE25 is for the UEs to get insights and recommendations for future quality improvement. The two most important documents to fulfil this aim are the self-evaluation and the panel report. The self-evaluations (as well as the data package) are intended for the panels work as well as for internal use within the UEs and is not part of this report. The panel reports, on the other hand, are included in this report. They are written based on an instruction from the LiRE25 office (see Appendix 4) and contain one section focusing on the UEs and one section with observations and recommendations to the various parts of the LiU organisation: departments, faculties and the university management.

3.6 Malmstens

Malmstens at Campus Lidingö was included in the evaluation in a slightly different manner due the unique profile and the direction of the current research, as well as the organisation and the location of Campus Lidingö in Stockholm. To utilize the possibilities of the current research evaluation and the focus on research questions that will automatically follow, it was decided that Malmstens should participate and obtain valuable insights from such a process. However, including Malmstens in any of the other Panels would not be suitable. Therefore, a process almost identical to the process described above, but shifted in time (see Figure 1), was implemented for Malmstens with a separate panel consisting of three experts. From a practical point of view the site visit to Malmstens including interviews and discussions was shorter in time.

3.7 Organisation

The Vice-Chancellor's decision to carry out LiRE25 included an implementation plan and a total budget for the evaluation. The organisation aimed at implementing LiRE25 is shown in Figure 4.

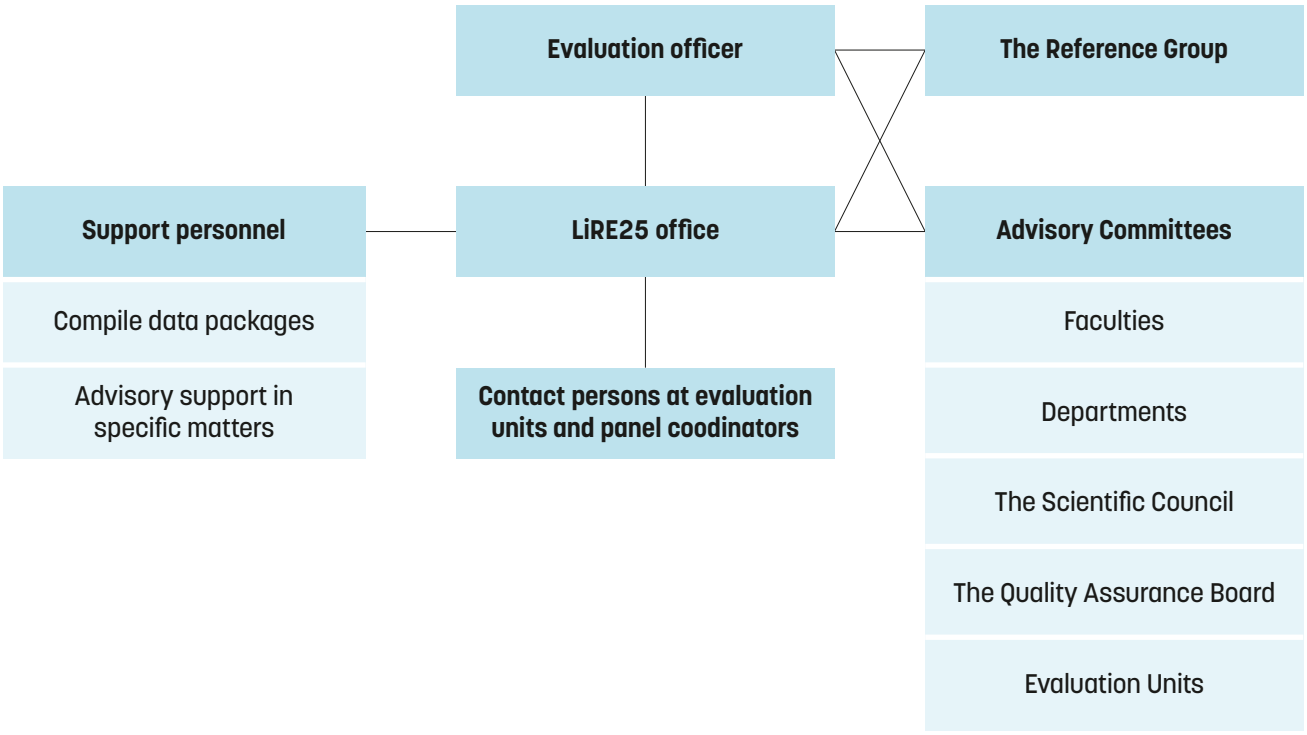


Figure 4. Organisational chart for LiRE25.

The Vice-Chancellor has appointed Vice-rector for Research, Matts Karlsson, as the responsible evaluation officer for LiRE25. The evaluation officer has the mandate to decide on the following:

- timetable for the implementation of the various stages of the evaluation
- design of data package and instructions both for self-evaluation and for the panels work
- appointment of reviewers

The evaluation officer led the office responsible for planning and implementing LiRE25. The office was also responsible for writing and compiling the final report. The office consisted of the following LiU staff: Emma Rörby, Nina Gennebäck (until December 2024), Theresa Apelqvist (from December 2024), and Gesine Ensle (from September 2024). Sven Stafström was part of the office as a senior expert. Lisa Franzén and Maria Eriksson were part of the LiRE25 office during spring 2025 for support with practical issues before and during the site visits.

In addition to the researchers, the university, faculty and department managements were involved in the planning and implementation of the research evaluation. This was done partly in the formally appointed reference group, which consists of the university management and the Adviser to the Vice-Chancellor for special research issues and partly through dialogue with various parts of the

organisation, such as the Advisory Council, faculties, departments, the Scientific Council, the Quality Assurance Board and the evaluation units themselves.

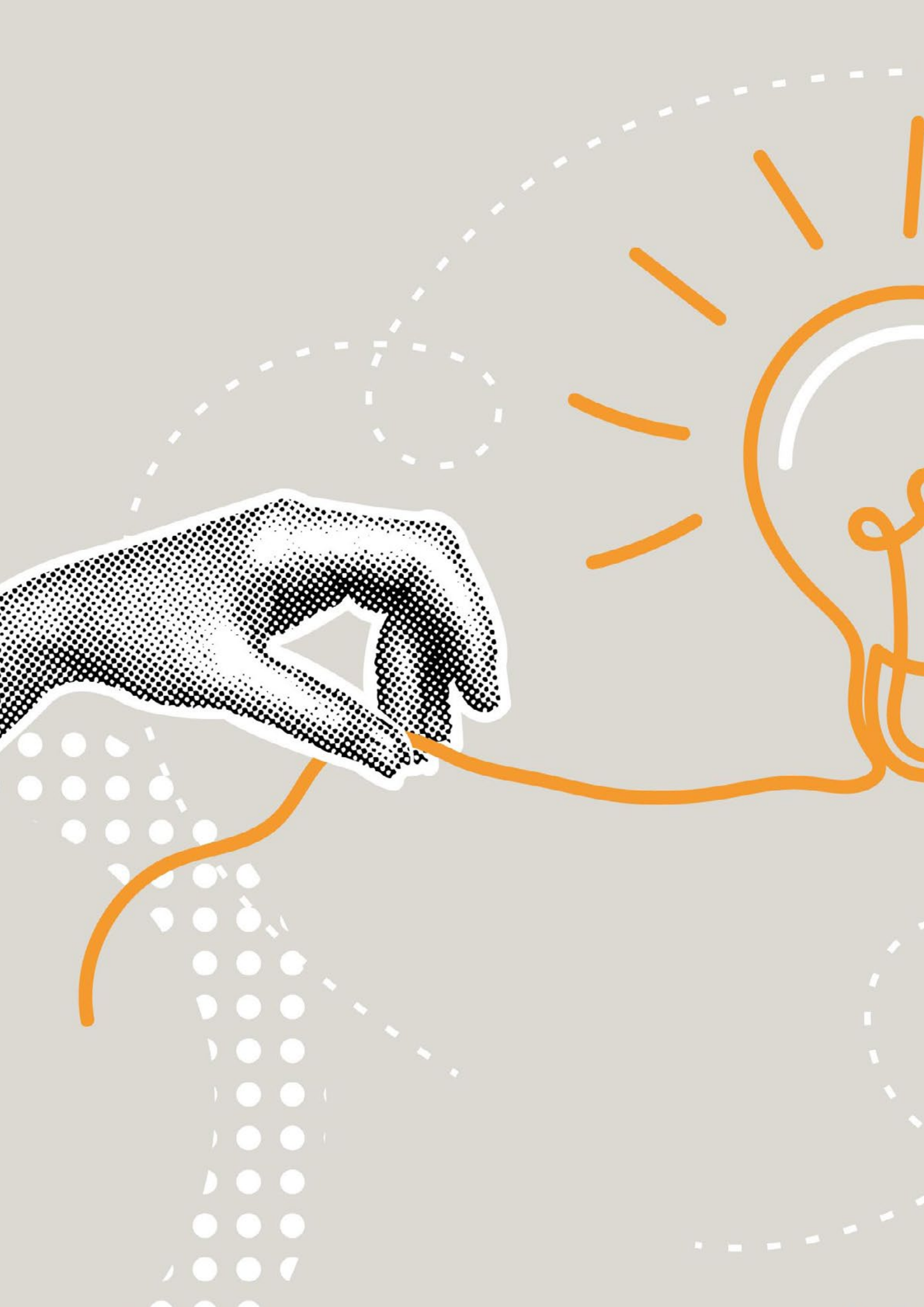
The most important communication activity from the LiRE25 office has been visits to the departments and meetings with groups representing different organisational parts of LiU mentioned above. In addition to these activities, the LiRE25 office has had a constantly updated website where all information related to LiRE25 was published. Also, newsletters were released when there was news to spread. Information aimed at specific recipients was sent out via email.

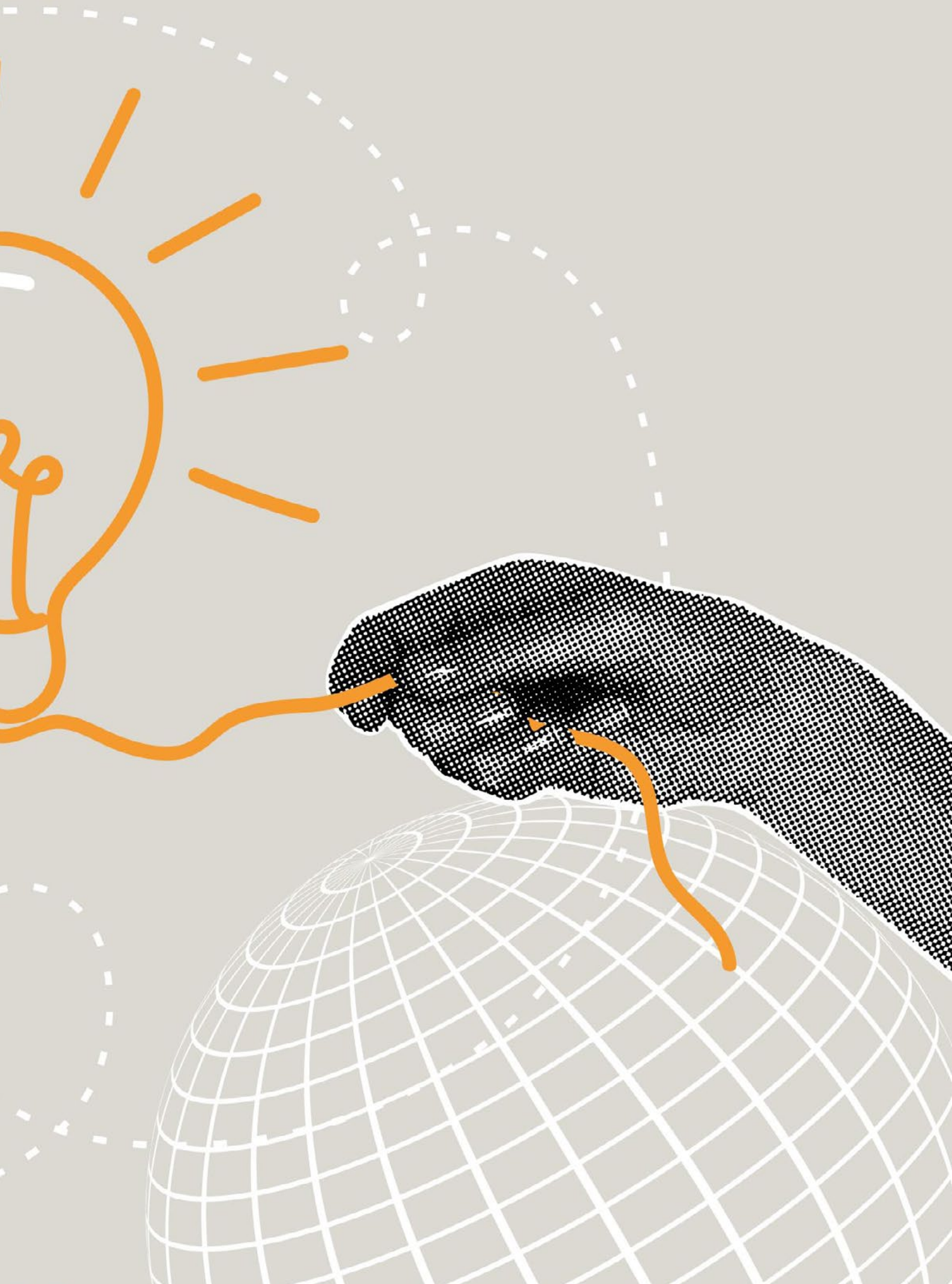
To assist the panels, the LiRE25 office established a role termed "panel coordinator". These coordinators were recruited among LiU's staff, one for each panel. The role of the coordinators was to help the panels prepare for the site visits and, most importantly, be their guide and support during the site visits. The service provided by the panel coordinator was critical during the site visits and also highly appreciated by the panels.

As shown in Section 3.4 above important contributions to LiRE25 also came from staff preparing the data package.



Figure 5. The LiRE25 office. From left to right Theresa Apelqvist, Sven Stafström, Matts Karlsson, Gesine Ensle and Emma Rörby.





4. SELF-EVALUATIONS

The aim of this section is to briefly present the content of the self-evaluations. The LiRE25 office has read all these reports with great interest and found a lot of material that we are sure will be of interest not only for the UEs themselves, but also for the management at all levels in the LiU organisation.

There are several purposes for the self-evaluation that was carried out by the UEs during autumn of 2024. The self-evaluations served as the main document that the panels use for their evaluation. It is also an important document for the UEs themselves, as it summarises issues that have been discussed within the units and that will be of importance for the future development of research and research culture within the division.

The template for self-evaluation (see Appendix 3) is structured so that the UEs are encouraged to provide information regarding the research culture and the conditions for research at LiU. Thus, the written self-evaluation will provide important information directed to departments, faculties and the university management related to their responsibilities on matters related to research and research quality. Examples from the self-evaluation related to these three purposes will be shortly presented and discussed in this section. Note, however, that a major part of the self-evaluations contain information that is related to the specific UE, content describing the research, personnel etc. This is not presented here.

There are several good examples of how to conduct high quality research, how to communicate research, how to formulate strategies for recruiting researchers etc. The LiRE25 office strongly believe that these examples can be an inspiration for other UEs in their ambition to develop their research quality and research culture. Therefore, in addition to more general observations about the research culture and the conditions for research, we will also present such examples of good research practice taken from the self-evaluation.

The template for the self-evaluation begins with a question concerning how the evaluation unit worked to develop this evaluation. This is followed by a description of the following topics: content of the research, research outputs, quality culture, recruitment, mobility and career, collaborations, research infrastructure, funding, teaching related to research, support functions. Finally, the template includes a SWOT analysis as well as comments and other reflections.

This final report provides a selection of the content of the self-evaluations. The presentation in chapters 4.1–4.3 below follows the structure of the self-evaluation template. We have copied the instructions from the template into our presentation (see text in italic at the beginning of each section) to clarify the meaning to each section. In the presentation we also copied quotes taken directly from the self-evaluations. These quotes are shown in italic, but without reference to specific UEs.

Since the panels largely base their observations on the self-evaluations of the UEs, there are quite a few references to the self-evaluations in the panel reports

as is evident from the material presented in Chapter 5. Some overlap between this section and the next is therefore unavoidable.

Also of note is that since one of the purposes of the self-evaluations is for the UEs themselves to be used in their own strategy and quality work. Therefore, unlike the panel reports, the self-evaluations are not published in this final report.

4.1 Description of the evaluation unit and its output

4.1.1 Content

Give a short presentation of the evaluation unit and the research profiles that are represented within the unit. Depending on the context in which the research is performed, describe how the research is related to centres, profile areas, strategic research areas or similar that exist within LiU (see also item 5). In particular, if some of the activities are interdisciplinary or multidisciplinary in character, please describe the different areas that are involved.

Give a few examples of particularly successful research projects and analyse what made these projects successful. You are also encouraged to present lessons learnt from your research work.

Present ideas and directions of future research. How will your research develop over time (coming 5 years), are there particular research questions that you plan to address?

The size and structure of the UEs (which are largely identical to the divisions within the departments) varies greatly between the UEs. Some large UEs are homogeneous in terms of the content of the research, others are more fragmented; many of the small ones with only a few senior researchers. This spread in size is of course well known to the organisation. To some extent, this reflects the conditions under which the divisions operate, with large differences in the amount of teaching and the opportunity and ability to attract external funding. But there are also some issues concerning the organisation in divisions that cannot be explained by such ”external” effects. We will return to this in the next chapter as there are several observations and recommendations from the panels relating to the composition of UEs.

4.1.2 Output

PUBLICATIONS

Describe and analyse the evaluation unit's publishing tradition and publishing strategy based on the bibliometric data that is part of the data package and regarding the publishing traditions that prevail in the evaluation unit's area(s). Note that LiRE25 uses a common format for the compilation of bibliometric data for all evaluation units. It is perfectly possible to supplement this compilation with information (in the submitted text below) that you think is missing.

The forward-looking analysis should focus on any changes caused by external factors, such a changing publishing landscape and reforms in research assessment, as well as on the evaluation unit's own view of future publishing strategies.

Many, but certainly not all UEs state that they have a strategy for how and where to publish their scientific results. The main motivation for where to publish is to reach out to the desired circle of readers and, because of this, to maximize the recognition of the publication. There are, however, surprisingly few examples of how this strategy is evaluated in relation to bibliometric data.

The tradition in the various research fields seems to be the strongest motivation behind the choice of journal or conference proceedings. The following citation describes a strategy which is representative for many UEs and that could serve as an inspiration for others.

> *Our publishing strategy hence is focused on quality over quantity, preferring fewer but more comprehensive papers which we believe guides us towards better research and yields higher impact in academia and society.*

Related to this, several UEs mention that their strategy includes activities to increase international co-operation and, as a result of this, international co-authorship. This is certainly a way forward which in general will lead to increased recognition and impact.

The tradition in certain research fields to publish mainly in conference proceedings remains strong but there are a few examples which indicate a changing strategy in this respect:

> *Rather than submitting to conference venues, the focus has been on submitting to journal venues. Consequently, the number of publications has decreased, but the quality and content have increased.*

There is also some criticism to the way bibliometric data has been collected.

The LiRE25 analysis does not incorporate the international CORE classification system, which can lead to an undervaluation of our contributions. While we remain dedicated to maintaining high standards in our publications, we recognize that our strategy may not receive the recognition it deserves in certain bibliometric evaluations.

The LiRE25 office would like to point out that in the case of LIRE25 we encouraged the UEs to complement the bibliometrics in the data package with missing information. This could be a way to handle such cases also in other situations when bibliometric data is used internally at LiU. In this context we also like to mention that a few self-evaluations brought up the model for distribution of funding within LiU's and that this model has had some influence on the publication strategy.

Publication in Swedish is the preferred choice for research which is aimed for a broader circle of readers within our society, e.g., to ensure accessibility and impact within a wide audience of policymakers and public officials. This is also the case for outlets with a popular science focus. Some UEs that today publish a majority of their output in Swedish stated in their self-evaluations an increased interest in international recognition and consequently a change in their future publication strategies in this respect.

PhD

Considering the information presented in the data package, comment on the output from the PhD education in terms of number of PhD degrees, the importance of the research performed by PhD students for enhancing the research quality of the evaluation unit, as well as for benefit to society. Also, give a brief presentation of the career of the PhD students that have finished their degrees during the last five years, what is the next step in their career?

Do you have suggestions for improving the PhD programme? What can be done within the evaluation unit? What can the department/faculty leadership or the LiU leadership do?

A vast majority of the self-evaluations mention that PhD students are essential both for the atmosphere at the division or unit and for the research output. Some UEs mention that the balance in time PhDs spend on the educational part of the PhD program and on the research projects can cause tensions. It is important that the individual study plans are realistically designed and followed up annually.

Several small divisions or more isolated units within a division report that they have only one or two PhDs. It might be important, also in relation to what was mentioned above regarding small units or divisions, for those responsible for the PhD programs to consider a widening of the environments in which the PhDs work and study. We note from the self-evaluations that some UEs have expressed an interest in starting PhD research schools to tackle the problem of isolation. Another aspect of isolation of PhDs was mentioned by one UE:

A challenge is that recruitment only takes place once external funding is in place, which means that PhD candidates are employed continuously, at different division at different times, on an individual basis, making them potentially rather isolated, especially since work place attendance in general is decreasing but primarily as they lack colleagues at similar stages in the PhD-process.

The funding of PhDs varies substantially between research faculties. At the Faculty of Science and Engineering, most PhDs are funded from external grants. At the Faculty of Medicine and Health Sciences there is a difference between the preclinical and the clinical areas, where the former to a large extent are funded by external funders whereas clinical PhDs are funded by ALF. In the Faculty of Arts and Sciences it is much more common to use faculty funding to finance PhD students.

Several UE express concern about the recruitment of good PhD candidates. To some extent, this is related to a lack of funding, but there is also a concern about the motivation of potential candidates to take on the challenge of completing doctoral studies. This is certainly not just a problem that LiU is facing, but it would be worth looking at LiU solutions to this problem.

Evaluations of the PhD program are performed regularly. This is brought up in several reports and considered important. Several UEs list activities based on the recommendations from recent evaluations.

OTHER RESEARCH OUTPUTS

Describe what research outputs other than scientific publications that research within the evaluation unit has led to. Focus on utilisation and impact of research outside academia in terms of e.g. innovations (of all kinds), policy papers, science communication, etc. What are the strengths and weaknesses of the evaluation unit's work in this respect? If you identify weaknesses, what can be done in the future to strengthen efforts to stimulate outreach/knowledge utilisation/innovation? What kind of support within LiU would you like to see?

In addition to output within academia, the self-evaluations list an impressive amount of output and outreach activities outside academia. Collaborations with companies, agencies and society, commissioned research, legislation and all kinds of innovation activities are the most frequently mentioned activities. Some divisions report difficulties in accessing funding and infrastructure for innovation activities, such as patent filing and scaling up solutions. Suggestions for improvement include targeted funding mechanisms and increased support for technology transfer.

Science communication is mentioned as an area in which there is room for improvement. It is realized that to reach out to a wider audience there is need for a combination of engagement from the researchers and support from communication experts. Time and to what extent researchers should prioritize science

communication is certainly a critical factor here. This could be brought up for discussions within the divisions. Guidelines from the university leadership on the value merits from communication could also be useful.

The use of social media has also been brought up in the context of science communication but not by many and often as a weakness of the UE. There are however several good ideas how to strengthen these activities:

> *Increase social media activity by appointing a motivated individual in the division to manage these efforts.*
>
> *It would be valuable to establish an official science podcast organized by LiU. This platform would allow us to communicate our scientific discoveries to a general public.*

Teaching has been mentioned as another important contribution to research communication. This also includes writing textbooks.

Supplementing scientific publications with activities that lead to further recognition and use of research results is important both for the individual researcher and for the university. This highlights issues such as responsibilities and roles in connection with such activities. The ongoing work to reform the research evaluation (Coalition for Advancing Research Assessment – CoARA) can be a platform that both stimulates researchers to be more active in this regard and to develop the university's support to broaden the concept of research results.

4.2 Conditions for research

4.2.1 Quality culture

Describe the activities aimed at fostering a culture that leads to high-quality research and renewal within the evaluation unit. What is the role of leadership and collegiality? How do you ensure intellectual interactions and research integrity/good research practice? What are the strengths and weaknesses of the current approach? Give examples of activities that can change the quality culture within the evaluation unit in a positive way.

Most of the UEs have, according to the self-evaluations, activities that stimulate a quality culture. Such activities include group meetings focussing on research quality, seminars and also to make use of collegiality to stimulate quality in research. Much of these activities were discussed at the panel meetings and the panel reports give further insights into how the different activities actually work within the UEs. We will come back to this in our compilation of these reports.

It is natural at any HEI that there are differences in how successful the divisions are in there performing research. Those that have been the most successful have in general also been successful in attracting external funding and have been

able to grow and become large. Such large divisions also have the possibility to divide responsibility for fostering a good research culture and a quality culture in particular among the researchers. Therefore, large groups or divisions have an advantage over smaller divisions in this respect. Furthermore, to build (fewer but) larger groups, i.e., team science rather than individual efforts is a general trend in science.

Judging by some of the comments in the self-evaluations, it seems that there is a realization that there are challenges with smaller departments to create a quality culture:

> *The idea of having many small and independent labs may have been a good one in the early days but this is not the case nowadays. The effect is basically that there is not a common culture … and in particular not a common quality culture.*
>
> *…a strategic focus for the division is to consolidate and expand existing research groups around specific application domains. We believe that this can further improve the quality culture by increasing the scientific discussion around these topics and ensuring that there are no "isolated islands" within the division.*

It would be valuable if discussions such as those exemplified above could be conducted, preferably at the departmental level: about how the divisions are organised, whether there are alternative organisations today and/or what type of organisations and research focus could be part of the department's long-term strategies. There are also plenty of comments and recommendation related to the research focus presented in the next chapter.

4.2.2 Recruitment, mobility and career

Describe your recruitment strategy. How do you advertise positions? What is the process for selecting candidates? Describe how you value skills related to teaching, innovation, management and leadership, and service to the community. What is your view on the faculty's way of handling recruitment matters?

Describe what kind of support the evaluation unit provides to young researchers for their career development. What support would you like to see from the department, faculty and/or central administration?

Given the present personnel, describe your thoughts on future opportunities and possible solutions for retaining highly qualified researchers in the evaluation unit.

You can refer to or comment on the data package regarding personnel data here.

Attracting external candidates and retaining researchers are identified as challenges by a majority of the UEs and is also considered critical in relation to research

quality and sustainability of the research environments. However, it is difficult to summarise the self-evaluations since the conditions vary quite a lot between different UEs. Some areas struggle a lot to find qualified candidates, others have been quite successful in recruiting junior researchers. The ratio of international to national recruitments also varies a lot between UEs, as well as the possibility to find candidates of the underrepresented gender.

> *Moreover, international recruitment is almost non-existent because education is delivered in Swedish, salaries are lower, and international academics are accustomed to having more research time in their positions if they are on a research track. If the unit's goal is to become more attractive to international and/or excellent researchers, improving the unit's webpage and more strategic planning are needed. Establishing distinct research and teaching tracks for each employee will be important.*

The following quote illustrates experiences from successful recruitment:

> *This indicates that to be competitive, extended recruitment efforts and advantageous funding and conditions may have the potential to attract candidates …*

The self-evaluations are quite consistent in the way positions are announced. To varying degrees, divisions use institutional websites, social media platforms, international platforms (e.g., Euraxess, Nature Careers), fostering international visibility through conferences and collaborations, and targeted outreach initiatives.

There is some criticism regarding the university homepage for positions, it is said that it "does not give a good impression of the university." Another criticism is that recruitment processes are often lengthy, which can lead to losing candidates. Some UEs suggest streamlining administrative procedures and improving communication with applicants.

> *Recruitment faces obstacles like lengthy timelines, financial constraints, competition with industry, visa issues, and limited diversity. Suggested improvements include streamlining processes, providing seed funding for new hires, enhancing administrative support, and offering family relocation assistance.*
>
> *A smooth, fast and predictable employment process is central to getting the best possible candidates.*

Recruitment of clinical researchers has special challenges:

Recruitment of senior clinical academic staff is heavily reliant on coordination between LiU and the hospital and can be very time-consuming with the average appointment taking more than 14 months. Better strategies to efficiently identify external reviewers and get their reviews in time, as well as coordinating decisions with important stakeholders from LiU and RÖ, should speed up the process.

But there are also reports which describe the recruitment process without complaints:

The appointment board then takes the process further, selecting the most qualified candidates based on the job specification and inviting them for interviews. Our head of department participates in the interviews. During the interviews, guest lectures are usually conducted with several members of the division. The appointment board also consults experts who assess the candidates based on the announcement. Finally, the appointment committee proposes who should be hired. The head of department or the Vice-Chancellor makes the decision on who to hire (depending on the position) and signs the contract.

Examples of initiatives from the self-evaluations related to career planning are: focus on creating structured career paths, support in writing applications for external funding, promoting collaboration both within academia and with business/society, and balance between research and teaching. One UE brought up the importance of feedback to the staff:

We also monitor our staff's career progression to ensure they are continuously working toward their professional growth and future goals.

4.2.3 Collaborations

Who are the evaluation unit's most important academic collaboration partners within LiU, with other universities in Sweden and abroad? How are you currently working to establish and maintain such collaboration and networks to support high-quality research? What measures will the evaluation unit take in the future in order to further strengthen your research network?

Who are your most important collaborators outside academia? Consider collaborations at all stages of the research process: research ideas, performing research, co-publication, use of the results. How is the unit currently working to establish and maintain such collaborations and networks, and to bring about a wider dissemination of research results to the rest of society? Present ideas on how to further strengthen collaboration with partners outside academia.

There are of course extensive collaborations both inside and outside LiU. However, most of what is reported in the self-evaluations deal with external collaborations. As will be discussed by the panels, there is a general impression that internal collaborations are underused.

The external collaborations, on the other hand, are extensive and used both to strengthen the research itself and for dissemination of research results. It is mentioned by several UEs that trust and openness are essential for fruitful and long-standing collaborations. Several quotes indicate that PhD projects are a good strategy for initiating collaborations and for building trust.

> *Active search for and approach of new potential partners is part of the strategy, and a fruitful opening is often to familiarize with each other around a student project that can develop into more extensive collaborations.*
>
> *Joint supervision of PhD students with international collaborators ensures a steady flow of ideas and cross-institutional learning.*

Participation in conferences as well as outreach and inviting activities are other frequently mentioned ways of stimulating collaborations:

> *Our method to foster collaborations is to be present at major events in our respective field, e.g., the main conferences, and participate in their International Program Committees.*
>
> *We will regularly invite existing and potential collaborators worldwide to visit us and engage with us. This will allow us to share findings, develop new joint projects and deepen collaboration.*

Among several UEs, there are strong and well-established contacts with industry. Such collaborations range from fairly basic to applied research activities and are seen as important both for the research itself but also for "real-world impact". The legal aspects of such collaborations are also addressed:

> *Expanding partnerships with industry is often hindered by legal challenges, particularly around Non-Disclosure Agreements (NDAs).*

4.2.4 Research Infrastructure

Describe the evaluation unit's research infrastructure (RI) needs and how important RI is to your research. Do you currently use RI that is available in your own lab/research environment, at LiU, nationally and/or internationally? Do you have sufficient access to the RI you need? What is the funding situation for RI? What are the biggest improvements to the access to RI that should be made, that can result in higher research quality from the evaluation unit?

The self-evaluations show that access to the research infrastructure needed for LiU's researchers to be able to produce high-quality research is generally satisfactory. There is, of course, a wide spread in the needs for research infrastructure between different research areas and, consequently also large differences in the costs of research infrastructure.

However, while most UEs are happy with the current situation, there is a concern among UEs with great needs related to securing funding for new infrastructure. This is a challenge both for research groups and for the university.

> *Increased funding for infrastructure improvements would allow us to update essential equipment, broaden our access to advanced facilities, and ultimately raise the quality and rigor of our research output.*

The opportunities to use infrastructures outside LiU seem to be exploited to a fairly large extent:

> *(The UE) essentially benefits from adequate access to research infrastructure and possesses the means to establish collaborations or secure alternative ways to access external facilities and techniques.*

In some cases, collaboration with industry contributes both to the local infrastructure by placing their equipment at LiU or by opening their resources for collaboration.

> *Due to this diversity, there has been a long-term strategy of collaboration around the required research infrastructure since it would be impossible to fund and maintain our own equipment for all projects. Instead, many projects have had industrial or academic partners providing access to relevant platforms.*

Technical experts dedicated to advanced infrastructure are also considered to be of utmost importance, especially for infrastructures that have a broad user base. Once again, funding these experts is a challenge for everyone responsible for the facilities and, in many cases, also for the university.

In this compilation of information from the self-evaluations we refrain from going into details regarding specific research infrastructures. However, digital infrastructures are used very broadly and are also growing in importance in many, if not all, research areas and deserves. UEs which belong to the Faculty of Arts and Sciences or the Faculty of Educational Sciences, use databases and digital services provided both internally, but also by the library and nationally. Recently established infrastructures such as the Human Open Social Science lab and the Norrköping Decision Arena are mentioned as important in the future. The national project initiative HUMINFRA has also contributed with expertise and courses in digital humanities that are available to researchers at LiU. This comment is worth mentioning in this context:

Over the past decade, arts and humanities scholars have become much better at articulating their demands for research infrastructure specific to humanities research in the digital age. This includes digital platforms, statistical databases, and digital collections.

Users from the other faculties, in particular the Faculty of Science and Technology but also from the Faculty of Medicine and Health Sciences, are more focused on high-performance computing facilities and resources for AI and visualization as well as storage of large data sets. Several UEs acknowledge the supercomputer facilities at NSC/NAISS and the UEs with the largest need of computational power also use European facilities such as PRACE and EuroHPC.

4.2.5 Funding

Considering the information presented in the data package, describe the funding situation of the evaluation unit including both faculty funding from LiU and external competitive funding from national as well as international funders, such as the EU. If you are conducting commissioned research, describe the conditions for such research activities.

Do you have procedures for review and quality assurance before submitting applications? To what extent do you use support provided by the Grants and Programme offices at LiU?

Comment on the success rate of external funding and discuss opportunities and threats for the future. Describe the unit's strategy/strategies for maintaining or increasing external funding.

Funding is of course central to all research divisions at LiU. The fact that the base funding to LiU (faculty funding) is low in relation to the external funding is extensively brought up in the self-evaluations. The low faculty funding results in a large dependence on external funding and, consequently, discussions related to how to attract external funding dominate the self-evaluations. The following quotes are not completely representative for these discussions but are nevertheless of high relevance:

The main strategy for maintaining or increasing external funding is to focus on producing landmark research papers and studies investigating key questions of scientific and clinical relevance, using cutting edge methods and models. This is increasingly dependent on having good collaborations and investing in longer-term projects for larger payoffs.

Securing funding is challenging and is dependent on many factors beyond application quality. These include evaluator preferences, the composition of evaluator committees, availability of suitable calls, and even luck.

The measures taken to ensure or increase the amount of external funding is frequently discussed. A majority of the UEs describe how they have internal review

processes before submitting proposals. These processes are different at different departments and divisions; here are a few examples:

> *A key factor behind this success (external funding) has been the grant application workshops that we arrange about three times each year, where we collaboratively review and discuss each other's application drafts.*
>
> *For applications to funders that have been categorised as excellent by LiU, a review of the application (internal reviewer) and budget plan must be approved in order for the Head of Department to sign off the application. The internal review is mainly aimed at improving readability.*
>
> *The workshops (preparing the LiRE25 self-evaluation) identified a need for an organized forum for reading each other's applications. This currently occurs haphazardly and in smaller groups, but, given that the division is collectively highly active in the funding agencies, a larger collegial support would be beneficial.*

The Grants Office is mentioned by several UEs with different descriptions of how they relate to the service provided:

> *We make use of the Grants and Programme offices at LiU and find them helpful, though they do not always provide help geared to (our UE's) specific needs which are more towards assisting in writing and coordinating large EU/Vinnova-type grants and less about advising on how to write individual project grants where we feel we already have good competence and internal support processes at (our UE).*
>
> *The demand for support among researchers is often more practical regarding administrative issues, proposal writing, proposal call guidance/identification while the Grants and Programme office seems to be more focused on general advice.*

The Swedish and European funding opportunities are extensive and there are many good examples in the self-evaluations of how to benefit from diversification by attracting industrial collaborations and commissioned research:

> *… commissioned research holds significant value. It primarily involves projects for government agencies and private sector partners. Such projects address specific practical needs that align with (the UEs) focus areas and often require flexibility, tight timelines, and defined deliverables. They offer the dual benefits of direct societal impact and additional funding.*

International collaborations are brought up as a way to increase the opportunities to receive European funding, which has been mentioned by many UEs as "key priority for the future":

To address this, (the UE) is working to strengthen its expertise in preparing international grant applications and exploring targeted support from LiU to enhance success rates in the EU funding landscape. By prioritizing these strategies, (the UE) aims to sustain and expand its funding base, fostering continued research innovation and societal impact.

During recent years we have increased the funding from the EU. Our experience is that you need many years of experience from such projects before you can apply successfully. It also takes a lot of time to prepare an application. The EU project we have been involved in is usually in areas where national funding is difficult.

Several UEs describe a situation where senior researchers have been successful in receiving external grants whereas it is much more difficult for junior researchers to become competitive.

However, this success also poses a threat, as it underlines our dependence on "soft" funding obtained by key senior researchers in the division. This situation creates uncertainty in funding for junior researchers (including assistant professors) and currently limits the division's growth.

Young researchers face increasing difficulty in competing for and consistently securing funding. In this context, smaller grants can serve as important stepping stones. However, these grants often require covering overhead costs, which can pose a challenge given the limited faculty funding available. All these issues have placed additional pressure on maintaining a steady flow of resources that are necessary to sustain our research.

One UE points out that the Junior Faculty at LiU enhances young researchers' chances of securing independent research funding by offering targeted career development, mentorship, and skill-building seminars. Through this support, early-career academics strengthen their research profiles and networks, increasing their competitiveness for grants.

Clearly, all UEs are aware of the disadvantages with the present relation between faculty funding and external funding.

Every year we run and participate in more than 70 projects and in most of them we have collaborating partners. Given the total external funding one can easily realize that many projects are relatively small and the total time for application writing, management, meetings and reporting make up a very large share of the project budget. The lack of faculty money makes this situation even more severe.

One aspect of this situation is that the more successful applicants are in attracting external grants, the more dependent they become on short-term funding since it is difficult, and perhaps also unwise, to redistribute large portions of faculty funding to those successful groups or divisions. Some ideas on how to deal with this

situation and what kind of costs can be covered by external and faculty funding, respectively, are presented in the panel reports but are of course also of outmost importance to discuss at all levels within the university.

4.2.6 Teaching related to research

Describe the evaluation unit's involvement in teaching at bachelor and master levels and how teaching is distributed among the staff (see also the data-package). How are the research profiles of the evaluation unit aligned with the teaching programmes at LiU.

We focus in this summary on the comments from the self-evaluations that are directly related to the interplay between teaching and research. It is clear from these comments that there is a lot to gain from having close connections between these two activities. Novel knowledge from research can be directly incorporated into teaching, primarily at the master's level:

> *Whenever possible, we incorporate the knowledge gained during our research into the course' content. We cover modern innovative approaches used to enhance the device performance that are outside conventional textbooks.*

This also give students an opportunity to see what it is like to do research, which can create an interest in continuing in academia. In this way teaching serves as a base for recruitment to doctoral studies at LiU. There are also existing study programs as well as ideas for future programs reported in the self-evaluation that show the direct link between research and teaching.

> *… we have ideas for developing a new program in Medical and Biological Data that could be implemented across departments and faculties.*

Commissioned courses, which are tailored courses that provide professional development opportunities outside of traditional academia, often cover themes directly connected to the research expertise at certain UEs. In this way, LiU expertise contribute to evidence-based practice to groups within the public and private sectors.

Research and teaching have a mutual impact on each other. Teaching contributes to the professional development of staff, enabling them to develop their own scientific as well as pedagogical skills through teaching. Student demand for certain methods has also pushed researchers to stay up-to-date with the latest technologies.

Just a few years ago, machine learning was a novel concept for (the UE) and for social science researchers more broadly. Since then, the staff has developed and introduced a new course on machine learning in social science and supervised master theses that apply these methods.

Students also contribute to research via master thesis projects supervised and examined by researchers. These projects quite often result in research publications.

Many master theses are close to our research projects and are sometime used to explore new interesting research ideas for which there is no funding.

(The UE) awards a prize to the best thesis on a topic of strategic importance for municipalities. This prize is also a way for (the UE) to stimulate interest and student engagement in local government research and become visible to students at LiU.

It is a well-known fact that the amount of teaching carried out by the staff varies a lot between different departments and research divisions at LiU (this situation is common for most Swedish universities). In areas where there is a good balance between teaching and research, we find comments in the self-evaluation such as:

There is a strong alignment between the research profile of the unit and our Bachelor's and Master's programs. Half of the teaching staff are active researchers, which allows us to incorporate and connect research outputs into our teaching, particularly in master's courses and during the supervision of bachelor's and master's theses. Many researchers teach courses within their areas of expertise. This synergy is one of our key strengths.

In some areas there is a lot of external funding granted, but less opportunities for teaching. This poses challenges for career development:

Moreover, only limited courses are available for teaching, which hinders the career development of young researchers since their promotion requires a large number of teaching hours.

Whereas for other areas, it is the other way around.

Some junior researchers, who have the potential to become excellent researchers, are often burdened with course coordination tasks and/or other administrative tasks which hinder or delay their research progress.

The panel reports have some recommendations on how to deal with these challenges, but this is by no means new to the university. Hopefully LiRE25 can stimulate new ideas that can help improve the balance between teaching and research.

4.2.7 Support functions

Describe the most important support functions provided by the different Organization levels at LiU which relate to your research: research funding, administrative issues, legal issues, internationalisation, communication, research ethics etc. What is functioning well, what can be improved. What is missing?

There is an ongoing debate in Swedish academia concerning various aspects of administration, one is about the increase in national regulations, another is about administrative systems that are difficult to manage and a third is about centralized vs. local administration and support functions. All these issues are brought up in the self-evaluations:

> *We do feel that during the last 10 years, many additional regulations, administration and administrative systems have been introduced… this has led to a substantial overhead in administrative work… and has reduced the time and resources for our core activities.*
>
> *In summary, the support functions we believe need to be less centralized and catering more to the specialized needs in different research areas, environments, and institutions to provide the support we really need.*

In general, however, the reports are quite positive about most of the support functions at LiU, not least about the local support at the departments.

Comments related to the Grants Office mention that they provide valuable assistance in preparing grant applications. This is particularly noted for applications to major Swedish funding agencies and EU projects.

> *Among central LiU support functions, the Grants Office is an exceptionally valuable asset. The legal unit that reviews contracts with industry and other partners is also competent and supportive. It is clear that they work hard to be responsive, but are understaffed, occasionally resulting in longer lead times than is desirable.*

While the Grants Office is helpful, some reports highlight areas for improvement. For example, more targeted support for junior researchers and improved support for larger EU applications.

The LiU library services are highly appreciated, especially for open access publishing and metadata optimization.

IT services are also in general appreciated but IT systems are described as user-unfriendly and unintuitive, with bureaucratic processes that can be inefficient.

Concerning communication several reports mention that the LiU website is difficult to manage and that "*researchers should be able to update their own pages.*" A need for more support in scientific dissemination and website development

to enhance public visibility is also requested. Limited external communication through the website and strict format requirements for collaborative research are seen as impractical.

4.3 SWOT analysis, comments and reflections

4.3.1 Strengths, Weaknesses, Opportunities and Threats (SWOT) -analysis and comments

As a summary of the self-evaluation, please provide a SWOT analysis based on your answers. List up to three (3) of the most important Strengths, Weaknesses, Opportunities and Threats, respectively, that the evaluation unit is facing at this point and comment on the likelihood of occurrence. Briefly describe the strategy to take advantage of or to mitigate each item.

This text is based on an AI generated [6] summary of the SWOT Analysis

Strengths:

- Diverse expertise and collaboration: Many units emphasise interdisciplinary research, strong international networks, and collaboration with industry and academia. Examples include robust industrial networks, interdisciplinary approaches, and proximity to clinical environments.
- High research quality: Units report strong publication records, external funding success, and impactful research outputs. Examples include high-quality publications and innovative research outputs.
- Unique research profiles: Several units highlight their specialization in areas.

Weaknesses:

- Dependence on external funding: Many units rely heavily on external funding, creating challenges for long-term planning and stability.
- Administrative and teaching burdens: High teaching loads and administrative responsibilities limit research time and productivity.
- Limited international collaboration: Some units report insufficient international partnerships and visibility.

6 The AI tool used is based on Microsoft Copilot

Opportunities:

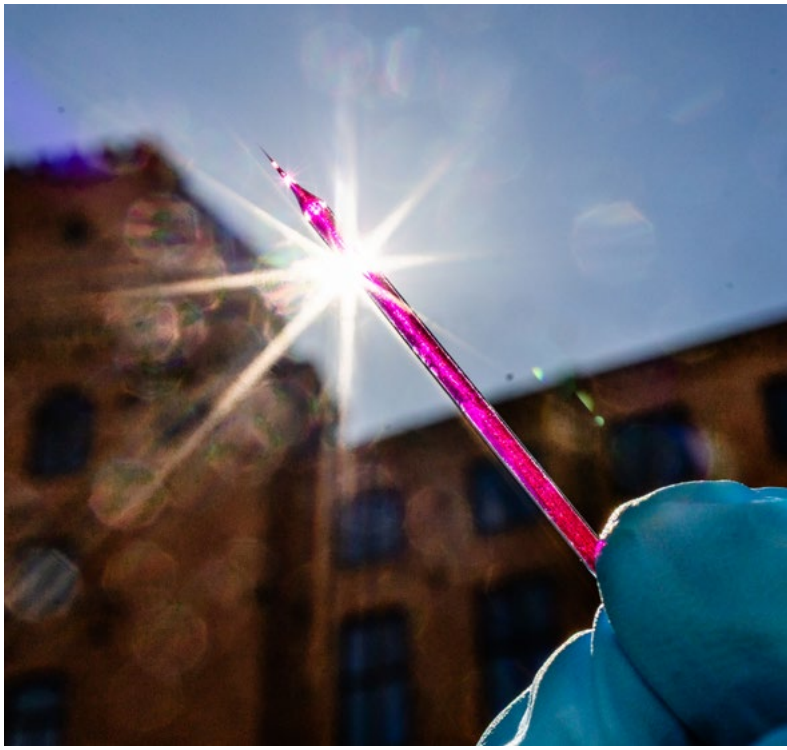
- Emerging research areas: Units identify growth potential in fields such as AI, sustainability, and precision medicine.
- Strengthened collaboration: Opportunities exist to expand partnerships with academia, industry, authorities, hospitals, civil society, international networks etc.
- Interdisciplinary Research: Many units see potential in leveraging their diverse expertise for multidisciplinary projects.

Threats:

- Funding challenges: Units face risks from fluctuating external funding, increased competition, and dependence on specific funding sources.
- Recruitment and retention: Difficulty attracting PhD students and researchers, especially in competitive fields, poses a threat to long-term capacity.
- Policy and economic changes: Shifts in government priorities, economic downturns, and administrative centralization may disrupt research activities.













5. PANEL REPORTS

5.1 Introduction

The 22 panels all have very valuable observations and recommendations related to the departmental, faculty and university levels, even though the focus of LiRE25 has been on the UEs and the quality of the research carried out. We would like to emphasise that LiRE25 in the way it is constructed is a ”bottom-up” evaluation, the panels’ observations and recommendations are largely based on input from the UEs via the self-evaluations and the discussions that took place during the site visits. The panel reports should be read and understood in this context.

The observations and recommendations naturally differ between the different divisions, departments, and faculties. Hopefully, it is made clear in this compilation of comments from the panels to which faculty the comments are directed. Furthermore, we have avoided explicit references to which department the panel’s comments relate to and concerning divisions (UEs) the comments are made anonymous. We strongly recommend the readers to go to the relevant panel report for information related to a specific department or UE. The LiRE25 office also stresses that we are not drawing any conclusions on our own and that we have done our best to cover all the topics mentioned by the panels.

5.2 Observations and conclusions related to the departmental, faculty and university levels

5.2.1 University

What is considered to be an issue for the whole university is up to the university management to decide, but there are several comments from the panels that obviously relate to this level. Topics that appear frequently in the panel reports are: funding, interdisciplinary science, recruitment, young researchers, organisation, university strategy, mobility, gender equality, internationalization and visibility of the university. These are by no means new or unexpected topics, they often appear in research evaluations both at the university level and at the national level. In fact, many of them are “typically Swedish” but are nevertheless important to consider also at the university (and faculty) level.

Funding: The lack of base funding is mentioned by many panels. This is common to most Swedish universities but, as has been pointed out by the Vice-Chancellor, LiU stands out as a university which has been very successful in attracting external funding but without any increase in the base funding. The panels noted that this leads to several negative effects among the personnel within the UEs:

lack of long-term visions, time spent on writing applications for external funding, stress etc. It also affects how research and teaching is divided among the staff, in particular in areas in which there are less possibilities for external funding and high demands for teaching. The following comment from one of the panels illustrates this situation:

> *Because there is a very low level of internal funding for research, positions are driven by teaching, while research time is so closely tied to external funding that it in many cases becomes equal to working on externally funded projects. As a result, academic staff without external research funding are left to focus primarily, or exclusively, on teaching.*

There is of course no easy solution to this problem but as pointed out by one panel, one way forward must be to live with the fact that external competitive funding is prioritized.

> *Given the Swedish Government's growing emphasis on competitive research funding, it is both timely and important that academic units consider how best to position themselves for success in this evolving landscape.*

Regarding external funding,

> *In most UEs there is a good culture of encouraging grant applications through dedicated institutionalised meetings or senior seminars. There are, however, complaints that the central grants office is of little help when support is needed for medium-sized and smaller grants, which are crucial since they can be the stepping stones for larger applications.*
>
> *There appears to be untapped potential for several units to engage more actively with applied and industry-oriented funding opportunities, such as those offered by Vinnova. While this was not consistently raised by researchers themselves, the panel recognizes it as a promising avenue for increasing external engagement and broadening the funding portfolio. Realizing this potential, however, will require more tailored and proactive institutional support.*

It is pointed out by some panels that European project applications often require text about the applying institution and that the university and each department should have an easily available text that describes the institution: The text should be regularly updated so that any numerical indicators (e.g., size, ranking) are up to date.

EU funding and ERC in particular- is mentioned as an underused potential:

Specifically concerning Horizon Europe, the evaluation panel noted that LiU do not appear to share draft versions of the work programs with researchers. …. Not sharing these drafts may put LiU researchers at a disadvantage as they miss the opportunity to prepare for upcoming calls in advance.

Organisation: Some of the panels bring up the university's organisation and comment that it is different from the usual line organisation. If this is a problem for the university itself, which has had this organisation since the start of the university, is of course a matter for the LiU management to consider, but to people from the outside it is obviously an issue:

The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU.

One panel suggested LiU should conduct an unbiased review of alternative organisational structures, emphasizing research priorities and collaborative efforts. Their impression was that the current structure is seen as more conducive to teaching than to research.

Interdisciplinary science is brought up by many of the panels. Even though LiU has a strong track record in this aspect, the panels find that there is room for improvement and new initiatives to remain a leading university in this aspect.

There are several interesting suggestions related to interdisciplinarity. Joint supervision of PhD students across different research units has been mentioned as an effective way to further enhance collaboration and interdisciplinary exchange. Also, the internal organisation within and between departments could be brought up for discussions to stimulate interactions between different research areas. Three explicit suggestions worth mentioning are:

There is significant potential synergy to be gained by fostering true interdisciplinary collaboration, not only between clinical and basic science researchers, but also by involving experts in technology, artificial intelligence and the social sciences. This broader approach to collaboration could lead to more innovative research outcomes, cross-fertilisation of ideas and a more holistic understanding of complex scientific challenges.

While examples of informal cooperation and joint applications exist, structured mechanisms to promote interdisciplinary work remain limited. Encouraging greater interaction, particularly among groups with overlapping or complementary interests, would enrich the research environment and may foster new and innovative directions.

A comment worth discussing in relation to interdisciplinarity and PhD education is:

While senior researchers highlighted the strength of interdisciplinary environments based on the way different disciplinary perspectives are brought together to solve complex problems, most of the current PhD students seem not to be encouraged to maintain a connection to their original disciplinary background. Instead, the focus is placed almost exclusively on the interdisciplinary framework of the research unit. We wish to raise a concern about this approach, while also recognizing that it may not be equally relevant for all students.

Some panels express a concern among certain UEs that the humanities are becoming more peripheral in the university. If this is indeed the case, one panel notes, it would lead to a significant loss of interdisciplinary potential at the level of the university as a whole and would weaken its research output and its prospects.

One of the most frequently mentioned issues is how LiU takes care of **young researchers** (**postdocs and later**). As mentioned by the panels, the responsibility for young researchers belongs, in different ways, to all levels in the organisation of the university. It is a general conclusion that there is a potential for LiU to focus more on developing high performing researchers by nurturing talented post docs and early career researchers. To some extent, this is related to the funding situation mentioned above but there are also other comments made concerning coaching young researchers to establish a successful academic career. The following comments from the panels illustrate these two aspects related to young researchers:

The panel sees a clear opportunity to further support early-career scholars through the provision of structured start-up packages. These should ideally include protected research time, modest seed funding, and the possibility to recruit one or two doctoral students or a postdoctoral researcher.

In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups assistant lecturers may start without any financing.

And

Many reported a feeling of largely being left to themselves in the early stages of their employment, particularly when trying to understand how the "system" works and what is expected of them. Therefore, the evaluation panel recommends that LiU initiate a process to develop a structured onboarding program, adaptable to various staff categories.

There are several comments related to how young researchers with an interest in an academic career are informed about the different career stages, their timelines, and promotion criteria. It is also mentioned that special attention should be paid to researchers from abroad concerning how the Swedish academic system works.

The panel recommends that LiU establish systems and structures for early-career development, including mentoring programs, to support junior scholars in building sustainable academic careers.

University management, in collaboration with senior principal investigators, should … actively promote a culture where mentoring and career planning is recognized as a core responsibility of senior academic staff.

And more specifically

New junior faculty members should be given more time for research in their first 2–4 years at the university, and their teaching load should be increased gradually, starting from, e.g., 0% to 20%.

Several panels also mention tenure-track positions with a clear signal that these positions should be for those that already have shown potential to become competitive research leaders (ERC potential was mentioned by one panel):

We don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy.

It is recommended that the university considers establishing a tenure-track (or similar) system in order to attract and retain the faculty with the best potential.

Tenure-track positions could be a recruitment instrument that the faculties are responsible for, but we understand from the comments that the university is recommended to develop a framework for these positions and also to contribute to financing in order to spread the positions to include, for instance, all profile areas.

There are a few comments related to **recruitment and mobility** of researchers. There is a concern among the UEs that the recruitment process takes too long time and that the research divisions (and the departments) are not enough involved in the process. Our impression is that the panels, to a large extent, understand the reasons for leaving the responsibility for recruitments to a higher level in the university hierarchy but, nevertheless, there are a few suggestions for changes:

LiU/Faculty reconsider the process for recruitment, to speed up the process, and include more involvement of the Department/Division/Unit in the hiring process, especially the selection of preferred candidate.

The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'in-crowd'-hiring and conflicts-of-interests in the whole process.

It is noted by several panels that the mobility of researchers is low at LiU.

Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale.

The consequences are expressed as a lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research. One panel expressed their impression that recruitment favours the "home-team" of postdoctoral fellows who have obtained their PhD in or around Linkoping. Another panel commented that the entities evaluated have not all succeeded in reaching out to global talents and making competition on an international scale a top priority in hiring.

A recommendation from one panel is to initiate mobility in other ways:

Since internal recruitment is highly common at LiU, and probably also will be in the future, a core focus should be on ensuring that the researchers obtain international experience to improve their career paths and assure high performing research.

And also, in relation to international recruitment:

The university does not have systematic support for dual careers when researchers recruited to the university have spouses who also seek employment in Sweden.

The **university's strategy and profile areas** are mentioned in several panel reports. In general, the panels impressions seem to be that there is a gap between the overall strategy of LiU and the research activities within the UEs. One panel formulated this as:

However, this grand university vision was not really diffused into the presentations of the individual research units that were assessed. Their research activities and ambitions were seldomly positioned in the bigger picture as established in the general presentation. Therefore, there seems to exist some 'disconnect' between the top-down strategy and the bottom-up aspirations.

One panel noted that the researchers' knowledge about the LiU profile areas is vague and instead, mainly because of the dependence on external funding, much activity seems to be based on "tacit knowledge, short-term opportunities, or reactive responses to immediate needs".

It is recommended by the panels that the university considers how to communicate to its staff, how the vision and strategies can be fulfilled. It is necessary for the university's vision and strategy to be owned by the entire university.

> *Furthermore, in the next round of strategic work, the university is recommended to implement a more robust planning process at all levels to ensure that the research objectives are clearly defined and anchored.*
>
> *By prioritising research-focused Organizational structures and encouraging interdisciplinary collaboration, the University can create an environment more conducive to high quality research and innovation.*

One specific recommendation is for LiU to:

> *Developing a language and conceptual understanding for a LiU-wide shared framework for strategy and development, to be implemented at the level of departments and divisions.*

One panel suggested a kind of bottom-up approach in relation to strategy work which we believe is worthwhile to consider from the university leadership:

> *In more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.*

It is also recommended that LiU becomes clearer on defining what is considered "good research" and use this definition to guide the development and implementation of a clearer and more transparent incentive system for developing good (or excellent) research. One panel mentioned CoARA as an example that could be used in this context. In addition to bibliometric data, societal impact, technology transfer etc. are brought up by the panels as examples of research outputs that can be used to define "good research".

> *We are also worried that the lack of attention to societal impacts in the evaluation documents reflects a managerial bias towards bibliometric indicators in research evaluation and strategies in general but hope that it is not the case. This could be a general concern for the entire university. One remedy might be using AI for collecting and summarising other forms of impact.*
>
> *The evaluation panel recommends that LiU develop and share clearer guidelines on how societal impact is defined and measured at LiU.*

Research infrastructure: Most comments related to research infrastructure appear in the UE specific section of the panel reports. At the more general level there is one recommendation to create an infrastructure roadmap for expensive equipment and the creation of infrastructure platforms where equipment and technical staff for support can be made available to a broader group of users. One panel noted that:

> *The university's excellent infrastructure in fields such as artificial intelligence and materials science presents valuable opportunities for innovation at the interface of disciplines.*

Concerning already centralized facilities that depend on qualified technical staff one panel commented that there is no specific career path for such staff.

> *The Review panel recommends that good working conditions and attractive career paths are established for this category, to assure that the infrastructure facilities can recruit and maintain highly skilled personnel.*
>
> *The Principal Research Engineer group in general possesses a significant body of laboratory and theoretical knowledge and are also engaged in teaching. A route for them to merit themselves for the Docent title, would be of value for them to be able to supervise PhD students and serve on various panels. Notably, the University would also benefit from their services in functions where Docent competence is required.*

Gender equality: Many panels brought up gender equality in their reports. Not surprisingly, it is noted that women are underrepresented among researchers primarily in engineering subject areas, but it is also mentioned by panels evaluating medical sciences. Good examples are also mentioned:

> *The panel noted encouraging individual efforts, such as the Women in Information Coding Theory workshop recently organized by (NN). Initiatives of this kind are commendable and serve as valuable examples of how targeted activities can raise awareness and promote inclusivity within specific research areas.*

There are several valuable recommendations such as: dedicated programs and directed funding initiatives for female researchers, promoting role models, efforts in relation to recruitment and activities that begin before students enter university. The LiU gender equality plan was also mentioned:

Only after the panel's dialogues with researchers did we learn of the existence of a Gender Equality Plan for Linköping University (dated November 2024). That none of the divisions mentioned this plan and how it can be used for promoting gender equality, indicates a lack of awareness and implementation. The panel therefore recommends that LiU intensify efforts to disseminate and integrate the Gender Equality Plan into the university's daily operations and culture.

Research ethics: There is a variation in how research ethics was addressed in the panel reports. It was emphasised that research ethics should not only be a matter of compliance but also a visible and integrated part of academic culture. This requires strategic leadership, practical support and continuous dialogue across all levels of the university. There were comments concerning a lack of a coherent and university-wide strategy. At the LiU level, a panel recommended that LiU establish central responsibility for promoting ethics and integrity. Another panel recommended:

Communicate a collective framework for professional ethics and socially-safe collegial communication and collaboration.

At the department level it was recommended that:

The department could also support the divisions in other ways, for example by providing funds for ethical review.

There were also observations from impressed panels that highlighted the workplace culture:

The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Visibility, communication and web sites: There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities.

The university's intranet is frequently described as difficult to navigate, making it harder for researchers and students to access essential information and services. To give an example, it could be made easier for researchers to update information regarding their research groups.

One panel recommends that the communication service should focus less on giving advice about how to communicate and more on doing the actual communication. Another panel mentioned that the central service should collaborate more

closely with the research units to develop a wider range of what research communication means.

The is a strong consensus among the panels that LiU needs to support new forms of, and platforms for, research output and scientific communication for various stakeholders and audiences. This is important considering societal impact and public engagement. It is noted that this requires a strategy as well as practical, infrastructural, and financial support. Experiences and accomplishments in this area also need to be considered as part of individual career development.

Internationalization: As mentioned above there are several comments related to the limited (international) mobility among the LiU staff. Internationalization and mobility are closely related and initiatives in increasing the international cooperations will most certainly also affect the mobility.

To raise LiU's international profile, there is a suggestion from one panel to implement a visiting professorship program (20% positions) to expand international networks and enrich the academic environment. Another panel recommended LiU and/or the departments to establish a fund to foster international collaboration (competitive).

> *We stress there is value in short visits to gain exposure to a different research culture, start to build collaborations and opportunities to refine competency in academic English.*

In the context of internationalization, the European collaborations as well as EU funding was mentioned by several panels:

> *In addition, there is a timely opportunity to enhance institutional preparedness for participation in European research programmes. Departments may wish to initiate internal discussions on current challenges and opportunities, share successful practices, and explore the potential for joint or cross-disciplinary applications.*
>
> *Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.*

5.2.2 Faculties

Many of the observations and recommendations presented above as belonging to the university level are also relevant for the faculties to consider but some of them are clearly relevant for a particular faculty. These are presented in this section.

There are a few recommendations related to resource allocation. The following two quotes are from panels evaluating UEs belonging to the **Faculty of Science and Engineering**, but we believe that they could be of interest also for other faculties:

The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE25, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles.

More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more 'insecure' times?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.

The important relation between LiU and Region Östergötland is brought up by all panels evaluating UEs belonging to the **Faculty of Medicine and Health Sciences**. Since these two organisations are involved in many of the medical research activities together, clearly defined responsibilities and transparent decision-making processes are considered very important. Several panels noted that there is room for improvement in this respect.

In light of increasing financial constraints on both sides, it is essential to establish formal agreements between university and hospital management that guarantee protected research time for clinician scientists. This is particularly essential in cases where third-party funding has been secured. In such instances, the availability of clinical substitutes must be ensured to prevent disruptions in research, because the clinician scientist always will have -for ethical reasons- to give priority to patient care. The review panel strongly recommends that this issue be prioritized by university leadership.

We recommend LiU consider a joint strategy with the region and make more joint appointments. This should address strategic areas of focus for research as well as arrangements for increasing workforce capacity and capability, in collaboration rather than competition.

Digital technologies have been brought up by panels evaluating UEs belonging to **the Faculty of Arts and Sciences**,

Given the strong technological and IT focus of LiU, we were surprised that none of the UEs which do empirical work has plans to develop in the area of digital humanities.

On the positive side, several of the UEs at IKOS contribute to research on new digital technologies and on the conditions and consequences of digitalization (AI, human-robot interaction).

Most of the research within the **Faculty of Educational Sciences** has been evaluated by one panel (panel T). They are in general very positive concerning the re-

search quality and the research culture. One observation concerning funding and recruitment is worth mentioning:

> *… smaller units struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.*

The panel also observed that UEs are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding).

In order to make room for more research, and in such a way facilitate recruitments, the panel's recommendation is to increase stability in resources for research, and in supporting opportunities for (international) research cooperation.

Relevant recommendations to all the faculties at LiU concerning PhD: The importance of creating a stimulating environment for PhD students has been mentioned by several panels and applies to all faculties. Especially at divisions with a small number of PhD students, there is a need for broadening the activities within departments as well as between departments and beyond. For example, it is required that a cohort is formed for which courses, seminars and other things can be offered. Another recommended measure is to increase the number of doctoral students in certain areas by improving the conditions for funding:

> *The Review panel proposes the introduction of a PhD program at the Medical Faculty of Linköping University, where partial support for PhD salary is provided by the faculty and the remaining salary and costs are covered by the supervisor.*

Another recommendation from a panel evaluating a UE within the Faculty of Arts and Sciences is:

> *A stronger link of PhD positions to research projects through external funding would also avoid the presently huge spread of PhD topics and would increase the fit between PhD projects and the supervisors' areas of specialization in research.*

Also, collaborations with other universities are a good way to be able to offer more PhD courses and to help PhD students build networks within their area. Intensive courses could be considered to make such collaborations more efficient in terms of travel. Joint supervision of PhD students across different divisions could serve as an effective way to further enhance collaboration and interdisciplinary exchange.

This observation has been made in relation to a UE within the Faculty of Science and Engineering:

While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research.

The review panels encourage further integration into relevant research groups by, for example, promoting the interaction between clinical doctoral students and university-employed research group members. Furthermore, providing a physical location within the current institution for clinical doctoral students during their research periods would provide better opportunities for focused research work and training in laboratory techniques. Introduce a program to make it possible for clinical PhD students to start their research training at an early stage.

One panel recommends that LiU initiates a targeted evaluation of the current organisation of PhD training, including the feasibility of developing more attractive consistent conditions for both internal and external, including international, PhD candidates.

Also, the course requirements for PhD students are brought by several panels. It appears that these requirements differ quite a lot between faculties. It is therefore hard to draw definite conclusions from the panel recommendations. These two comments, the first from the Faculty of Science and Engineering and the second from Faculty of Medicine and Health Sciences illustrate this:

The panel further believes that the course requirement (100 credits) for PhD students in mathematics is too high (e.g., higher than at the panel members' departments) and should be decreased by a significant amount.

The course content is found to be more relevant to clinical PhD students, e.g., in the ethics course. It is our recommendation that the compulsory courses are reviewed and modified to suit both clinical and preclinical/ animal research. Two course variants could be given, or alternatively, both research tracks covered within the course(s).

5.2.3 Departments

Most of the observations and recommendations of relevance to the departments are contained in the part of the panel reports dealing with the UE. Several of the issues raised above in this report are of course also relevant to the departments. In this section, we would like to mention one issue in particular that was raised by several panels. It is about the department's internal organisation and the sense of identity and belonging to a particular department. The two quotes below illustrate this issue. However, there are similar comments also from panels that evaluate UEs at other institutions, which is why we believe that these observations and recommendations are important to consider for all departments.

From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research.

Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs... Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.

Some panels also brought up the lack of interactions between colleagues from different units and divisions. This is an observation that we think is relevant for the management of the divisions and departments to consider.

Finally, as already commented by the UEs in their self-evaluations, we would like to further emphasise their appreciation of the support that the departments provide by the following quote from one of the panels:

It is worth emphasizing, however, that many researchers spoke highly of the administrative support provided at the departmental level. This support was described as efficient, accessible, and highly appreciated.

5.3 Observations and recommendations related to the evaluation units

Here we present findings from the sections in the panel reports related to the UEs. Several of the panels' observations and recommendations that are listed in these sections also appear in the panel reports on "General observations" and have already been presented in section 5.2 above. The aim of this section is instead to highlight observations and recommendations that could be of interest to other UEs than that for which they are primarily aimed at. Hopefully this could give new ideas and inspiration also across disciplines. In addition, since the faculties have the prime responsibility for research quality at LiU, we believe that the observations and recommendations presented and discussed here will be valuable also for them.

The panel reports show that the quality of research at LiU is generally considered to be very good and in many cases excellent. The following quote, which was included in the section "conclusions" in a panel's report, summarises what can be read in many of the reviews in the three evaluation areas, research quality, research culture and conditions for research, that have been the focus of LiRE25:

> *(The UE) could serve LiU as a research pilot in many respects, in its interdisciplinary breadth, its publication strategies, its funding strategies and its international research education. The research culture is outstanding and very encouraging for junior scholars as well as for the new PhD students. The institutional conditions for research work are satisfactory but not excellent: secured research time is at minimum, and the service systems seem to be too far from active researchers and research teams.*

And in relation to LiRE25:

> *It was apparent that the evaluation had been discussed in detail at the division, where many had contributed input at various division meetings and at a dedicated brainstorming session. We see the good working climate as an additional major strength of (the UE).*

As can be seen from the quotes above, we have removed the explicit reference to which UE the quote relates to. This procedure is also followed in all the sections below. We assume that the panel reports have been carefully studied by both the UE itself and by the host department, ensuring that the specific recommendations will be considered by those most concerned. We also leave most of the quotes uncommented. This follows from the overall purpose of this report, namely, to present the panel reports and avoid adding our own views on the issues brought up in the evaluation.

It is also clear after reading all the panel reports that the observations, and therefore also the recommendations, differ quite a lot between UEs belonging to different faculties. In some cases, we are explicit regarding which faculty the discussions relate to.

5.3.1 Research quality

The following quote could serve as a general introduction to the discussion that will take place at the UEs following LiRE25:

> *Both the self-evaluation and the discussion described a 'focus on performing the best possible science'. However, the best possible science lacks a constructive definition, and it is unclear how the best possible science would be achieved and assessed within the unit. We encourage the UE to define what this means in practice—clarifying the standards, methods, and benchmarks by which scientific excellence is assessed internally.*

Many panels stress the need for a strategy for the research carried out. Some divisions already have one, which is applauded by the panels, but in many cases the panels encourage further efforts in this respect:

(The UE) should make a concerted effort to identify, articulate, and discuss the societal impact and the novelty of your research. This will make it easier for everyone – from doctoral students to senior researchers – to clearly communicate the value of the research, both within and outside academia. Many interviewees found this a challenging task, so more collective reflection and dialogue may help.

We believe that this recommendation could stimulate discussions in divisions as well as at the department level.

Criteria for prioritization have also been addressed by the panels:

We suggest collaboratively establishing a research strategy that outlines key research profiles and methodological areas to prioritize in the future. These focus areas should be well-supported by a critical mass of researchers, enabling effective project execution, PhD supervision, and contributions to teaching activities within the field.

The balance and possible tension between basic and applied science and purely scientific merits and (societal) impact merits are discussed frequently by panels related to all faculties. Of course, this balance is highly dependent on research area, which favours one or the other approach. However, they can also be combined as illustrated by the following quote:

The unit excels in both of its functions: its research output is regularly of high quality and high impact and its societal output is outstanding. In the development of this dual strategy, the practices of peer-mentoring and peer-facilitating established in (the UE) seem crucial.

But also cause challenges as illustrated by this quote:

A focus on applied research, while attracting significant resources and ensuring relevance to real-world problems, may potentially shift the balance away from basic studies that address the division's long-term fundamental research interests. The division is aware of the challenges and has sensible plans for dealing with them.

The direction of research might also be related to funding and is therefore also an important task for the faculties to consider.

Since LiU's system for allocating internal funding promotes peer-reviewed articles in high ranked international journals, there is a risk for a tension between what is expected and valued from LiU and what the unit sees as their main channels of communication.

However, there is a general perception that impact is undervalued in Sweden, and a strategic focus on articulating and measuring societal relevance is still emerging. Visibility outside academia remains an area for development, particularly in aligning research agendas with healthcare system needs and community engagement.

A recurring theme in several of the panel reports is collaboration. The panels observe a lack of collaboration within many of the divisions but also stress that the research quality could benefit from more collaborations within the department as well as within LiU.

While the division has produced impactful research, the research quality could be further improved if a stronger alignment is created across the division in terms of research ambitions and what should be the specific future research targets for the division.

Our main recommendation is to increase cooperation within and outside the division and to focus effort on the most promising research questions. Such cooperation and concentration of forces could lead to an increase in high-impact publications and support PhD training.

Much of the research collaboration across units at LiU seems to depend on personal relationships, making it harder for the junior researchers to establish cross-unit cooperation and become part of grant applications.

Panels also point out the importance of international collaborations for research quality as well as in relation to recognition of the research and the possibilities for EU-funding:

Investing in the unit's international brand will increase the chances of high-end recruitment. The panel suggests that the unit invests more in marketing their research internationally. To increase their international network, the unit may want to prioritize/enforce international visits for PhD students and early career researchers. Also, the unit may want to encourage international visits at the unit.

Concerning how the research is performed, by individuals or in teams, there are strong recommendations toward the latter:

… community continues working in projects teams and reinforces their collaborative activities despite the trends towards more individual-based research procedures. This will ensure that the research becomes even more innovative, of higher quality, and less individually burdensome for the individual UE researcher.

5.3.2 Research culture

COLLEGIAL ACTIVITIES

The opportunities to exchange knowledge and experiences with a UE as well as at the department level was brought up in several panel reports. Not surprisingly, the main conclusion from review panels is that challenging and critical seminars are an important part of a dynamic and lively academic environment. Also, the possibilities to interact with researcher from different but complementing research fields is mentioned as important.

Many panels observed that seminars are popular among the researchers and well attended and that seminars are perceived as an important component in building a common identity and in keeping the UE together. But there are also comment which raises some concern about attendance:

> *However, there seems to be a post-pandemic effect where the seminar culture is not as strong as earlier. Given that learning is a research area in the group, there are opportunities for innovative and creative development of formats and methods for academic interaction.*

The following observations made by the panels related to three UEs are also worth mentioning in the context of collegiality:

> *…. grant writing retreats have previously been productive and securing resources for them would be beneficial especially for PhD students, early, and mid-career researcher staff dependent on external funding.*
>
> *… secure the continuation and development of the excellent peer-counselling practices that it has established for production of publications, PhD theses and applications for research funding. LiU should support and reward such peer-counselling work. Namely, specialized peer-counselling is crucial to the university's and rectorate's aims of excelling in research.*
>
> *Being a rather small unit, the unit relies heavily on collegial management and responsibility. Such an Organization entails a vulnerability, because if the culture bearers leave for one reason or another, there is no default structures to rely on. It relies on the good will of faculty members as there seems to be no incentive structures to support those "taking one for the team". The unit could consider how more formal structures around the organization could make it less vulnerable. At the same too formalistic structures should be avoided as they will not create value and may even be counterproductive.*

PUBLICATION STRATEGIES

It seems from the panel reports that many divisions do not have a clearly defined publication strategy. Most panels emphasise a publication strategy which focusses on "quality instead of quantity" and publication that maximize the scientific impact:

> *At all levels in the unit, from PhD students to professor, the publishing credo appears to have evolved from "get published" to "aim high and impact on society", which the panel wholeheartedly support.*

Where to publish is another issue brought up by several panels, again with recommendations related to impact and visibility:

> *(The UE) is working in a specific research field with specific intellectual traditions and sources for publishing and must consider such societal relevance in their publishing. We agree with this statement but add that there is a set of journals that are indexed in for instance Web of Science that could be of relevance.*
>
> *The unit produces a healthy volume of publications, but a substantial proportion appear in lower-impact journals such as PLOS One and Scientific Reports. While these journals ensure accessibility and broad dissemination, there is a concern that they may not sufficiently enhance the visibility and prestige of the unit's research nor reach readership in relevant scientific communities.*

The balance between publishing textbooks and journal articles is discussed frequently by the panels reviewing UEs from the Faculty of Arts and Sciences:

> *Two-thirds of the publications consist of books and book chapters, while one-third are journal articles. It is suggested both in the self-evaluation and the interviews that reversing this ratio would be desirable.*

In some areas within the Faculty of Science and Engineering the discussion instead relates to the balance between journal and conference publications:

> *Furthermore, the self-evaluation report states that many conference papers are apparently not registered in the bibliometric analysis. This may pinpoint the importance of establishing firm guidelines for when a conference paper can be classified as a research output and can be registered. It might also mean that there is potential for taking conference papers to the next step – publishing in good international peer-reviewed journals.*

It Is also clear that many of the panels recommend that the UEs should focus on an increase in publications co-authored with international colleagues and to target a greater range of international journals.

It has been observed that the unit's international research network is not yet sufficiently broad or strong. Consequently, there is a need to expand international collaborations to increase the number of internationally co-authored publications.

RECRUITMENT

The panel evaluating one of the (in many aspects) most successful divisions at LiU made the following observation:

They have been very successful in hiring very good PhD students although it has been very hard to get good candidates from Europe especially from Sweden…. (The UE) does not recruit senior staff (with few exceptions) since it is difficult to compete financially with other national and international institutions! To overcome this difficulty (the UE) established an overall system to hire young researchers early in their career and help them to develop into rising stars for further evolution within the division or elsewhere.

Several other panels also emphasise the importance of recruiting young researchers and also taking good care of them:

Targeted recruitment could strengthen the research aspects of the unit. Having said that, the panel found that strategic views presented by a junior member of (the UE) are quite impressive, and any external recruitment should be balanced with giving current junior staff room to grow into more responsible roles.

The notion of younger researchers (BULs) having somewhat less teaching and more time resources for research is good for developing an academic career.

There is a need for a formal research mentoring system in which more experienced scholars have clear responsibilities in relation to junior colleagues. This would help maintain the motivation and professional development of early career researchers.

One panel note that it is essential that the university take timely action to secure continuity, either through the appointment of a suitable replacement or by identifying and supporting emerging leaders within the existing group. This will be crucial to preserve and build upon the strong foundation that has been established in many of the divisions.

Panels also recommend the division's research strategy plan to be combined with a long-term strategic personnel plan that outlines clear pathways for recruitment, career progression, and succession planning across all academic levels.

How the lack of long term (faculty) research funding is related to the possibilities to recruit highly qualified researchers was brought up in section 5.2. The following quote represents a serious problem in certain divisions (departments):

> *(The UE) has faced significant recruitment challenges which have had an impact on the research time of existing members of staff. Moving forward, new positions need to offer a more desirable balance between teaching and research time in order to attract suitable candidates. In addition, creative strategies are needed to consider how teaching can be organised to liberate time for research for existing staff.*

One panel noted that some divisions had been advised by the faculty to focus on employing postdocs rather than doctoral students, and to exploit the possibility to pay postdocs with a non-Swedish PhD degree two years of stipend and then exchange this postdoc for a new postdoc. The recommendation from the panel is against such strategy:

> *If this is a generally applied strategy, we find that this is not a productive strategy for supporting excellence in research. It also raises concerns about its impact on the university's long-term research capacity, the quality, and continuity of the scientific work, and the career development of the individuals involved.*

Panels, particularly in the fields of engineering sciences and life sciences, have observed that the there is a considerable predominance of male researchers at the senior scientist's level. This is partly caused by recruitments back in time, but it is also noted in some cases that:

> *The recruitment procedure described, e.g. announcements, interviews, etc., is state-of-the art overall. However, it is very surprising that gender aspects do not seem to play any role. As a severe underrepresentation of female researchers affects any research environment, this aspect has to be taken seriously.*

There is a marked difference among divisions concerning in-house, national and international recruitment. In some cases (see also section on PhD education below) the international recruitment is too dominating in other cases the panels observe a lack of external competences joining the research teams. The latter case is considered as an obstacle to developing different aspects of research:

> *The division intentionally promotes its own students to the senior scientist positions. This recruitment culture in part hinders diversity, mobility, and coherence in research.*

INTERDISCIPLINARITY

Clearly, the panel regards LiU as a university which has been, and still is, a leading university for interdisciplinary research and there are several examples of excellent interdisciplinary science highlighted in the panel reports.

One panel made the following recommendations related to areas that could benefit a lot from collaboration across disciplines:

> *collaborate more closely when writing grant applications and manuscripts in order to simultaneously address (i) critical biological/clinical questions with major health implications, (ii) cutting-edge imaging methods, and (iii) advanced analytics, multimodal data integration and -visualization, whether they target a technical or biological audience.*

The interplay between disciplinary and interdisciplinary approaches is brought up by a few the panels. It has been noted that there is a potential challenge in being part of an interdisciplinary research environment while fulfilling disciplinary criteria and demands associated with PhD education, dissertation and a future academic career.

> *On the one hand, this scope is impressive and offers a wealth of intellectual resources. On the other hand, this complex knowledge ecology presents challenges regarding how to utilize and integrate these resources effectively. Moreover, the situation may hinder the development of a shared professional identity. Some suggested to us that they could be 'un-disciplinary', but the implications of such identity remain unclear.*

In order to deal with this challenge, it is recommended that the researchers reflect on how they practice interdisciplinarity, particularly regarding knowledge integration practices. Such reflection could facilitate a further strengthening of the research practice and enhance the competence to engage in such collaborations.

PhD EDUCATION

It is encouraging to read the panels' observations based on the discussions with doctoral students. According to these observations, the doctoral students are consistently very positive about how the education is conducted. Of course, there are things to improve, but they are usually linked to each department's special conditions, and we will not go into details in this compilation except for one more general observation regarding how doctoral students are prepared for professional life after their dissertation, which is illustrated by the following two quotes:

> *We recommend that the future recruitment of PhD students (including industrial PhD students) be subject to a strategic discussion, and that a plan to mitigate the threats is formed.*

The group leaders are clear when communicating career perspectives with PhD students and junior staff. This has led to excellent careers with international exposure and independent research. It also prevents misunderstandings about everyone being able to spend their entire career at LiU.

Several PhD students reported having chosen to write a monograph dissertation instead of a compilation of articles. This has been commented by two panels evaluating divisions belonging to the Faculty of Arts and Sciences:

While this is a legitimate format, it has become increasingly uncommon in many academic fields. The ability to write academic journal articles is a key skill for researchers, and publishing articles during the PhD period can provide valuable peer review and strengthen competitiveness for future academic positions. Despite this, some of the PhD students may not have had a clear discussion with their supervisors about the potential implications of choosing a monograph format over a compilation thesis.

and

However, we got the impression that PhD candidates were insufficiently aware of the advantages of writing articles in the current academic labor market, where there is a strong preference for journal publishing and thus for candidates with demonstrated skills in writing articles.

COMMUNICATION, DISSEMINATION

There are relatively few observations and recommendations related to science communication in the panel reports. Instead, most of the panel comments relate to science impact which was discussed in section 5.3.1 above. It is clear, however, that the panels see communication as an important part of research and also an activity to make the division visible:

Improve visibility of applied policy relevance and interdisciplinary links in future reporting and communications. Clearer positioning—internally within the department and externally through communication and web presence—can help ensure that the new areas complement and strengthen the existing research identity.

Spending time articulating their impact outside of academia (i.e. what difference they have made) would enable them to demonstrate their importance to industry funders and may lead to more industrial PhDs and industry funding.

There are several comments related to an observed lack of a clear strategy on how to develop dissemination skills:

To strengthen the popular dissemination of its research, we recommend that the unit develops—with support from LiU and units that are successful in popular dissemination—a dedicated strategy and concrete measures for communicating with industry and ministries.

There is also a discussion related to publication of manuscript intended for an academic circle of readers versus non-academic stakeholders:

… interviewees emphasised the importance of also producing publications for educational use (e.g., textbooks) and for non-academic target groups (e.g., reports), something the evaluation panel strongly agree on.

5.3.3 Conditions for research

FUNDING

The limited base funding from the faculty is brought up by most panels. Their reports are not fully consistent with each other even in relations to UEs belonging to the same faculty.

The faculty should reconsider its university-immanent allocation systems in light of all research output, and not just the output that is easily measured by ready-made standard (e.g. the Norwegian system).

Reconsider the resource allocation model to better support units with high research performance and societal impacts in a transparent manner.

The Organization of faculties and departments at LiU appears difficult to navigate, and the interviews revealed several ambiguities — particularly concerning the performance-based elements of funding. The explanations given at faculty and university levels differ from the way these matters are understood at the unit level. As a result, the effects of the funding system may not be clearly perceived by senior staff at the unit level.

Recommendations point at the divisions as well as at departments and faculties:

to mitigate pressure and reduce stress among junior and mid-level researchers, it is recommended that (the UE) and the broader faculty develop mechanisms for stronger internal financial support. Providing base funding or seed grants would help early-career researchers maintain research momentum, particularly during gaps in external funding.

Here are a few examples of observations and comments from the panels about how (faculty) funding is used:

The research environment has chosen to allocate faculty funding to hiring PhDs rather than to giving a fixed percentage of research time to the faculty. This puts extra pressure on the faculty to apply for external funding.

It was also expressed that recruitment and retention of junior faculty with excellent potential have been financially prioritized, which we find to be a very important strategy for continued scientific excellence and attractiveness of the research environment.

(The UE) has decided to grant all senior staff a base of 20% research time, as a strategic decision to enhance the research quality. A consequence is that less faculty funded PhD positions have been offered.

We believe that these examples could serve as a basis for discussions regarding funding strategies both within divisions and at other levels in the university's hierarchy.

There is a large spread in the external funding available at the divisions. To some extent this depends on the research subject, in some areas there is more external funding available than in others. However, the degree of external competitive funding is of course also strongly related to the research quality at divisions and research units which was also discussed above. The following quote presents some ideas how to improve the external funding:

Although funding for smaller projects has been obtained, larger applications (e.g., VR) have been unsuccessful, highlighting the need for an internal review process before submission and having access to a shared database of successful proposals. Also, better inter-division collaboration, encouraged by the department, would be beneficial despite internal competition.

With regard to the high degree of external funding, there are also concerns regarding the academic freedom and the fact that the research becomes too project oriented:

Prioritize cohesion: Make sure that the success with external funding is not deteriorating core academic functions and research culture.

The lack of basic funding and the need to run a continuous stream of externally funded projects is an accepted fact of life for those who aim for an academic career at LiU. The project-oriented approach does, however, limit the ability of research groups to focus efforts on a promising problem when one is found or to form a joint strategy on the division level. For postdoc researchers and PhD students, the funding source determines their research topic and collaborations, which can limit their development.

A majority of the panels also express concerns regarding underused possibilities for EU funding. This quote expresses this in a positive way:

There is an opportunity for this unit in seeking EU funding. We believe that the research unit is a very attractive project partner in European projects, given its extensive networks and proven ability to create societal impacts. A stronger international profile could also generate an even higher share of international co-authorships and serve as a foundation for international recruitment (senior level). Also, supporting PhD students and junior staff to develop their international networks, via longer stays abroad, contributions to international conferences etc. could foster further international collaboration.

Since more than half of (the UEs) external funding comes from the Wallenberg Foundation, the need for further diversification is obvious. Especially ERC funding could be a viable option given the excellence of researchers on all levels.

The panel observed that the younger researchers are expanding their own network in Europe, with the target of getting European funds to the unit.

TEACHING IN RELATION TO RESEARCH

A general comment from the panels is that there is a strong and mutually reinforcing relationship between research and teaching.

(The UE) teaches 14 undergraduate courses, half of them being fundamental and the other half more advanced. Especially the advanced courses are constantly updated with the most recent developments in the research field.

However, it is observed by the panels that there is an imbalance between research and teaching in many divisions and that this is regarded as a problem (both by the UE and the panel). Some UEs have little teaching opportunities and education merits are therefore hard to reach. For other, teaching is the dominating activity within the division and when planning new positions teaching is prioritized and it difficult to find time to conduct any research.

Although the unit needs a broad research base to support their extensive teaching assignments, the panel finds that it is important to define key research areas that will allow the unit to position themselves within the national and international scientific community.

The evolution from a teaching-oriented division to one that combines high-quality teaching and research has created some tensions between the "old" staff, who are primarily focused on teaching, and the "new" staff, who place greater emphasis on research.

It is also noted that valuable research is underutilized as a resource and knowledge base for teaching.

The problems with recruitment of students to some teaching programs is also affecting research and career opportunities for young researchers.

> *However, over the past decade, there has been a decline in student enrollment in these programs, which has had a negative impact on student engagement in research projects, PhD recruitment, and teaching opportunities for researchers.*

It is noted by several panels that this problem seems to be particularly serious for some programs at Campus Norrköping:

> *The limitations on marketing individual campuses have likely contributed to a reduction in student interest and enrollment at Norrköping, potentially affecting the division's overall visibility.*

The panel encourages the LiU leadership to incentivize and support stronger collaboration among the divisions and think of better mechanisms to bridge the gap between Norrköping and Linköping.

> *The establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.*

INFRASTRUCTURE

There is little reported by the panels related to research infrastructure. Most panels mention that the UEs are satisfied with the access to relevant local equipment and large facilities both at LiU and at the national level. They also find that the UEs take advantage of the possibilities offered by the infrastructure landscape:

> *Their proximity to the National Supercomputer Centre, which is based in Linköping, and access to SciLifeLab computational infrastructures, is exceptionally convenient and well exploited by the unit. Overall, the available research infrastructure appears adequate, with the exception that the unit reports difficulties in accessing office space, which has hindered productive research and collaboration.*

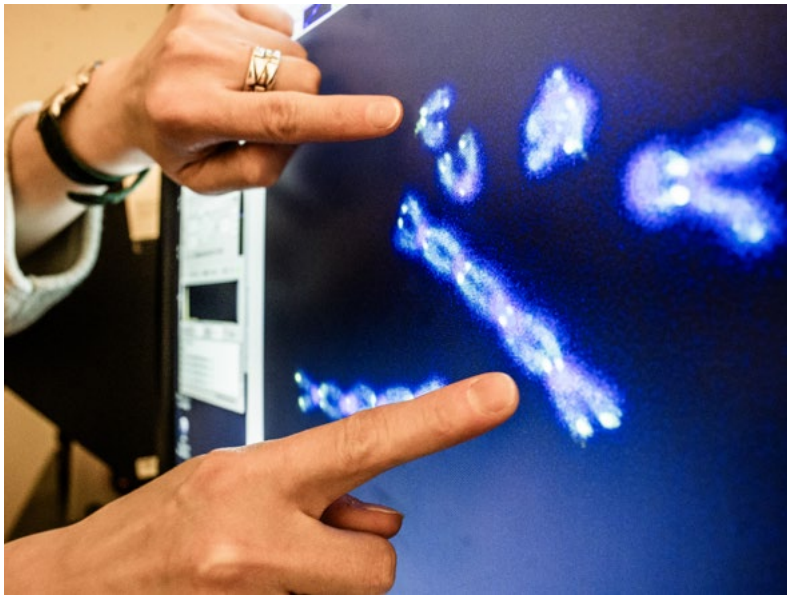
> *The panel identified CMIV is a catalyst and a critical hub that enables high-quality interdisciplinary and clinical research within the Radiological Sciences unit – not only by its cutting-edge equipment, but also as an inspiring, physical meeting place where researchers from various disciplines can meet informally and for seminars.*

One panel made the comment that the conditions for animal research was brought up by a few UEs as a problem. The animal facility is considered modern and adequate but not adapted to the users' actual needs. The panel's recommendation is:

> *The university needs to engage in dialogue with users of the animal house to optimise the use of space, efficiency and reduce the administrative load. This will maximise the value of the animal house as part of the university's infrastructure.*
>
> *A well-functional animal house is also crucial for recruitment of junior faculty continuing and expanding the research. Investment will be needed to develop this facility and ensure it is able to support world-leading research.*

It is also mentioned by one panel that support functions related to statistics, trial development, data management, protocols, etc. located in the region (e.g., Forum Östergötland) are not well used. It is recommended to investigate the reasons for this and to mitigate any obstacles.











6. REFLECTIONS

6.1 Evaluation method

LiRE25 is characterized by the fact that research and researchers are in focus, which we believe have had several good consequences. First, it has stimulated the UEs to (a greater extent than before) reflect on their strategies in relation to research and research quality. One panel noted the following:

> *(The UE) has developed as a research unit since the self-evaluation was written, and they have carried out several of the strategic activities described in the report. (The panel's) impression is that the self-evaluation started a positive process for the unit to become more focused and better organized. Several improvement processes have been implemented.*

After reading all the panel reports, the LiRE25 office believes that they contain a lot of recommendations that should be useful for the divisions in their future quality work. It should be noted that the reviewers, even though they are experts in areas that lie close to the research at the respective UEs, had limited information and limited time to discuss with the UEs. Therefore, it is not expected, in an evaluation of this kind, that the UEs will receive detailed suggestions related to the content of their research. Instead, the recommendations are at a slightly more general level. The divisions now have the task to apply these recommendations to their particular research area.

Concerning what goes beyond the UEs, i.e., the university, faculties and departments, LiRE25 has given the UEs the opportunity to express what needs to be improved and taken care of higher up in the organisation at LiU. These suggestions provide the leaderships at all levels with a unique list of potential areas for improvement. We are also impressed by the comprehensive review done by the panels and their observations and recommendations related to the LiU organisation. It deserves to be mentioned though, that the panels had very limited possibilities to interact with, for instance, the department and faculty leaderships. The observations and recommendations must be understood in this context.

The success of LiRE25 depends almost entirely on the follow-up process, which was decided rather late, after the panel reports became available. The material produced during LiRE25 serves as a basis for this process. We have noticed during LiRE25 that there were worries expressed concerning how the results from LiRE25 should be used. It would have been good if the forms of follow-up had been ready when we started LiRE25.

Several recent university evaluations have included "themes", i.e., cross cutting areas that are of importance for the university as a whole. Examples of such themes were mentioned in the feasibility study and were also discussed during the

early phase of LiRE25. Eventually, though, it was decided not to include themes in LiRE25. The main reason for this decision was to give full focus on research quality of the UEs. Evaluations of themes require different expertise and evaluation methodology. Now that the LiRE25 results are available, there is a good basis for choosing themes for a review, for example in the form of internal or external assignments.

At the more practical level of LiRE25 we have the following reflections:

- **The content of the data package** received some criticism (see below) due to the quality of the data. We recommend LiU to take this criticism seriously and develop the data package in collaboration with departments and divisions and make sure that these data are useful also for the divisions themselves.
- **The self-evaluation** obviously inspired many divisions to develop their quality work, which was one of the goals of LiRE25. We hope that the self-evaluation template will be used in the future and possibly also modified by the divisions to serve their needs even better than the general template that was provided by the LiRE25 office.
- **The nomination procedure** generally worked very well, the UEs provided the LiRE25 office with the desired list of experts. In some cases, we (or the nominated person) experienced a too close relation between the nominated person and the LiU researchers, which excluded them from acting as reviewers.
- We knew from the start that the **appointment of reviewers** should be a time-consuming process. This was indeed the case. We should have started a little earlier with the initial contact with the nominees. The overall impression is that the reviewers took their work very seriously.
- **The instructions for the reviewers and the report template** worked very well. The list of assessment areas was quite extensive, but this was not seen as a problem for the reviewers.
- **The site visits** were the central part of LiRE25 and also absolutely necessary for the quality of the evaluation. In addition, it was also a possibility for LiU and the divisions to show all the fantastic research taking place at the university. We also received a very positive feedback from the reviewers (see below) related to the site visits. To fit each site visit into maximum one week, the schedule for some of the panels was quite intense, perhaps too intense. Still, we did not allow time for meetings with the department managements (and possibly also the faculty managements) which should have raised the

quality of the site visit. We would also like to mention that the panel coordinators played an essential role for the success of the site visits.

Finally, an interesting idea from one of the panels:

> *In addition, while the evaluation materials contain various useful information about the research at (the UE), it would be helpful if they also included a systematic, structured overview of the key lines of research at the division (which issue was somewhat mitigated by an oral presentation given at LiU). Such a systematic overview, which seems to be relatively easy to create, could also be a tool for generally supporting awareness and reflection at the division. In particular, it may help to understand how certain issues (e.g., low-impact publications or problems with unspent funds) are manifested across different labs and groups and therefore recognize the need for different solutions.*

6.2 Communication

As mentioned in chapter 3, the LiRE25 office have spent a considerable amount of time disseminating information about LiRE25: department visits, dialogues with faculty managements and our reference group, meetings with the panel coordinators, website, newsletters and mailings. We have also made use of existing information channels such as Head of Department Advisory Council and the Quality Assurance Board. All these information channels and meetings have been essential for fulfilling the purpose of LiRE25. The meetings we had with the departments were particularly useful since this was "the closes we came" to personal meetings with the UEs. The departments decided themselves who attended these meetings. In the cases when, in addition to the department management, the contact persons from the UEs were present, the discussions became particularly valuable for the LiRE25 office and hopefully also for the departments and the UEs. In addition, the department management also played an important role for communications to the UEs.

As for external communication, we had two digital meetings with the reviewers and one additional meeting with the panel chairs. The feedback from the reviewers concerning information (see below) is generally very positive. We also encouraged the panels to arrange meetings on their own to prepare for the site visits. Most panels arranged such meetings, and it proved to be very useful in making the site visits more effective. In this context we would like to mention the role of the panel coordinators, who helped to arrange these meetings, as well as many other communication issues.

6.3 Practicalities

Many of the practical issues were related to the site visits and in some cases not taken care of directly by the LiRE25 office even though these issues also involved support from the LiRE25 office. We are very satisfied with the service from the travel agency and the hotel reservation which was first handled by a coordinator at the University Management Office and closer to the site visit taken care of by administrators at the Department of Management and Engineering. However, the centrally procured food supply and taxi service were beneath contempt. As a matter of fact, we had to take care of the major part of the food service ourselves. The problems with taxi service were also extensive and, in some cases, ruined the schedule for the panels visits to the UEs. We therefore call on LiU's management to review the procurement procedure with a focus on the quality of the services provided.

The budget consists of two main parts, the remuneration of the reviewers and their travel expenses. The renumeration fee was decided by LiU's management and seems to have been at a relevant level. As such, they were known costs and did not cause any uncertainty in the budget. However, the costs of travel were more uncertain. To reduce costs, we avoided reviewers from outside Europe, and it turned out that the final travel cost was lower than what had been calculated in the budget.

The most work consuming task related to budgetary matters was the "Application for special income tax for non-residents" (SINK). However, this is inevitable, and the lessons learned from the handling of the SINK applications are that it took time both for the reviewers and for the LiRE25 office. The administration of the Tax Agency also takes time, usually a few months, which is important information to convey to the reviewers.

Finally, we are very grateful for all the support from various departments at LiU: the Planning and Finance Department, the Bibliometric Team, the Digitalisation Department, administrative support (the main contribution came from Department of Behavioural Sciences and Learning and the Department of Management and Engineering), and others and last but not least, all the high-quality work that the panel coordinators did related to practical issues.

6.4 LiRE25 survey, chairs and panel members

The LiRE25 survey collected responses from 67 reviewers involved in the research evaluation process. The survey aimed to assess the clarity, usefulness, and effectiveness of the process, including preparation and implementation, as well as practical arrangements.

Purpose and Implementation

- *Purpose Clarity:* Most respondents agreed that the purpose of the evaluation was clearly communicated, with 61% strongly agreeing. Comments highlighted appreciation for the constructive focus rather than punitive measures.
- *Implementation Information:* Around 91% felt the implementation details were good, though some noted repetitive or unclear information and a lack of clarity on strategic implications.

Evaluation Materials

- *Self-Evaluation and Data Package:* While 77% found the materials helpful, many pointed out missing or inconsistent data, especially regarding bibliometrics, financial structures, and publication lists. Suggestions included providing clearer definitions, more discipline-specific comparisons, and CVs of researchers.

Practical Arrangements

- *Pre-Visit Tasks:* Nearly 70% felt well-informed about practical tasks. Some minor issues were noted, such as missing information about meals.
- *Site Visit Logistics:* Over 74% rated the arrangements positively, praising coordinators and logistics. A few concerns were raised about transportation and scheduling flexibility.

Panel Work and Interviews

- *Panel Functioning:* 78% agreed the panel worked well, with many praising the collaborative atmosphere and leadership. Time constraints were mentioned as a challenge.
- *Meeting Duration:* About 66% felt the time allocated for interviews was sufficient, though several respondents suggested longer sessions for deeper discussions.

Reporting

- *Feedback:* 92% believed the interviews and self-evaluations enabled constructive feedback. However, some felt more context and structured information were needed.
- R*eport Instructions:* 95% found the report writing instructions clear, though suggestions were made for separate templates (general observations vs. evaluation unit) and clearer language guidelines.
- *Satisfaction with Final Report:* 98% expressed satisfaction with the submitted panel report, emphasizing the positive experience and hope for meaningful impact.

6.5 LiRE25 survey, UEs

The LiRE25 survey aimed at the UEs gathered responses from nearly 50 LiU researchers. The survey covered issues such as the usefulness, clarity, and impact of the self-evaluation process, the data package, the panel meetings, and the final panel reports.

Purpose and Implementation

- While 61% of respondents agreed that the purpose and implementation of the evaluation were communicated well, others found the purpose vague or evolving during the process. Some expressed concern about whether the evaluation would lead to tangible outcomes.

Self-Evaluation Process

- 71 % of the respondents found the instructions for writing the self-evaluation clear and helpful. The process was seen as valuable for internal reflection, strategic discussions, and team building.
- Some units struggled with interpreting expectations, especially regarding the level of detail and honesty.

Data Package

- Around 36 % found the data package useful, especially for funding trends, but many felt it was incomplete, outdated, or not tailored to their unit's needs. Several noted errors or missing information, and some said the data was too aggregated or not relevant for their discipline. There was a desire for more detailed and accurate data, especially regarding publications and collaborations.
- Units requested more tailored data, complete publication lists, and clearer explanations of metrics.

Perception of self-evaluation

- Just over 60 % of respondents considered self-evaluation valuable, for example for reflection, team building, and internal discussion. Others felt it added little new insight, especially for groups that already conduct regular reviews. Some saw it as time-consuming and not particularly beneficial, though it did prompt some useful discussions and highlighted strengths and weaknesses.

Panel Meetings

- Around 52 % of respondents concluded the meeting with the panel provided valuable insights. Other respondents felt the panel meetings were interesting but often focused on clarifying misunderstandings about local organisation and funding. Some felt

the meetings were too short or that the panel was not fully prepared. While some found the meetings productive, others felt they did not gain much new insight, as discussions often repeated what was already in the self-evaluation.

- Several comments indicated that panels were unfamiliar with Swedish academic structures, which limited the effectiveness of discussions.

Panel Reports

- The panel reports were seen as valuable by approximately 52 % of the respondents. While some units found the reports affirming and confidence-building, others felt they merely echoed the self-evaluations or included generic suggestions. A few reports were criticized for containing speculative or impractical recommendations.
- Some respondents questioned whether the feedback would lead to meaningful change, especially when recommendations required action at faculty or university level.

Overall Themes

- The self-evaluation process was widely appreciated for encouraging internal dialogue and strategic thinking.
- More accurate, discipline-specific data and clearer communication about the evaluation's purpose and follow-up were requested.
- The effectiveness of panel meetings and reports varied significantly depending on panel preparation and understanding of local conditions.









7. FINAL WORDS

The output from LiRE25 is extensive. The written material consists of 91 data packages, 90 self-evaluations reports, 90 panel reports and this final report. In addition, since LiRE25 was the first complete research evaluation carried out at Linköping University, there is also a lot of material and new knowledge gathered at LiU regarding how to perform such an evaluation.

We are convinced that there are already some positive effects of LiRE25, for instance related to the work carried out within the UEs during the self-evaluation that took place during the fall 2024. The self-evaluations stimulated many of the UEs to perform strategic work related to research quality and research culture in a more structured way which can be of help also in the future.

However, the large part of the quality work around LiRE25 has yet to start. This work will primarily be a process organised and implemented by the divisions. It deserves to be mentioned once again that the whole idea behind LiRE25 is a bottom-up approach where the focus is on the UEs. The data packages, the self-evaluations, the panel interviews and panel reports are all addressing issues related to the UEs. Therefore, the most important part of the upcoming quality work must be carried out by the divisions (UEs), closely linked to the departments, to deal with and address their specific challenges related to research quality.

Besides the quality work that will be performed by the division, there are also plenty of recommendations directed to departments, faculties and the university leadership and support functions, which should be addressed at the respective level in the university's organisation. LiU has already decided on such a LiRE25 follow-up process.[7]

Finally, it is our sincere hope and belief that LiRE25 will fulfil its goals, to raise the quality of the research conducted at LiU. As pointed out by almost all panels, the most important step forward is to introduce a more strategic approach to all aspects of research, the focus of the research, publications and dissemination, the impact of the research, recruitment, retention, gender balance etc. Such strategy work must involve all levels of LiU's organisation and start immediately, now that the results of the evaluation are available. We wish all of you who, in one way or the other, will take part in the follow-up of LiRE25 the best of luck in this important effort.

Linköping 2025-10-10

Sven Stafström

Matts Karlsson Emma Rörby Theresa Apelqvist

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Sven Stafström, Theresa Apelqvist, Emma Rörby and *Matts Karlsson.*

8. APPENDICES

APPENDIX 1
List of evaluation units (UEs) and panels

APPENDIX 2
List of panel members

APPENDIX 3
Self-evaluation template

APPENDIX 4
Instructions, external evaluation

APPENDIX 5
Panel report template

APPENDIX 1

List of evaluation units (UEs) and panels

Panel	Evaluation unit
A	A1. MAI.ALGD Algebra, Geometry and Discrete Mathematics A2. MAI.ANDI Analysis and Mathematics Education A3. MAI.TIMA Applied Mathematics
B	B1. IDA.ADIT Computer and Information Science B2. IDA.AIICS Artificial Intelligence and Integrated Computer Systems B3. IDA.HCS Human-Centered Systems B4. IDA.SaS Software and Systems B5. IDA.STIMA Statistics and Machine Learning B6. ITN.MIT Media and information technology
C	C1. IFM.BIOIN Bioinformatics C2. IFM.ECOMOD Ecological and Environmental Modelling and IFM.BIOLO Biology
D	D1. IFM.EFM.EFMFEM Unit Functional Electronic Materials*,[1] D2. IFM.HALV Semiconductor Materials D3. IFM.MDESIGN Materialsw design D4. IFM.NANO Nanostructured Materials D5. IFM.PLASM Plasma and Coatings Physics D6. IFM.TEOFY Theoretical Physics D7. IFM.TUNNF Thin Film Physics
E	E1. IFM.BBIOBIO Biophysics and bioengineering E2. IFM.EFM Electronic and photonic materials*,[1] E3. IFM.KEMI Chemistry E4. IFM.MOLYT Molecular Surface Physics and Nanoscience E5. IFM. SAS Sensor and Actuator Systems E6. ITN.LOE Laboratory of Organic Electronics
F	F1. ISY.DA Computer Engineering F2. ISY.EKS Integrated Circuits and Systems F3. ISY.ICG Information Coding F4. ITN.FEM Physics, Electronics and Mathematics

* Part of division.
[1] Division divided and present in two panels. Note: data package is based on the entire division.

Panel	Evaluation unit
G	G1. IMT.MT Division of Biomedical Engineering G2. ISY.CVL Computer Vision Laboratory G3. ISY.FS Vehicular Systems G4. ISY.KS Communication Systems G5. ISY.RT Automatic Control
H	H1. IEI.ENSYS Energy Systems H2. IEI.FLUMES Fluid and Mechatronic Systems H3. IEI.KMAT Engineering Materials H4. IEI.MVS Applied Thermodynamics and Fluid Mechanics H5. IEI.PROD Product Realisation H6. IEI.SOLMEK Division of Solid Mechanics
I	I1. IEI.INDEK Industrial Management I2. IEI.LOGQ Logistics and Quality Management I3. IEI.PEK Production Economics I4. IEI.PIE Project, Innovations and Entrepreneurship I5. ITN.KTS Communications and Transport Systems
J	J1. IEI.ARÄTT Commercial and Business Law J2. IEI.FEK Business Administration J3. IEI.INDIG Information Systems and Digitalization J4. IEI.NEK Economics J5. IEI.STATSV Political Science
K	K1. BKV.CELLB Cell biology K2. BKV.II Division of Inflammation and Infection K3. BKV.MMV Division of Molecular Medicine and Virology
L	L1. BKV.BKH Division of Children's and Women's Health L2. BKV.KKF Division of Clinical Chemistry and Pharmacology L3. BKV.KOO Division of Surgery, Orthopedics and Oncology
M	M1. BKV.CSAN Center for Social and Affective Neuroscience M2. BKV.NEURO Neurobiology M3. BKV.SOK Division of Sensory Organs and Communication
N	N1. HMV.ORH Division of Nursing Sciences and Reproductive Health N2. HMV.PRNV.FYSIO Unit for Physical Therapy* N3. HMV.PRNV.AT Unit for Occupational Therapy*

* Part of division.
[1] Division divided and present in two panels. Note: data package is based on the entire division.

Panel	Evaluation unit
O	O1. HMV.DISP.IMD Unit of Internal Medicine* O2. HMV.DISP.KAV Unit of Cardiovascular Sciences* O3. HMV.DISP.RAD Unit of Radiological Sciences* O4. HMV.PRNV.KLM Unit for Clinical Medicine*
P	P1. HMV.SH.HSA Unit of Health Care Analysis* P2. HMV.SH.FH Unit of Public Health Science* P3. IBL.FUSA Disability Research Division P4. IBL.PSY Division of Psychology
Q	Q1. IKOS.ASC Division of Ageing and Social Change Q2. IKOS.CKS Centre for Local Government Studies Q3. IKOS.REMESO Division of Migration, Ethnicity and Society Q4. TEMA.temaT Technology and Social Change
R	R1. IEI.IAS The Institute for Analytical Sociology R2. IKOS.SOCARB Division of Social Work R3. TEMA.temaB Tema Child Studies R4. TEMA.temaG Tema Gender studies
S	S1. IKOS.FTE Philosophy and Applied Ethics S2. IKOS.HKR History, Arts and Religious Studies*,[1] S3. IKOS.KLS Communication, Literature and Swedish*,[1] S4. IKOS.KSFM Culture, Society, Design and Media S5. IKOS.SKI Language, Culture and Interaction
T	T1. IBL.APS Education and Sociology T2. IBL.LEN Learning, Aesthetics, Natural Science T3. IBL.PeDi Education, Teaching and Learning T4. IBL.PVL Education and Adult Learning T5. IKOS.HKR History, Arts and Religious Studies*,[1] T6. IKOS.KLS Communication, Literature and Swedish*,[1] (including IKOS.SAROS Swedish as a Second Language, Rhetoric and Language Support)
U	U1. IEI.MILJÖ Environmental Technology and Management U2. TEMA.temaM Tema Environmental Change
V	V1. IEI.MLU Malmstens Linköping University

* Part of division.
[1] Division divided and present in two panels. Note: data package is based on the entire division.

APPENDIX 2
List of panel members

A

Kimmo Eriksson	Chair	Mälardalens university	Sweden
Gabriele Kaiser	Member	University of Hamburg	Germany
Pekka Koskela	Member	Jyväskylä University	Finland
Antonella Zanna Munthe-Kaas	Member	University of Bergen	Norway
Mikael Rørdam	Member	University of Copenhagen	Denmark

B

Ann Nowe	Chair	Vrije University Brussel	Belgium
Thomas Ertl	Member	University of Stuttgart	Germany
Victor Kaptelinin	Member	Umeå University	Sweden
Sune Karlsson	Member	Örebro University	Sweden
Aura Tuomas	Member	Aalto University	Finland
Katinka Wolter	Member	Freie Universität Berlin	Germany

C

Niclas Kolm	Chair	Stockholm University	Sweden
Marc Lensink	Member	University of Lille	France
Liam McGuffin	Member	University of Reading	United Kingdom
Alexandra Teleki	Member	Uppsala University	Sweden

D

Claudia Draxl	Chair	Humboldt-Universität zu Berlin	Germany
Matthias Bickermann	Member	Technische Universität Berlin	Germany
Freddy Kleitz	Member	University of Vienna	Austria
Allan Matthews	Member	The University of Manchester	United Kingdom
Saroj Prasad Dash	Member	Chalmers University of Technology	Sweden
Nini H. Pryds	Member	Technical University of Denmark	Denmark

E

Souhir Boujday	Chair	Sorbonne Université	France
George Hadziioannou	Member	University of Bordeaux	France
Olli Ikkala	Member	Aalto University	Finland
Sven Lidin	Member	Lund University	Sweden
Toribio Fernández Otero	Member	Polytech Cartagena	Spain
Oliver Renault	Member	Affillierad Grenoble	France

F

Erika Andersson	Chair	Heriot Watt University	United Kingdom
Ernesto Galvao	Member	International Iberian Nanotechnology Laboratory	Portugal
Mikael Gidlund	Member	Mid Seden University	Sweden
Jari Nurmi	Member	Tampere University	Finland
Susana Paton Alvarez	Member	Universidad Carlos III de Madrid	Spain

G

Bart De Moor	Chair	Katholieke Universiteit (KU) Leuven	Belgium
Bo Egardt	Member	Chalmers University of Technology	Sweden
Ales Leonardis	Member	University of Birmingham	United Kingdom
Thomas Parisini	Member	Imperial College London	United Kingdom
Erik G. Ström	Member	Chalmers University of Technology	Sweden
Elisabeth Verpoorte	Member	University of Groningen	The Netherlands

H

Staffan Lundström	Chair	Luleå University of Technology	Sweden
Niels Aage	Member	Technical University Denmark (DTU)	Denmark
Elvin Karana	Member	Delft University	The Netherlands
Ramin Karim	Member	Luleå University of Technology	Sweden
Ulrich Krupp	Member	RWTH Aachen University	Germany
Ewa Wäckelgård	Member	Dalarna University	Sweden

I

Ina Drejer	Chair	Aalborg University	Denmark
Peter Björk	Member	Hanken School of Economics	Finland
Marielle Christiansen	Member	Norwegian University of Science and Technology	Norway
Rune Fitjar	Member	University of Stavanger	Norway
Marianne Jahre	Member	Kühne Logistics University, Lund university	Germany, Sweden
Christian Larsen	Member	Aarhus University	Denmark

J

Maria Bengtsson	Chair	Umeå University	Sweden
Tone Bratteteig	Member	University of Oslo	Norway
Liam Delaney	Member	London School of Economics	United Kingdom
Martin Laffin*	Member	Queen Mary University of London	United Kingdom
Per Skålen	Member	Karlstad University	Sweden
Hanne Søndergaard Birkmose	Member	University of Southern Denmark	Denmark

* Absence due to unforeseen circumstances, replaced by Katarina Eckerberg from Panel U.

K

Carl-Henrik Heldin	Chair	Uppsala University	Sweden
Barbara Bohle	Member	University of Vienna	Austria
Teunis B. H. Geijtenbeek	Member	Academisch Medisch Centrum Universiteit van Amsterdam	The Netherlands
Catharina Larsson	Member	Karolinska Institutet	Sweden
Ross McManus	Member	Trinity College	Ireland

L

Annette Grüters-Kieslich	Chair	Charité – Universitätsmedizin Berlin	Germany
Wieland Kiess	Member	Leipzig University	Germany
Peter Naredi	Member	University of Gothenburg	Sweden
Antti Sajantila	Member	University of Helsinki	Finland
Malin Sund	Member	University of Helsinki, Umeå university	Finland, Sweden

M

Marie Carlén	Chair	Karolinska Institutet	Sweden
Mikael Landén	Member	University of Gothenburg	Sweden
Chloe R. Marchall	Member	University College London	United Kingdom
Julie Morris	Member	Newcastle University	United Kingdom
Pertti Panula	Member	University of Helsinki	Finland

N

Alison Richardson	Chair	University of Southampton	United Kingdom
Tore Bonsaksen	Member	Inland Norway University	Norway
Philip Moon	Member	University of Leuven	Belgium
Mona Ringdal	Member	Sahlgrenska Academy University of Gothenburg	Sweden
Eva Roos	Member	University of Southern Denmark	Denmark

O

Jan Borén	Chair	Sahlgrenska Academy University of Gothenburg	Sweden
Simon Griffin	Member	University of Cambridge	United Kingdom
Per Morten Sandset	Member	University of Oslo	Norway
Alistair Young	Member	King's College London	United Kingdom
Leif Østergaard	Member	Aarhus University	Denmark

P

Monica Melby-Lervåg	Chair	University of Oslo	Norway
Mats Fredrikson	Member	Uppsala University	Sweden
Dorte Gyrd Hansen	Member	University of Southern Denmark	Denmark
Monika Nerland	Member	University of Oslo	Norway
Lars Nyberg	Member	Umeå University	Sweden

Q

Charlotta Mellander	Chair	Jönköping University	Sweden
Thomas P. Boje	Member	Roskilde University	Denmark
Mikael Granberg	Member	Karlstad University	Sweden
Knut Holtan Sørensen	Member	Norwegian University of Science and Technology	Norway
Päivi Rasi-Heikkinen	Member	University of Lapland	Finland

R

Nanna Verhoeff	Chair	Utrecht University	The Netherlands
Magnus Jegermalm	Member	Marie Cederschiöld University	Sweden
Bengt Larsson	Member	University of Gothenburg	Sweden
Susanna Paasonen	Member	University of Turku	Finland
Ann Phoenix	Member	University College London	United Kingdom

S

Peter Auer	Chair	University of Freiburg	Germany
Sara Heinämaa	Member	University of Jyväskylä	Finland
Lena Roos	Member	Södertörns University	Sweden
Torunn Sellberg	Member	University of Bergen	Norway
Jan Svennevig	Member	University of Agder	Norway

T

Sverker Lindblad	Chair	University of Gothenburg	Sweden
Ulrika Haake	Member	Umeå Universitet	Sweden
Alison Kington	Member	University of Worcester	United Kingdom
Kenneth Nordgren	Member	Karlstad University	Sweden
Christina Olin-Scheller	Member	Karlstad University	Sweden
Fritiof Sahlström	Member	University of Helsinki	Finland

U

Katarina Eckerberg	Chair	Umeå University	Sweden
Thomas Budde Christensen	Member	Roskilde University	Denmark
Margareta Groth	Member	Luleå University of Technology	Sweden

V

Gunnar Almevik	Member	University of Gothenburg	Sweden
Katarina Bonnevier	Member	Linnaeus University	Sweden
Jonas Olsson	Member	Stiftelsen Svensk Industridesign	Sweden

Self-evaluation

Basic information

Evaluation unit:	
Contact person:	
Date of finalisation:	

Describe briefly how the evaluation unit worked to develop this self-evaluation. Who has been involved in discussions, who has written the text, etc.
[Please insert information here]

1. Description of the evaluation unit and its output

1.1. Content

Give a short presentation of the evaluation unit and the research profiles that are represented within the unit. Depending on the context in which the research is performed, describe how the research is related to centres, profile areas, strategic research areas or similar that exist within LiU (see also item 5). In particular, if some of the activities are interdisciplinary or multidisciplinary in character, please describe the different areas that are involved.

Give a few examples of particularly successful research projects and analyse what made these projects successful. You are also encouraged to present lessons learnt from your research work.

Present ideas and directions of future research. How will your research develop over time (coming 5 years), are there particular research questions that you plan to address?

[Please insert information here]

1.2. Output

a. Publications

Describe and analyse the evaluation unit's publishing tradition and publishing strategy based on the bibliometric data that is part of the data package and regarding the publishing traditions that prevail in the evaluation unit's area(s). Note that LiRE25 uses a common format for the compilation of bibliometric data for all evaluation units. It is perfectly possible to supplement this compilation with information (in the submitted text below) that you think is missing.

The forward-looking analysis should focus on any changes caused by external factors, such a changing publishing landscape and reforms in research assessment, as well as on the evaluation unit's own view of future publishing strategies.

[Please insert information here]

b. PhD

Considering the information presented in the data package, comment on the output from the PhD education in terms of number of PhD degrees, the importance of the research performed by PhD students for enhancing the research quality of the evaluation unit, as well as for benefit to society. Also, give a brief presentation of the career of the PhD students that have finished their degrees during the last five years, what is the next step in their career?

Do you have suggestions for improving the PhD programme? What can be done within the evaluation unit? What can the department/faculty leadership or the LiU leadership do?

[Please insert information here]

c. Other research outputs

Describe what research outputs other than scientific publications that research within the evaluation unit has led to. Focus on utilisation and impact of research outside academia in terms of e.g. innovations (of all kinds), policy papers, science communication, etc. What are the strengths and weaknesses of the evaluation unit's work in this respect? If you identify weaknesses, what can be done in the future to strengthen efforts to stimulate outreach/knowledge utilisation/innovation? What kind of support within LiU would you like to see?

[Please insert information here]

2. Conditions for research

2.1. Quality culture

Describe the activities aimed at fostering a culture that leads to high-quality research and renewal within the evaluation unit. What is the role of leadership and collegiality? How do you ensure intellectual interactions and research integrity/good research practice? What are the strengths and weaknesses of the current approach? Give examples of activities that can change the quality culture within the evaluation unit in a positive way.

[Please insert information here]

2.2. Recruitment, mobility and career

Describe your recruitment strategy. How do you advertise positions? What is the process for selecting candidates? Describe how you value skills related to teaching, innovation, management and leadership, and service to the community. What is your view on the faculty's way of handling recruitment matters?

Describe what kind of support the evaluation unit provides to young researchers for their career development. What support would you like to see from the department, faculty and/or central administration?

Given the present personnel, describe your thoughts on future opportunities and possible solutions for retaining highly qualified researchers in the evaluation unit.

You can refer to or comment on the data package regarding personnel data here.

[Please insert information here]

2.3. Collaborations

Who are the evaluation unit's most important academic collaboration partners within LiU, with other universities in Sweden and abroad? How are you currently working to establish and maintain such collaboration and networks to support high-quality research? What measures will the evaluation unit take in the future in order to further strengthen your research network?

Who are your most important collaborators outside academia? Consider collaborations at all stages of the research process: research ideas, performing research, co-publication, use of the results. How is the unit currently working to establish and maintain such collaborations and networks, and to bring about a wider dissemination of research results to the rest of society? Present ideas on how to further strengthen collaboration with partners outside academia.

[Please insert information here]

2.4. Research Infrastructure

Describe the evaluation unit's research infrastructure (RI) needs and how important RI is to your research. Do you currently use RI that is available in your own lab/research environment, at LiU, nationally and/or internationally? Do you have sufficient access to the RI you need? What is the funding situation for RI? What are the biggest improvements to the access to RI that should be made, that can result in higher research quality from the evaluation unit?

[Please insert information here]

2.5. Funding

Considering the information presented in the data package, describe the funding situation of the evaluation unit including both faculty funding from LiU and external competitive funding from national as well as international funders, such as the EU. If you are conducting commissioned research, describe the conditions for such research activities.

Do you have procedures for review and quality assurance before submitting applications? To what extent do you use support provided by the Grants and Programme offices at LiU?

Comment on the success rate of external funding and discuss opportunities and threats for the future. Describe the unit's strategy/strategies for maintaining or increasing external funding.

[Please insert information here]

2.6. Teaching related to research

Describe the evaluation unit's involvement in teaching at bachelor and master levels and how teaching is distributed among the staff (see also the data-package). How are the research profiles of the evaluation unit aligned with the teaching programmes at LiU.

[Please insert information here]

2.7. Support functions

Describe the most important support functions provided by the different organisation levels at LiU which relate to your research: research funding, administrative issues, legal issues, internationalisation, communication, research ethics etc. What is functioning well, what can be improved. What is missing?

[Please insert information here]

3. SWOT analysis, comments and reflections

3.1. Strengths, Weaknesses, Opportunities and Threats (SWOT) - analysis and comments

As a summary of the self-evaluation, please provide a SWOT analysis based on your answers. List up to three (3) of the most important Strengths, Weaknesses, Opportunities and Threats, respectively, that the evaluation unit is facing at this point and comment on the likelihood of occurrence. Briefly describe the strategy to take advantage of or to mitigate each item.

Strengths
[Please insert information here]

Weaknesses
[Please insert information here]

Opportunities
[Please insert information here]

Threats
[Please insert information here]

Other comments
[Please insert information here]

3.2. Other reflections (optional)

Describe any thoughts and reflections on research quality that do not fit under the headings above. In particular, topics that the evaluation unit would like to bring up for discussion with the experts in the panels or that you would like to bring to the attention of the department, faculty or university management.

[Please insert information here]

LiRE25: Instruction for the external evaluation and report writing

Introduction

The LiRE25 project is now in the preparation phase for the external evaluation. The university leadership and the LiRE25 office look forward to welcoming the panels to Linköping for meetings with the evaluation units. The evaluation units themselves are of course also very keen to discuss their research with the panels. The joint efforts of LiU researchers and external reviewers will be of great help in improving the research conducted at our university.

The aim of these instructions is twofold: to help the reviewers and the panels prepare for the site visits and interviews with the evaluation units, and to serve as a guide in writing the panel reports. We will present the instruction at the second information meeting with the reviewers on January 14th/15th and the LiRE25 office is of course ready to answer questions that might arise as the panels prepare their work.

Thank you very much in advance for your important contributions to LiRE25!

LiRE25 office

Evaluation guidelines

The analysis and recommendations presented in the panel reports should be based on the self-evaluation, data package, and the interviews with each evaluation unit. Note that LiRE25 does not use any grading system, and that no comparison should be made between evaluation units. Furthermore, there is a strong focus on enhancing the quality of research at LiU. The panel's report should therefore include an analysis of strengths and weaknesses of the research in the evaluation unit as well as a forward-looking part with a particular focus on recommendations for improvement.

Evaluation areas and guiding questions

The four areas that the panels should consider when performing the evaluations and formulating the report are: 1) Research and research quality, 2) Research culture, 3) Conditions for research, and 4) General observations. In each area we have listed several topics. Most of them correspond to topics presented in the self-evaluation. We have also listed a few guiding questions for each topic. It is not

necessary to cover all topics and please consider the guiding questions only as a help to approach the topic, we do not expect direct answers to these questions.

Both the self-evaluation and the interviews may add issues that are not included in the topics presented below. Such issues can be related to a particular evaluation unit or to observations obtained from the combined impressions from all units the panel has evaluated. Please feel free to add such observations and recommendations to the report.

The panel's analysis and recommendations related to the evaluation units (areas 1-3 below) should form the main part of the report, 3-4 pages per evaluation unit. The area "General observations" aims to present findings that go beyond the evaluation unit, that are relevant for all units in the panel or the department-, faculty- and/or the university-management and can be short or long dependent on the panel's observations. Please consider the guiding questions only as a help to approach the topic, we do not expect direct answers to these questions.

1. Research and the research quality

- **Relevance and novelty of the research topics covered by the evaluation unit**
  - What position does the research have in relation to the national and/or international research forefront?
  - What is the panel's view on the novelty of the research carried out by the evaluation unit and the way in which novelty is stimulated?
- **Quality of the research output**
  - What is your assessment of the research quality? (pay attention to all kinds of output given the nature of the research)
  - How do you assess the scientific impact of the research (pay attention to bibliometric data as well as other information presented by the evaluation unit)
- **Research impact outside academia**
  - Given the kind of impact expected in relation to the research field, how well is the evaluation unit performing?
- **Strategies, priorities and future research plans**
  - Which are the strengths and weaknesses of visions, strategies, priorities and research plans presented by the evaluation unit?

Please present your (most important) recommendations regarding the direction and quality of research

2. Research culture

- **Publication strategies**
  - Given the kind of research performed by the evaluation unit, do they publish in relevant scientific channels (journals, books, etc.)?
  - Is there a clear strategy at the evaluation unit level for how to achieve maximum scientific impact from the publication?

- **Recruitment**
  - How successful has the evaluation unit been to attract talented researchers (PhD students, postdoc, assistant, associate and full professors)
- **Opportunities for early-career researchers to develop their originality and independence**
  - How well does the evaluation unit (and the department) leadership handle career development and independence? What are your impressions after meeting with the early carrier researchers?
- **Quality of the PhD training**
  - Compare the self-evaluation with the impressions from the discussions with the PhD-students. Conclusions?
- **Academic as well as non-academic networks and collaborations**
  - How active is the evaluation unit in establishing collaborations and networks?
  - In what way have collaborations affected the quality of research?
- **Equal opportunities and gender equality**
  - Is there an awareness and strategy to consider equal opportunities and gender equality to improve the research quality?
- **Good research practice**
  - How does the evaluation unit promote integrity and an ethical culture among its employees?
  - What kind of (collegial) activities are there that stimulate good research practice?
- **Research in relation to teaching**
  - How do the research strengths of the evaluation unit relate to the teaching curriculum?

Please present your (most important) recommendations regarding the research culture

3. Conditions for research

- **Organization**
  - Comment on the way the evaluation unit is organized, does the organization stimulate high quality research as well as good working conditions?
- **Staffing**
  - Comment on the mix between senior and junior staff
  - Comment on the relation between supervising staff and PhD students, are there too few or too many PhD students per supervisor?

  - In general, is there an adequate mix between research, teaching and other duties among the staff?
- **Funding**
  - Is the evaluation unit competitive with respect to external (national) funding?
  - Are the possibilities for EU-funding explored by the evaluation unit?
- **Research infrastructure**
  - Does the evaluation unit have access to relevant research infrastructure locally, at the department/university level and/or nationally?
  - To what extent does the evaluation unit make use of the available research infrastructure?
- **Support functions**
  - How does the evaluation unit view the support functions (grants office, exploring innovations, administration etc.) provided by the department/faculty/university?

Please present your (most important) recommendation regarding the conditions for research

4. General observations

There are certainly also issues brought up that go beyond the individual evaluation units. The panel is therefore also asked to report on more general observations and make recommendations related to (a) combined impressions from all units in the panel, and (b) departmental-, faculty- and/or the university management levels.

Panel (Letter) Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Text …

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Text …

Evaluated Unit's Name: XXX.XX.XXX

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Text …

Recommendations

Text …

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Text …

Recommendations

Text …

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Text …

Recommendations

Text …

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Text …

9. PANEL REPORTS

See Appendix 1 for complete division names

Panel_Report_A1_MAI.ALGD
Panel_Report_A2_MAI.ANDI
Panel_Report_A3_MAI.TIMA
Panel_Report_B1_IDA.ADIT
Panel_Report_B2_IDA.AIICS
Panel_Report_B3_IDA.HCS
Panel_Report_B4_IDA.SaS
Panel_Report_B5_IDA.STIMA
Panel_Report_B6_ITN.MIT
Panel_Report_C1_IFM.BIOIN
Panel_Report_C2_IFM.ECOMOD_IFM.BIOLO
Panel_Report_D1_IFM.EFM.EFMFEM
Panel_Report_D2_IFM.HALV
Panel_Report_D3_IFM.MDESIGN
Panel_Report_D4_IFM.NANO
Panel_Report_D5_IFM.PLASM
Panel_Report_D6_IFM.TEOFY
Panel_Report_D7_IFM.TUNNF
Panel_Report_E1_IFM.BBIOBIO
Panel_Report_E2_IFM.EFM
Panel_Report_E3_IFM.KEMI
Panel_Report_E4_IFM.Molyt
Panel_Report_E5_IFM.SAS
Panel_Report_E6_ITN.LOE
Panel_Report_F1_ISY.DA
Panel_Report_F2_ISY.EKS
Panel_Report_F3_ISY.ICG
Panel_Report_F4_ITN.FEM
Panel_Report_G1_IMT_MT
Panel_Report_G2_ISY_CVL
Panel_Report_G3_ISY_FS
Panel_Report_G4_ISY_KS
Panel_Report_G5_ISY_RT
Panel_Report_H1_IEI.ENSYS
Panel_Report_H2_IEI.FLUMES
Panel_Report_H3_IEI.KMAT
Panel_Report_H4_IEI.MVS
Panel_Report_H5_IEI.PROD
Panel_Report_H6_IEI.SOLMEK
Panel_Report_I_General recommendations
Panel_Report_I1_IEI.INDEK
Panel_Report_I2_IEI.LOGQ
Panel_Report_I3_IEI.PEK
Panel_Report_I4_IEI.PIE
Panel_Report_I5_IEI.KTS
Panel_Report_J1_IEI.ARÄTT
Panel_Report_J2_IEI.FEK
Panel_Report_J3_IEI.INDIG
Panel_Report_J4_IEI.NEK
Panel_Report_J5_IEI.STATSV
Panel_Report_K1_BKV.CELLB
Panel_Report_K2_BKV.II
Panel_Report_K3_BKV.MMV
Panel_Report_L1_BKV.BKH
Panel_Report_L2_BKV.KKF
Panel_Report_L3_BKV.KOO
Panel_Report_M1_BKV.CSAN
Panel_Report_M2_BKV.NEURO
Panel_Report_M3_BKV.SOK
Panel_Report_N1_HMV.ORH
Panel_Report_N2_HMV.PRNV.FYSIO
Panel_Report_N3_HMV.PRNV.AT
Panel_Report_O1_HMV.DISP.IMD
Panel_Report_O2_HMV.DISP.KAV
Panel_Report_O3_HMV.DISP.RAD
Panel_Report_O4_HMV.PRNV.KLM
Panel_Report_P1_HMV.SH.HSA
Panel_Report_P2_HMV.SH.FH
Panel_Report_P3_IBL.FUSA
Panel_Report_P4_IBL.PSY
Panel_Report_Q1_IKOS_ASC
Panel_Report_Q2_IKOS.CKS
Panel_Report_Q3_IKOS.REMESO
Panel_Report_Q4_TEMA.Tema T
Panel_Report_R1_IEI.IAS
Panel_Report_R2_IKOS.SOCARB
Panel_Report_R3_TEMA.tema B
Panel_Report_R4_TEMA.tema G
Panel_Report_S1_FTE_IKOS
Panel_Report_S2_HKR_IKOS
Panel_Report_S3_KLSandS5SKI_IK
Panel_Report_S4_KSFM_IKOS
Panel_Report_T1_IBL.APS
Panel_Report_T2_IBL.LEN
Panel_Report_T3_IBL.PeDi
Panel_Report_T4_IBL.PVL
Panel_Report_T5_IKOS.HKR
Panel_Report_T6_IKOS.KLS
Panel_Report_U1_IEI.MILJÖ
Panel_Report_U2_TEMA.tema M
Panel_Report_V_IEI.MLU

Panel A Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The research in the mathematical sciences at LiU has been assessed by an international panel chaired by Kimmo Eriksson (Mälardalen University, Sweden) and with panel members from four other countries: Mikael Rørdam (University of Copenhagen, Denmark), Pekka Koskela (Jyväskylä University, Finland), Gabriele Kaiser (University of Hamburg, Germany), and Antonella Zanna Munthe-Kaas (University of Bergen, Norway). Our reports are based on the panel's reading of the self-evaluations and the data provided, additional information available online, and interviews with senior management, researchers, and PhD students in the three divisions of the department of mathematics.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

At the university level: There is great potential for interdisciplinary collaboration between mathematicians and other disciplines working with problems where high-level mathematical competence can make a difference. The Applied Math Division already works very successfully in this direction but in the other two divisions this potential could be exploited more, to the benefit of the entire university. This would require efforts from the mathematicians, which could be incentivized by funds for the startup of interdisciplinary collaborations.

At the department level: We observed a distinct difference between the evaluation units in the department. Specifically, the Applied Math Division appears to have achieved a considerably stronger research culture than the other divisions. This is both a cause and a consequence of more grants, strong recruiting, and high research output. We believe the department needs to find ways for the other divisions to learn from the research culture the Applied Math Division has established. At the departmental level, there seems to be a need to develop a vision for how it wants to develop over the coming 5-10 years and for a clear

strategy for recruitment to realize that vision. It is recommended that hiring postdocs is included in this strategy.

The department should also jointly consider ways of further improving the PhD program in mathematical sciences. The total number of PhD-students in the department is good, but the numbers of students within the same research area are small (and in some areas too small; having at least two students in similar fields is recommendable). Consequently, the number of PhD courses that would be needed to serve all these research areas cannot be given within available resources. Collaborations with other universities is a good way to be able to offer more PhD courses and to help PhD students build networks within their area. Intensive courses could be considered to make such collaborations more efficient in terms of travel.

The panel further believes that the course requirement (100 credits) for PhD students in mathematics is too high (e.g., higher than at the panel members' departments) and should be decreased by a significant amount. Moreover, many math departments have a graduate student seminar, in which students from different research areas give presentations to each other. This serves the double purpose of training PhD students in communicating mathematics and providing a broad exposure to areas in mathematics.

The panel found that PhD students were not sure what is expected of them in terms of research output. Perhaps the minimum requirements stated in the general syllabus (two papers that are published or accepted for publication) have not been clearly communicated. At any rate, we suggest making formal and informal expectations clear to PhD students early in their studies.

As teaching easily infringes on the time for research, ensure that service teaching is done in the most efficient way, not compromising quality. More reflections on teaching and ways to improve teaching culture should be considered, for example by implementing or strengthening the role of a pedagogical mathematics club, in which new ways on teaching and overall ideas for raising the quality of teaching could be discussed. It could be beneficial to involve the researchers in the didactics of mathematics in these activities.

Evaluated Unit's Name: MAI.ALGD Algebra, Geometry and Discrete Mathematics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The division conducts research within algebra, discrete mathematics and medical imaging, which is published in international journals, some of which are top journals. The research in

discrete mathematics is primarily in graph theory with potential applications to AI and computer science. Research in algebra is a classical discipline in pure mathematics. The algebra group runs a successful and well-attended seminar with internal as well as external speakers, which has brought together the division and reactivated several of its members. The algebra group is also actively involved in a national network (SNAG), which is beneficial for young researchers' networks in this area.

There are several retirements coming up in the division over the coming 5 years, and the division has expressed several visions for recruitments, including reinforcing the existing groups in algebra and discrete mathematics, as well as making hires in interdisciplinary and applied topics.

Recommendations

The algebra seminar runs on a very low budget and could benefit from some minor additional funding from the department.

The strategy for future hires in this division needs to be made clear and then executed with the highest possible ambitions. If it is decided to, say, hire at the interface between discrete mathematics and AI/computer science, a search for possible candidates should be initiated.

It should be considered if the existing interdisciplinary research in medical imaging, or in adjacent research areas, can be secured to the next generation, either by existing members of the division turning their research interest in this direction, or by making new hires.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Some researchers in the division are very productive but a considerable proportion publish irregularly or have stopped doing research altogether, which indicates a weakness in the research culture. Without external funding, the time for research is limited (15% for associate professors, 20% for full professors, and 20% for three years for newly hired faculty). Within these available resources, it is important for the division to find ways to maintain research activity. To build for the future, it is probably most important that junior faculty are strongly encouraged to develop a research platform and that the strongest researchers in the division aim to do research of such high quality that it can be published in the very top journals, which, in turn, can open doors to more prestigious grants (including ERC).

PhD students in this division seem overall happy with their conditions but they are very few and they don't have a sufficient number of PhD courses to choose from.

The gender balance at the division is problematic, which is typical in pure mathematics, and this should be taken into account in future hirings.

Recommendations

Consider better start-up packages for newly hired faculty. At least they should have funds to attend conferences and for research trips.

Engage in building a stronger research culture. Encourage those who have no active research to team up with someone who is active.

Encourage and make it possible for PhD students to visit a university abroad for 1-3 months during their studies.

Gender balance and equal opportunities is an issue and should be considered in the hiring strategy at all levels and in all groups.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The division currently has one shared VR grant in medical imaging. Obtaining further funding is crucial for expanding research time for the members of the division and for having funds for more PhD students. The division appears to have a good practice with applying for funds (mainly, or exclusively, VR) via peer reviews of applications. This, however, has to be supplemented with more competitive recruitment and better research conditions for new faculty. It is possible that it will also be helpful for some members of the division to turn research interest in the direction of interdisciplinary topics.

Recommendations

Consider joint PhDs or double degrees (co-tutelle). It can strengthen international relations and potentially be a way of sharing costs for a PhD student with another institution.

Encourage mathematicians - especially those who are no longer active in their former research area - to seek collaborations with other disciplines in which their mathematical expertise may be valuable. Invite other departments to present their research questions that may benefit from mathematical expertise.

Grant applications could be more successful if more than one researcher teams up to pool their ideas and CVs. Look more broadly at possible sources of funding, such as Marie Sklodowska-Curie postdoctoral fellowships (to enable foreign postdocs to come to LiU) and

other European grants. Riksbankens jubileumsfond funds research in probability, which could be an option for some researchers in this group.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division for Algebra, Geometry and Discrete Mathematics employs highly qualified people and has several interesting ongoing research directions in areas that are central to mathematics and its applications. With efforts to strengthen the research culture, there is very good potential for this division to contribute more strongly to the research of the university.

Panel A Report

Introduction

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General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

At the university level: There is great potential for interdisciplinary collaboration between mathematicians and other disciplines working with problems where high-level mathematical competence can make a difference. The Applied Math Division already works very successfully in this direction but in the other two divisions this potential could be exploited more, to the benefit of the entire university. This would require efforts from the mathematicians, which could be incentivized by funds for the startup of interdisciplinary collaborations.

At the department level: We observed a distinct difference between the evaluation units in the department. Specifically, the Applied Math Division appears to have achieved a considerably stronger research culture than the other divisions. This is both a cause and a consequence of more grants, strong recruiting, and high research output. We believe the department needs to find ways for the other divisions to learn from the research culture the Applied Math Division has established. At the departmental level, there seems to be a need to develop a vision for how it wants to develop over the coming 5-10 years and for a clear strategy for recruitment to realize that vision. It is recommended that hiring postdocs is included in this strategy.

The department should also jointly consider ways of further improving the PhD program in mathematical sciences. The total number of PhD-students in the department is good, but the numbers of students within the same research area are small (and in some areas too small; having at least two students in similar fields is recommendable). Consequently, the number of PhD courses that would be needed to serve all these research areas cannot be given within available resources. Collaborations with other universities is a good way to be able to offer more PhD courses and to help PhD students build networks within their area. Intensive courses could be considered to make such collaborations more efficient in terms of travel.

The panel further believes that the course requirement (100 credits) for PhD students in mathematics is too high (e.g., higher than at the panel members' departments) and should be decreased by a significant amount. Moreover, many math departments have a graduate student seminar, in which students from different research areas give presentations to each other. This serves the double purpose of training PhD students in communicating mathematics and providing a broad exposure to areas in mathematics.

The panel found that PhD students were not sure what is expected of them in terms of research output. Perhaps the minimum requirements stated in the general syllabus (two papers that are published or accepted for publication) have not been clearly communicated. At any rate, we suggest making formal and informal expectations clear to PhD students early in their studies.

As teaching easily infringes on the time for research, ensure that service teaching is done in the most efficient way, not compromising quality. More reflections on teaching and ways to improve teaching culture should be considered, for example by implementing or strengthening the role of a pedagogical mathematics club, in which new ways on teaching and overall ideas for raising the quality of teaching could be discussed. It could be beneficial to involve the researchers in the didactics of mathematics in these activities.

Evaluated Unit's Name: MAI.ANDI Analysis and Mathematics Education

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The ANDI division is subdivided into two distinct groups, Analysis and Didactics, for which the panel gives separate comments.

Analysis: The research of the mathematical analysis group concentrates on topics around potential theory, harmonic analysis and PDEs. The chosen topics are in the mainstream of

research in these areas. Some of the publications are very novel, as manifested by the publication forums and the international reputation of the researchers. As typical in pure mathematics, the immediate impact of the research outside academia is limited. The group has, however, reached out by giving popular science presentations.

Six of the members of the mathematical analysis group are active in research, some with high productivity, but the number of active researchers is only about half of the total number of permanent faculty in analysis. Permanent faculty that are no longer active in research may be encouraged to explore the possibility of doing interdisciplinary research.

Didactics: The two members of the mathematics didactics group are researching relevant themes from mathematics education, specifically mathematical modelling education, vocational education. Especially in mathematical modelling education an international research group and network exists to which both mathematics educators are contributing at a high level. Vocational education is an internationally overlooked topic, and it is of high benefit that this topic is researched in the group. Both mathematics educators have brought in external competitive research money, which allowed them to have more research time. In addition, both mathematics educators are internationally connected and benefit from participation in EU-wide networking activities. Research results are published by both researchers in proceedings, books, and high-ranking journals, quite often jointly which confirms their high level of cooperation.

Recommendations

Analysis: Try to involve the non-active permanent faculty in interdisciplinary research.

Didactics: It could be advisable for both mathematics educators to shape their own research profile in addition to their collaborative work as was already done with the work by Frejd on vocational education. Furthermore, more collaborative work on mathematical modelling between mathematicians and mathematics education should be implemented leading to joint research activities.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Without external funding, the time for research is limited (15% for associate professors, 20% for full professors, and 20% for three years for newly hired faculty)

Analysis: The group already now publishes in strong generalist journals. There are no recently hired young researchers, the active associate professors obtained their doctoral

degrees more than 15 years ago. The unit has tried to hire in the past without success. They should repeat now that the market for hiring is very good. Hiring now would also allow for the strong researchers in analysis to act as mentors for the incoming people. However, it is important to make offers as attractive as possible.

The PhD program is very small, with only a single student, which is unfortunate given the level of research conducted in the unit.

The active researchers in the unit have extensive research collaborations and are well-connected. The gender balance at the division is problematic, which is typical in pure mathematics, and this should be taken into account in future hirings.

Didactics: Both mathematics educators are following a good publication strategy publishing in books and journals. They are members of an international study group on the research of mathematical modelling education (ICTMA) and are in the process of organizing the next conference, which will take place in August 2025. This will enhance the international visibility of the group and of the university in general.

Recommendations

Analysis: Consider better start-up packages for newly hired faculty. At least they should have funds to attend conferences and for research trips. Hire a second PhD student.

Engage in building a stronger research culture encompassing the entire analysis group. Encourage those who have no active research to team up with someone who is active or to engage in interdisciplinary research.

Didactics: Both mathematics educators should try to increase their publication efforts, especially in high-ranking journals, not only in mathematics education, but in general education as well.

To strengthen the research potential of the group, it is advisable to hire at least one more PhD student and to include students at the master level in ongoing research projects. Overall, the group of graduate students within education should be strengthened with more courses offered and more support for joint activities. Participation in national and international conferences should be encouraged. The mathematical courses required should be connected to the PhD thesis and strengthen the quality of the thesis.

Gender balance and equal opportunities is an issue and should be considered in the hiring strategy at all levels and in all groups.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Obtaining further funding is crucial for expanding research time for the members of the division and for having funds for more PhD students. The division appears to have a good practice with applying for funds (mainly, or exclusively, VR) via peer reviews of applications. This, however, has to be supplemented with more competitive recruitment and better research conditions for new faculty.

Recommendations

Consider joint PhDs or double degrees (co-tutelle). This can strengthen international relations and, potentially, be a way of sharing costs for a PhD student with another institution.

Encourage mathematicians - especially those who are no longer active in their former research area - to seek collaborations with other disciplines in which their mathematical expertise may be valuable. Invite other departments to present their research questions that may benefit from mathematical expertise. Grant applications could be more successful if more than one researcher teams up to pool their ideas and CVs.

Look more broadly at possible sources of funding, such as Marie Sklodowska-Curie postdoctoral fellowships (to enable foreign postdocs to come to LiU) and other European grants.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Analysis: A second PhD-student in analysis should get hired. One should hire in analysis in the very near future: retirements have weakened the research group, market for hiring is good now and the remaining strong researchers could help in early career development before their own retirements.

Didactics: The mathematics education group is too small and needs strengthening, at least by one more additional position, maybe at a lecturer level. A second PhD-student is needed to support each other and raise the overall quality of the research culture.

Panel A Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The research in the mathematical sciences at LiU has been assessed by an international panel chaired by Kimmo Eriksson (Mälardalen University, Sweden) and with panel members from four other countries: Mikael Rørdam (University of Copenhagen, Denmark), Pekka Koskela (Jyväskylä University, Finland), Gabriele Kaiser (University of Hamburg, Germany), and Antonella Zanna Munthe-Kaas (University of Bergen, Norway). Our reports are based on the panel's reading of the self-evaluations and the data provided, additional information available online, and interviews with senior management, researchers, and PhD students in the three divisions of the department of mathematics.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

At the university level: There is great potential for interdisciplinary collaboration between mathematicians and other disciplines working with problems where high-level mathematical competence can make a difference. The Applied Math Division already works very successfully in this direction but in the other two divisions this potential could be exploited more, to the benefit of the entire university. This would require efforts from the mathematicians, which could be incentivized by funds for the startup of interdisciplinary collaborations.

At the department level: We observed a distinct difference between the evaluation units in the department. Specifically, the Applied Math Division appears to have achieved a considerably stronger research culture than the other divisions. This is both a cause and a consequence of more grants, strong recruiting, and high research output. We believe the department needs to find ways for the other divisions to learn from the research culture the Applied Math Division has established. At the departmental level, there seems to be a need to develop a vision for how it wants to develop over the coming 5-10 years and for a clear strategy for recruitment to realize that vision. It is recommended that hiring postdocs is included in this strategy.

The department should also jointly consider ways of further improving the PhD program in mathematical sciences. The total number of PhD-students in the department is good, but the numbers of students within the same research area are small (and in some areas too small; having at least two students in similar fields is recommendable). Consequently, the number of PhD courses that would be needed to serve all these research areas cannot be given within available resources. Collaborations with other universities is a good way to be able to offer more PhD courses and to help PhD students build networks within their area. Intensive courses could be considered to make such collaborations more efficient in terms of travel.

The panel further believes that the course requirement (100 credits) for PhD students in mathematics is too high (e.g., higher than at the panel members' departments) and should be decreased by a significant amount. Moreover, many math departments have a graduate student seminar, in which students from different research areas give presentations to each other. This serves the double purpose of training PhD students in communicating mathematics and providing a broad exposure to areas in mathematics.

The panel found that PhD students were not sure what is expected of them in terms of research output. Perhaps the minimum requirements stated in the general syllabus (two papers that are published or accepted for publication) have not been clearly communicated. At any rate, we suggest making formal and informal expectations clear to PhD students early in their studies.

As teaching easily infringes on the time for research, ensure that service teaching is done in the most efficient way, not compromising quality. More reflections on teaching and ways to improve teaching culture should be considered, for example by implementing or strengthening the role of a pedagogical mathematics club, in which new ways on teaching and overall ideas for raising the quality of teaching could be discussed. It could be beneficial to involve the researchers in the didactics of mathematics in these activities.

Evaluated Unit's Name: MAI.TIMA Applied Mathematics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The role of Mathematics at LiU has, historically, been service teaching. Nonetheless, the TIMA division has played a pioneering role in research in the fields of Computational Mathematics and Optimization, subsequently complemented with the addition of Mathematical Statistics, which has become increasingly crucial in today's data-driven world.

TIMA's research topics have a wide range, spanning theoretical analysis of convergence of numerical methods to application-driven research, machine learning and artificial intelligence.

The division has a high level of collaboration with other units and departments at LiU as well as national, international, and industrial partners (including industrial master projects). These collaborations, combined with a targeted recruitment strategy, have resulted in prestigious funding from the WASP program for promising early career researchers. Plans for future research funding are set high on the agenda, and it is exciting that the division is planning to apply to the EU-Horizon program.

Recommendations

The division is successful with respect to external funding on a national level. TIMA has high potential as a competitive partner / coordinator for EU programs, especially the Horizon programs/Pillar II (European industrial competitiveness). The first steps in this direction have been taken and could be further pursued and included in the strategy plans for securing future research funding.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

TIMA has worked systematically and successfully with their research culture. Research culture is regularly discussed at division meetings, and expectations are brought up as a topic in the "medarbetarsamtal". Early career researchers are included as co-applicants to projects and co-supervisors, which contributes to career development.

All the members of the division, even those with low research time, are active researchers and publish regularly in good to high level journals. Another major output is open-source software.

PhD students are distributed unevenly between faculty members in the Statistics and Optimization groups. This may be something to consider.

The division has the highest level of gender balance in the department and also the highest proportion of international members. These are positive factors for a dynamic environment.

Recommendations

Continue sharing research culture/good practices about research expectations with the other divisions in the department. Use opportunities, when possible, to encourage

collaboration with less active researchers from the other divisions to engage in interdisciplinary projects. Collaboration with other departments on the new MSc program in Engineering Mathematics can provide a platform for new interdisciplinary contacts and master projects.

The current initiative with peer-review of project proposals is positive. Work with the other divisions on a strategic plan with the goal of securing/increasing research funding at the department level.

Consider applying for or participating in EU funding schemes such as MSCA Doctoral Networks.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Within the department, the TIMA division has the best conditions for research. TIMA has the advantage of higher industrial relevance and a better fit to the thematic priorities of external funding (especially WASP and other foundations). A strategic use of external funding towards PhD positions (rather than research time for faculty) has ensured high research output, further strengthening the competitiveness of the group in applications for external research funding. The courses taught by the unit are relevant for the research activity of the teachers. Recruitment of junior researchers, especially within the WASP and Zenith career development program, has been particularly successful. Overall, the plans, strategies and organization of work in the TIMA division appear to work very well.

Recommendations

To strengthen the support of PhD students in their research training, especially in the Statistics and Optimization groups, recruitment of more researchers at the postdoc level would be beneficial. PhD students can benefit also from spending some research time in an international institution.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel was impressed with the level of activity, energy, and strategic thinking shared by the interviewees in the applied mathematics division.

Panel B Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel composition

Chair
Ann Nowe, Vrije Universiteit Brussel, Belgium
Expertise : Artificial Intelligence / Computer Science

Members
Aura Tuomas, Aalto University, Finland
Expertise: Information Security
Victor Kaptelinin, Umeå University, Sweden
Expertise: Human-Computer Interaction
Katinka Wolter, Freie Universität Berlin, Germany
Expertise: Dependable distributed systems
Sune Karlsson, Örebro University, Sweden
Expertise: Statistics
Thomas Ertl, University of Stuttgart, Germany
Expertise: Visual Computing, Visualization

All members participated in the online meetings organised by LiU.

The panel had a preparatory meeting to prepare the visit. During this meeting, we decided on a plan of approach. Each unit was assigned a primary person to initiate the discussions and a secondary person to take notes. The panel compiled a set of generic questions for all units and supplemented them with unit-specific questions. It should be noted that all panel members were actively involved in both the interviews and in the evaluation of all the units.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The general observations and recommendations listed below are intended as suggestions that the divisions and/or the university may explore when planning future work.

The panel is generally impressed by the breadth and depth of computer science research at LiU and its positioning on the national and international scale. The fact that the expertise is spread over several campuses brings some challenges for collaboration between ITN and IDA. While improvements are possible, the panel appreciates the efforts being made, both related to research and education.

The evaluation was overall well organized, and the administrative support was highly appreciated. Nevertheless, the schedule was tight, leaving little room for internal discussion among the panel.

The evaluation units provided relevant information for the site visits and created an open and welcoming atmosphere for discussions with research leaders, junior researchers, postdocs and PhD students. The information presented by the groups could have been more consistent. Some additional information was provided on request; this information could have been provided before the site visit. It would also have been more informative to have the composition (who and which position) of the unit in the material provided, as well as a publication list and an overview of service to the community. Finally, the base funding mentioned in the background material also includes competitive internal funding, which makes the information less transparent.

Although this research evaluation was not targeted at comparing units or individual researchers, differences between the evaluation units became obvious in the self-evaluations and during the discussions with the units. The panel tried to analyze the conditions for the various levels of research excellence and found issues which often have structural reasons beyond the division level.

Financial model

While academic institutions all over the world strive for an increase in basic funding, the panel acknowledges that LiU for historical and other reasons has been struggling with relatively limited governmental funding. The panel encourages the university leadership to work on strategies for improving the basic recurrent funding. This is especially important from the computer science field perspective, where research has significantly grown in quality and quantity during the last years mainly due to external funding.

Other factors influencing the research quality can be identified in various facets of the university and are described below in detail. One general observation is that the university structure from the university administration over faculty, department, division down to a unit is perceived as very hierarchical with the administrative hierarchy standing in the way of effective use of resources. The panel had the impression that more transparency and communication regarding university strategies (like profile areas or major investments) would enable units and researchers to better align with university strategies.

As far as the financial model of the divisions is concerned, we noticed a strong general feeling of *"Earn your own salary"*. PIs have to manage to obtain a combination of teaching and research to pay for their own salary. There are no guidelines on a healthy balance between teaching and research. The model incentivizes divisions to "protect" their teaching share. The panel also noticed a discrepancy in the university financial system between who takes risk and who is allowed to mitigate risk. In practice, the risk for funding shortfall is with the division or lab, and they are responsible for multi-year commitments to employment and research infrastructure. This is not aligned with the practice of taking away a part of the division's funding surplus at the end of the year. The part of the organization that carries the financial risks should also be allowed to mitigate the risks and to plan their finances over multiple years, including making some savings.

Finally, there is a significant dependency on WASP funding, also for permanent positions. The university should set up a long-term plan, in case the WASP funding is phased out, as the units cannot suddenly absorb the cost of all these permanent employees.

Hiring

Success in hiring the best researchers is essential for the university's future. The faculty hiring process at LiU is slow, which may result in the best candidates going elsewhere. The process is managed by a faculty-level appointments board, and the department has no control over how long the process takes. This is a problem especially when hiring entry-level faculty, who often receive competing offers from other institutions. The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

The panel has the impression that the divisions and (to a lesser extent) the department are disconnected from the recruitment process once the position is announced. While

the final hiring decision can be made at the higher level there should be a clear path for the division and department to give input about the selection of candidates.

The university does not have systematic support for dual careers when researchers recruited to the university have spouses who also seek employment in Sweden. More advice could be provided to partners of relocating faculty members on finding employment in and outside the university. The panel heard both good and bad examples in this regard. There is a policy at IDA against married partners working at the same division. While it is good practice to avoid conflicts of interest in the management chain, the current policy seems too strict. It may prevent hiring of the most qualified candidates, and it may result in unfair treatment of married researchers.

Career model

The university does not provide a starting package for most new faculty members. From day one, many are expected to provide funding for their own position from external grants or from teaching full time, unless the unit has a budgetary buffer. This creates a trap for new junior faculty where some have to spend their time teaching, have a gap in publications, and cannot start building their own group. New junior faculty members should be given more time for research in their first 2-4 years at the university, and their teaching load should be increased gradually, starting from, e.g., 0% to 20%. Now, it is fully up to the unit if the new hire can be protected from a full teaching load. Starting grants from WASP mitigate the issue for some new hires in some research areas, but they are not an overall solution.

Most PhD students and postdoc researchers whom we interviewed want to continue their research career at LiU. This is primarily a positive indicator. However, LiU cannot keep them all permanently. There should be clearer advice to starting PhD students and postdocs that most will eventually have to seek opportunities in other Swedish and international institutions or in industry. The illusion that everyone can stay at LiU has probably been created by the career model that does not limit the number of researchers who can progress in the career path, provided they have external funding for themselves and their group. On one hand, the career model enables growth in research fields that are in high demand and avoids harmful internal competition. On the other hand, PhD students and postdocs may be given a false sense of security.

Grant writing support

There could be more systematic university or department-level support for major grant applications such as European projects. The quality of the central support now seems to vary a lot. Currently, each researcher has to learn the application process and format by themselves or rely on informal help from colleagues. Timely advice and review from

an experienced grant writer could save a lot of work and reduce the number of unsuccessful applications.

European project applications often require text about the applying institution. The university and each department should have an easily available text that describes the institution: The text should be regularly updated so that any numerical indicators (e.g., size, ranking) are up to date. Currently, each individual researcher has to write their own version of these texts.

Diversity and gender balance at IDA

The evaluated units are culturally diverse with many international members. Many of them joined because friends and colleagues recommended the university or unit to them. It is a great advantage for LiU to have such a reputation internationally.

Gender balance in most of the evaluated units is poor. While the university is taking some actions on the global level, it would be good to take specific actions for computer science as gender balance is still a concern internationally. The uncertainty of funding for new faculty members is one possible reason why qualified candidates choose not to apply. This is a self-perpetuating problem, and all possible measures should be taken to recruit some women to all levels of the career structure. The panel recommends that the department and division leaders study best practices for equal-opportunity efforts in other universities to develop their own tools to achieve gender balance.

Organization and community creation at IDA

The internal division structure within IDA was originally created for organizing the management of the growing department and especially growing undergraduate education. Over time, the divisions have also become a structure for organizing research in the department. From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research. With that said, none of the groups interviewed expressed an immediate need for changes in the organization.

PhD students and postdoc researchers typically form a community within their own lab or division. They also form networks outside the university through joint projects and doctoral schools. On the other hand, there is less interaction between the divisions within IDA. There could be more support for department members learning to know each other across division boundaries. This could help especially those who are new to

LiU to create connections for both social activities and for future research collaborations.

Web pages and science communication

There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities. The research groups and individual researchers would want to maintain their own pages and make updates without delay. Each group and person should be able to decide what information they want to share besides the uniform basic items. It should be easy for departments and divisions to post news items, such as scientific awards, major grants, and outreach activities, on or linked to the university web pages. Visibility of the research on the web is critically important for the results to have an impact and for the careers of the individual researchers and units.

The university web pages should be structured so that they are reliably indexed by search engines such as Google.

IT support

Buying and maintaining equipment is too complicated and loaded with administrative procedures. Research IT needs more flexibility compared to basic IT services that are provided to everyone. The procurement processes for equipment and online services should support the fast pace and changing needs of cutting-edge research.

When possible, the researchers should use cloud and university data center computing resources to avoid the overhead of managing their own hardware infrastructure.

PhD education

The panel noticed a big diversity amongst the different doctoral schools to which the students belong. While some schools are very well organised and allow students to meet peers from other universities, the planning and announcement of internal PhD courses could be improved. Attending international summer schools should also be valued more. Not only can students attend up to date high level courses by experts; they also build up their research network by attending such events.

Evaluated Unit's Name: IDA.ADIT Computer and Information Science

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The evaluation unit, Division for Database and Information Techniques (ADIT), belongs to the Department of Information and Computer Science (IDA). The division is comparably small; it employs two full professors and a total of 23 academic staff. The division was created for administrative reasons, and there is no one overarching research theme. Instead, each faculty member has their own research topic, and no attempt was made to present them as one shared narrative. The currently active research topics in the division are mostly related to semantic information systems, communication, and cyber security. Over time, database research has moved out of the division while security has grown to an important topic.

The research groups headed by senior faculty members are Air and Ground Information Security Group (AEGIS), which works primarily on unmanned aviation, Communications for Networked Intelligent Systems Group (CNIS), working on semantic communication, Databased and Web Information Systems group (DWIS), which focuses on graph-structured data and graph query languages, and Security and Networks Group (SN), which has attacked a broad range of topics in these areas. The groups are informal and overlap with the inter-divisional Semantic Web Group and cross-group Sports Analytics research.

The faculty members are each visible and productive in their own niche research area. Most publications appear in specialized conferences and workshops. The division is consistently active in the semantic web research community. Top-tier publications appear in journals and occasionally in conferences. The division could have a stronger presence in mainstream communications and information security conferences, but since it is more an administrative unit than one research group, it is not easy to have a joint strategy to build reputation as a group.

The strategic priority in ADIT has been placed on the development of individual research careers. The interviews did not highlight shared research problems or societal goals. If there is one overall vision for the future, it is to maintain the current research environment that allows each of the individuals to develop in their own direction. Renewal of the research topics happens when new faculty members join and decide to work in a different direction.

As is common in the department, ADIT has many collaborative research projects with both national and European funding. These often include industry partners, which ensures continuous interaction with the application fields. No specific successes in technology transfers or public outreach were highlighted; instead, industry impact arises mainly from the mobility of people, including doctoral graduates.

The sports analytics group within ADIT is an ad-hoc cooperation between faculty members who are ice hockey enthusiasts. It is currently a hobby, and no significant resources are allocated to the area. There would be potential to develop sports analytics into a rigorous academic research agenda. The topic could capture the imagination of students and lead to commercial applications.

Recommendations

Continue to find opportunities for cross-group collaboration within ADIT with the goal of gradually forming a more cohesive research agenda.

Discuss joint strategies for creating and maintaining continuous visibility of the research conducted in the division, and more widely at the university, in the most relevant specialized and mainstream research conferences.

Decide whether to develop sports analytics into a serious academic research area at LiU. The research agenda and methodological basis would need to be defined more rigorously, and the work should be supported by external funding and cooperation with businesses.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The publication strategy varies greatly between faculty members, with the common observation that the number of minor publications is quite high. One reason for this is that the research is split into many externally funded projects, each with its own goals. Working together and focusing the effort on a smaller number of the most promising problems might make it possible to convert the quantity to even better quality.

Hiring in the division is opportunistic and does not follow any clear strategy. Candidates are often found through the personal networks of the existing faculty members. New members have embraced the existing culture where each person focuses on their individual research agenda. This relative freedom can be attractive for new faculty members. The downside is that individuals need to build their own reputation from scratch, and being or having been a member of ADIT does not give them a boost.

PhD students within the division form a social community and are generally happy with their situation. However, they each work on their separate externally funded project or receive funding from different graduate schools. This has the result that each PhD student forms their professional network primarily outside the university.

The project-based funding model ensures that, to survive in academia, every faculty member has a collaboration network in Sweden and often also in Europe.

While gender balance is a common problem in computing, it is quite striking that all faculty members in ADIT are male. It can be difficult to break out of this situation.

ADIT faculty members had a more positive view of teaching than the panel heard elsewhere. They felt that there is a balance between teaching and research, teaching adds stability to the otherwise project-based funding, and they are able to influence the selection of courses so that it matches their interests.

The lack a basic funding for research creates a potential vicious cycle for newly hired researchers: If they do not find external funding in the beginning, they must teach full time and have no time for research, which further reduces the chances successful grant applications in the following years. This is a common problem across the interviewed units.

Recommendations

Join forces within the division or with others at LiU to work on research problems that have high potential impact even if this leads to fewer publications overall.

Find ways for multiple PhD students to work together on research tasks. For example, PhD students could contribute to each other's projects, leading to joint publications.

Consider possible actions to improve the gender balance in faculty positions.

The university should have a startup package for new faculty members to avoid them getting trapped into full-time teaching. Until such packages become available, the division should pool resources to give new hires sufficient research time in their first years.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The research in ADIT has significant overlap with other divisions in IDA, and there is no thematic reason for the division boundaries to remain as they are today. Nevertheless, it appears that everyone is satisfied with the current organizational structure, and there are no pressing reasons to make changes. There have been examples of faculty members moving between divisions when they felt it served their research interests, which is a healthy situation.

Contrary to the typical model in the IDA department, the ADIT division has no formal internal group structure. The lack of formal organizational hierarchy has the potential of encouraging opportunistic cross-area collaboration, with the sports analytics research as one example.

The lack of basic funding and the need to run a continuous stream of externally funded projects is an accepted fact of life for those who aim for an academic career at LiU. The project-oriented approach does, however, limit the ability of research groups to focus efforts on a promising problem when one is found or to form a joint strategy on the division level. For postdoc researchers and PhD students, the funding source determines their research topic and collaborations, which can limit their development.

Like other evaluated units, ADIT expressed dissatisfaction with how university web pages are maintained and how difficult it is to publicize academic successes. They also could use more support for writing European project applications. It is a waste of resources if everyone has to go through the same learning process on their own.

Recommendations

Arrange exchange of ideas and seek collaboration with others at LiU who are working on similar topics. There are many units across the university doing research on semantic information, communications, and security.

Help PhD students and postdoc researchers to network professionally across the organizational boundaries, for example, by arranging seminars with others who work on similar topics in the IDA department. Encourage PhD students to start ad-hoc collaborations when they find common interests.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel's overall impression of ADIT is that the people there are comfortable in the current environment, each working on their own priorities, and there is no desire to stir things up. The individual faculty members with their students are productive, active in specialized research communities, and publish in high-quality venues. Our main recommendation is to increase cooperation within and outside the division and to focus effort on the most promising research questions. Such cooperation and concentration of forces could lead to an increase in high-impact publications and support PhD training.

Panel B Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel composition

Chair
Ann Nowe, Vrije Universiteit Brussel, Belgium
Expertise : Artificial Intelligence / Computer Science

Members
Aura Tuomas, Aalto University, Finland
Expertise: Information Security
Victor Kaptelinin, Umeå University, Sweden
Expertise: Human-Computer Interaction
Katinka Wolter, Freie Universität Berlin, Germany
Expertise: Dependable distributed systems
Sune Karlsson, Örebro University, Sweden
Expertise: Statistics
Thomas Ertl, University of Stuttgart, Germany
Expertise: Visual Computing, Visualization

All members participated in the online meetings organised by LiU.

The panel had a preparatory meeting to prepare the visit. During this meeting, we decided on a plan of approach. Each unit was assigned a primary person to initiate the discussions and a secondary person to take notes. The panel compiled a set of generic questions for all units and supplemented them with unit-specific questions. It should be noted that all panel members were actively involved in both the interviews and in the evaluation of all the units.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The general observations and recommendations listed below are intended as suggestions that the divisions and/or the university may explore when planning future work.

The panel is generally impressed by the breadth and depth of computer science research at LiU and its positioning on the national and international scale. The fact that the expertise is spread over several campuses brings some challenges for collaboration between ITN and IDA. While improvements are possible, the panel appreciates the efforts being made, both related to research and education.

The evaluation was overall well organized, and the administrative support was highly appreciated. Nevertheless, the schedule was tight, leaving little room for internal discussion among the panel.

The evaluation units provided relevant information for the site visits and created an open and welcoming atmosphere for discussions with research leaders, junior researchers, postdocs and PhD students. The information presented by the groups could have been more consistent. Some additional information was provided on request; this information could have been provided before the site visit. It would also have been more informative to have the composition (who and which position) of the unit in the material provided, as well as a publication list and an overview of service to the community. Finally, the base funding mentioned in the background material also includes competitive internal funding, which makes the information less transparent.

Although this research evaluation was not targeted at comparing units or individual researchers, differences between the evaluation units became obvious in the self-evaluations and during the discussions with the units. The panel tried to analyze the conditions for the various levels of research excellence and found issues which often have structural reasons beyond the division level.

Financial model

While academic institutions all over the world strive for an increase in basic funding, the panel acknowledges that LiU for historical and other reasons has been struggling with relatively limited governmental funding. The panel encourages the university leadership to work on strategies for improving the basic recurrent funding. This is especially important from the computer science field perspective, where research has significantly grown in quality and quantity during the last years mainly due to external funding.

Other factors influencing the research quality can be identified in various facets of the university and are described below in detail. One general observation is that the university structure from the university administration over faculty, department, division down to a unit is perceived as very hierarchical with the administrative hierarchy standing in the way of effective use of resources. The panel had the impression that more transparency and communication regarding university strategies (like profile areas or major investments) would enable units and researchers to better align with university strategies.

As far as the financial model of the divisions is concerned, we noticed a strong general feeling of *"Earn your own salary"*. PIs have to manage to obtain a combination of teaching and research to pay for their own salary. There are no guidelines on a healthy balance between teaching and research. The model incentivizes divisions to "protect" their teaching share. The panel also noticed a discrepancy in the university financial system between who takes risk and who is allowed to mitigate risk. In practice, the risk for funding shortfall is with the division or lab, and they are responsible for multi-year commitments to employment and research infrastructure. This is not aligned with the practice of taking away a part of the division's funding surplus at the end of the year. The part of the organization that carries the financial risks should also be allowed to mitigate the risks and to plan their finances over multiple years, including making some savings.

Finally, there is a significant dependency on WASP funding, also for permanent positions. The university should set up a long-term plan, in case the WASP funding is phased out, as the units cannot suddenly absorb the cost of all these permanent employees.

Hiring

Success in hiring the best researchers is essential for the university's future. The faculty hiring process at LiU is slow, which may result in the best candidates going elsewhere. The process is managed by a faculty-level appointments board, and the department has no control over how long the process takes. This is a problem especially when hiring entry-level faculty, who often receive competing offers from other institutions. The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

The panel has the impression that the divisions and (to a lesser extent) the department are disconnected from the recruitment process once the position is announced. While

the final hiring decision can be made at the higher level there should be a clear path for the division and department to give input about the selection of candidates.

The university does not have systematic support for dual careers when researchers recruited to the university have spouses who also seek employment in Sweden. More advice could be provided to partners of relocating faculty members on finding employment in and outside the university. The panel heard both good and bad examples in this regard. There is a policy at IDA against married partners working at the same division. While it is good practice to avoid conflicts of interest in the management chain, the current policy seems too strict. It may prevent hiring of the most qualified candidates, and it may result in unfair treatment of married researchers.

Career model

The university does not provide a starting package for most new faculty members. From day one, many are expected to provide funding for their own position from external grants or from teaching full time, unless the unit has a budgetary buffer. This creates a trap for new junior faculty where some have to spend their time teaching, have a gap in publications, and cannot start building their own group. New junior faculty members should be given more time for research in their first 2-4 years at the university, and their teaching load should be increased gradually, starting from, e.g., 0% to 20%. Now, it is fully up to the unit if the new hire can be protected from a full teaching load. Starting grants from WASP mitigate the issue for some new hires in some research areas, but they are not an overall solution.

Most PhD students and postdoc researchers whom we interviewed want to continue their research career at LiU. This is primarily a positive indicator. However, LiU cannot keep them all permanently. There should be clearer advice to starting PhD students and postdocs that most will eventually have to seek opportunities in other Swedish and international institutions or in industry. The illusion that everyone can stay at LiU has probably been created by the career model that does not limit the number of researchers who can progress in the career path, provided they have external funding for themselves and their group. On one hand, the career model enables growth in research fields that are in high demand and avoids harmful internal competition. On the other hand, PhD students and postdocs may be given a false sense of security.

Grant writing support

There could be more systematic university or department-level support for major grant applications such as European projects. The quality of the central support now seems to vary a lot. Currently, each researcher has to learn the application process and format by themselves or rely on informal help from colleagues. Timely advice and review from

an experienced grant writer could save a lot of work and reduce the number of unsuccessful applications.

European project applications often require text about the applying institution. The university and each department should have an easily available text that describes the institution: The text should be regularly updated so that any numerical indicators (e.g., size, ranking) are up to date. Currently, each individual researcher has to write their own version of these texts.

Diversity and gender balance at IDA

The evaluated units are culturally diverse with many international members. Many of them joined because friends and colleagues recommended the university or unit to them. It is a great advantage for LiU to have such a reputation internationally.

Gender balance in most of the evaluated units is poor. While the university is taking some actions on the global level, it would be good to take specific actions for computer science as gender balance is still a concern internationally. The uncertainty of funding for new faculty members is one possible reason why qualified candidates choose not to apply. This is a self-perpetuating problem, and all possible measures should be taken to recruit some women to all levels of the career structure. The panel recommends that the department and division leaders study best practices for equal-opportunity efforts in other universities to develop their own tools to achieve gender balance.

Organization and community creation at IDA

The internal division structure within IDA was originally created for organizing the management of the growing department and especially growing undergraduate education. Over time, the divisions have also become a structure for organizing research in the department. From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research. With that said, none of the groups interviewed expressed an immediate need for changes in the organization.

PhD students and postdoc researchers typically form a community within their own lab or division. They also form networks outside the university through joint projects and doctoral schools. On the other hand, there is less interaction between the divisions within IDA. There could be more support for department members learning to know each other across division boundaries. This could help especially those who are new to

LiU to create connections for both social activities and for future research collaborations.

Web pages and science communication

There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities. The research groups and individual researchers would want to maintain their own pages and make updates without delay. Each group and person should be able to decide what information they want to share besides the uniform basic items. It should be easy for departments and divisions to post news items, such as scientific awards, major grants, and outreach activities, on or linked to the university web pages. Visibility of the research on the web is critically important for the results to have an impact and for the careers of the individual researchers and units.

The university web pages should be structured so that they are reliably indexed by search engines such as Google.

IT support

Buying and maintaining equipment is too complicated and loaded with administrative procedures. Research IT needs more flexibility compared to basic IT services that are provided to everyone. The procurement processes for equipment and online services should support the fast pace and changing needs of cutting-edge research.

When possible, the researchers should use cloud and university data center computing resources to avoid the overhead of managing their own hardware infrastructure.

PhD education

The panel noticed a big diversity amongst the different doctoral schools to which the students belong. While some schools are very well organised and allow students to meet peers from other universities, the planning and announcement of internal PhD courses could be improved. Attending international summer schools should also be valued more. Not only can students attend up to date high level courses by experts; they also build up their research network by attending such events.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The unit of AI and Integrated Computer Systems (AIICS) does fundamental and applied research in AI and autonomous systems. The unit consists of five groups: AILAB (AI and The AILAB is a structural unit at IDA and part of the Artificial Intelligence and Integrated Computer Systems Division), MR (Machine Reasoning), NLP (Natural Language Processing), ReaL (Reasoning and Learning), and TCSLAB (Theoretical Computer Science). The unit has grown over the past years. What is now AILAB was initially the core of AIICS, meaning that new teams have joined. Today, the unit consist of 4 professors, 2 professors emeriti, 1 guest professor, 1 senior associate professor, 4 associate professors, 2 assistant professors, 3 research engineers, 8 postdocs, and 27 PhD students.

AIICS is the **unit** at LiU which does core AI research and studies a variety of AI approaches. This broad spectrum is necessary as trends and opportunities change over time. The panel supports this strategy. Below, we briefly describe each team. The **AILab**, founded in 1995, can build on a long history. The lab is taking a leading position and combines theoretically grounded and integrated with robotic systems that have been field tested. It puts strong emphasis on the fact that experiments should be repeatable, which is key for scientifically valid results. The **Machine Reasoning group (MR)** combines symbolic approaches with Machine Learning. This hybrid approach is strategically interesting and allows to combine the best of both worlds. The **NLP group** can build on its expertise in the intersection of traditional natural language processing and theoretical computer science. The team also includes machine learning techniques, which are very relevant with the recent breakthroughs in Generative AI in general and LLMs in particular. The **Reasoning and Learning Lab (ReaL) group** also takes an integrated approach by focusing on a variety of Machine Learning techniques. This integrated approach allows the team to be at the forefront of Trustworthy AI. Finally, the **Theoretical Computer Science Laboratory (TCSLAB**) does fundamental research on algorithms and computational complexity, with a focus on computational problems encountered in AI. FPT-approximability has been identified as a strategic topic and has already led to publications at top conferences.

All groups are publishing at high impact journals and top conferences in the field. The publication record of all groups is at a very high level. They are participating in major projects, including international projects and consortia, which shows they are well embedded in the international community. In the unit, there is also a strong focus on more applied research, and theory and practice reinforce each other.

The long-term road map of some groups is more elaborate than others, but all are sufficient and strategically interesting. It should be noted that AI is a fast-developing field, and the hype which drives the main interest of industry is determined by the big tech. As this is unpredictable, the strategy of the unit to also study topics which currently receive less attention is positive.

Recommendations

While all groups are performing at a very high level and are internationally recognized, the panel recommends the unit to look for more internal collaboration and exchange of expertise. This could be realised by joint seminars, incentivising staff and PhD students to attend them and brainstorming together. The panel's impression is that currently the groups are not sufficiently benefiting from each other's expertise. As all groups put integrated approaches high on their agenda, this cross-fertilisation is key to staying at the forefront of research. While the self-evaluation report was convincing in conveying the strength of each group, it was lacking an overall ambition. A stronger unit-level vision could further improve the international recognition of the five groups. This could also contribute to realising the unit's ambition w.r.t acquiring ERC funding.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

As mentioned above, all groups are publishing at high impact journals and top conferences in the field. The publication record of all groups is at a very high level, mainly targeting CORE A* and CORE A ranked conferences and Q1 journals. The unit can rely on a large international network to recruit PhD and young staff. The number of PhDs that graduate per year is quite high and is expected to increase over the coming years.

The junior staff was partially recruited locally, partially internationally. They feel well supported by the senior staff and appreciate received guidance. The gender balance is a point of attention (only 8% of staff and 1/4 PhD students of AIICS are female).

The groups organise regular seminars and meetings. How these seminars are organised, the frequency, and approach are group dependent. There is also a seminar at AIICS unit level, but it its general attendance is not mandatory and variable .

The groups are involved in teaching which is related to their research. The teaching load varies between the groups. The teaching involves all levels, from bachelor and master to PhD, as well professional education. The ReaL group is also responsible for the course Elements of AI with about 80 000 participants online, and more than 10 000 students have received university credits for the course. Prof. Heintz is the Program Director for WASP-ED and the Director of the WASP Graduate School with more than 600 PhD students.

The PhD course credits have been reduced from 90 to 60 credits, which the panel considers positive. As the PhD students belong to different PhD schools (some are in WASP, others mainly have to rely on courses offered locally), there is a large diversity in the courses the students take and how PhD students experience the studies.

Recommendations

The panel recommends finding ways to share in a more efficient way the expertise which is available in the different groups. While senior staff might be aware of the expertise in the other groups, this is not necessarily the case for junior staff, especially PhD students. It would be good to intensify knowledge exchange between the PhD students in the unit, as well as with other units working on related topics. Reviving the AIICS Seminar, which is currently not well-attended, could be considered. An alternative is to organise reading groups. This would not only benefit the knowledge exchange but could also be a way to reduce the PhD school teaching load within the unit. The panel also advices to give higher value (including more credits) to the participation PhD student in international summer schools.

As mentioned above, the junior staff feels well supported by the senior staff. On the other hand, the support provided by the central university services is perceived to be variable in terms of both quality and responsiveness, which depend on the person who deals with the case. The panel advises the university to evaluate what can be improved, e.g., make standard administrative information on the university and department, which are required for funding proposals, continuously available on the intranet.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The unit consists of 5 groups (see above), with a good balance of senior and junior staff. Besides the formal meetings of the unit, there are informal meetings where information is shared, e.g., on funding opportunities.

The unit's project portfolio contains a wide variety of projects, ranging from fundamental theoretical research to industry collaborations. The grants show a positive trend, both for direct governments grants and external grants. The income from education is steady over the last few years. It should be noted that there is significant share of WASP funding (60% of external funding in 2023). WASP also funds a significant share of the PhD students and lab infrastructure.

WASP AI funds have contributed to the development of the cutting-edge UAV lab. In addition, the unit has a diverse suite of heterogeneous robotic systems. To maintain this infrastructure the unit invests a significant part of its budget in technical support staff, currently 5 FTE technical staff and 1 FTE administrative support.

Besides the Berzelius AI/ML cluster hosted by LiU, the groups also have access to more dedicated infrastructure such as AIOps via the ELLIIT Infrastructure project and EuroHPC machines. While the infrastructure fulfils most needs, usage rules for Berzelius are not optimal for the specific research needs of AIICS, who develop new algorithms instead of running existing stable code on large datasets.

Recommendations

The unit often needs to purchase latest technology or specialized equipment that cannot be provided by the regular vendors. Flexible procurement processes are necessary for the unit to remain competitive in research areas that require such equipment. The central services are too rigid to efficiently support the equipment needs of the unit, and alternative processes should be developed for one-time research equipment needs.

The unit receives a significant share of WASP funding, which is mainly used to fund PhD students and in addition, engineers to support activities associated with the WASP Public Safety Research Arena. While the unit is actively applying for other funding and is successful in doing so, there is a risk the unit might become significantly less competitive when the Wallenberg funding comes to an end. This would especially have an impact on the research infrastructure and could put the unit in a vulnerable position. It is important to have a diverse portfolio of projects and funding sources and be careful to not overgrow the department based on just one funding source.

Another issue related to the funding is that the unit is not allowed to save budget for larger equipment purchases or future maintenance. There should be mechanisms for units to plan their budgets over several years to enable investment into research infrastructure on the unit and group level.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The atmosphere of the unit is open and welcoming. Recently, one researcher joined another unit with a better content fit and a group decided to join AIICS, demonstrating the dynamic nature of the unit. The unit has a good view on the opportunities and the challenges available to it. The panel appreciates that the NLP group is reflecting their research agenda against the background of the fast evolving and much better funded big tech. Maintaining cutting-edge equipment is a challenge and will require recurrent investments. To make the unit less vulnerable to budget fluctuations from project income, there should be a way to save budget over multiple years.

The AI Factory MIMER that will be based in Linköping creates important new opportunities, which will require investment and vision from LiU. AIICS should play a key role in this.

Panel B Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel composition

Chair
Ann Nowe, Vrije Universiteit Brussel, Belgium
Expertise : Artificial Intelligence / Computer Science

Members
Aura Tuomas, Aalto University, Finland
Expertise: Information Security
Victor Kaptelinin, Umeå University, Sweden
Expertise: Human-Computer Interaction
Katinka Wolter, Freie Universität Berlin, Germany
Expertise: Dependable distributed systems
Sune Karlsson, Örebro University, Sweden
Expertise: Statistics
Thomas Ertl, University of Stuttgart, Germany
Expertise: Visual Computing, Visualization

All members participated in the online meetings organised by LiU.

The panel had a preparatory meeting to prepare the visit. During this meeting, we decided on a plan of approach. Each unit was assigned a primary person to initiate the discussions and a secondary person to take notes. The panel compiled a set of generic questions for all units and supplemented them with unit-specific questions. It should be noted that all panel members were actively involved in both the interviews and in the evaluation of all the units.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The general observations and recommendations listed below are intended as suggestions that the divisions and/or the university may explore when planning future work.

The panel is generally impressed by the breadth and depth of computer science research at LiU and its positioning on the national and international scale. The fact that the expertise is spread over several campuses brings some challenges for collaboration between ITN and IDA. While improvements are possible, the panel appreciates the efforts being made, both related to research and education.

The evaluation was overall well organized, and the administrative support was highly appreciated. Nevertheless, the schedule was tight, leaving little room for internal discussion among the panel.

The evaluation units provided relevant information for the site visits and created an open and welcoming atmosphere for discussions with research leaders, junior researchers, postdocs and PhD students. The information presented by the groups could have been more consistent. Some additional information was provided on request; this information could have been provided before the site visit. It would also have been more informative to have the composition (who and which position) of the unit in the material provided, as well as a publication list and an overview of service to the community. Finally, the base funding mentioned in the background material also includes competitive internal funding, which makes the information less transparent.

Although this research evaluation was not targeted at comparing units or individual researchers, differences between the evaluation units became obvious in the self-evaluations and during the discussions with the units. The panel tried to analyze the conditions for the various levels of research excellence and found issues which often have structural reasons beyond the division level.

Financial model

While academic institutions all over the world strive for an increase in basic funding, the panel acknowledges that LiU for historical and other reasons has been struggling with relatively limited governmental funding. The panel encourages the university leadership to work on strategies for improving the basic recurrent funding. This is especially important from the computer science field perspective, where research has significantly grown in quality and quantity during the last years mainly due to external funding.

Other factors influencing the research quality can be identified in various facets of the university and are described below in detail. One general observation is that the university structure from the university administration over faculty, department, division down to a unit is perceived as very hierarchical with the administrative hierarchy standing in the way of effective use of resources. The panel had the impression that more transparency and communication regarding university strategies (like profile areas or major investments) would enable units and researchers to better align with university strategies.

As far as the financial model of the divisions is concerned, we noticed a strong general feeling of *"Earn your own salary"*. PIs have to manage to obtain a combination of teaching and research to pay for their own salary. There are no guidelines on a healthy balance between teaching and research. The model incentivizes divisions to "protect" their teaching share. The panel also noticed a discrepancy in the university financial system between who takes risk and who is allowed to mitigate risk. In practice, the risk for funding shortfall is with the division or lab, and they are responsible for multi-year commitments to employment and research infrastructure. This is not aligned with the practice of taking away a part of the division's funding surplus at the end of the year. The part of the organization that carries the financial risks should also be allowed to mitigate the risks and to plan their finances over multiple years, including making some savings.

Finally, there is a significant dependency on WASP funding, also for permanent positions. The university should set up a long-term plan, in case the WASP funding is phased out, as the units cannot suddenly absorb the cost of all these permanent employees.

Hiring

Success in hiring the best researchers is essential for the university's future. The faculty hiring process at LiU is slow, which may result in the best candidates going elsewhere. The process is managed by a faculty-level appointments board, and the department has no control over how long the process takes. This is a problem especially when hiring entry-level faculty, who often receive competing offers from other institutions. The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

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the final hiring decision can be made at the higher level there should be a clear path for the division and department to give input about the selection of candidates.

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LiU to create connections for both social activities and for future research collaborations.

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Evaluated Unit's Name: IDA.HCS Human-Centered Systems

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research at HCS adopts a human-centered approach to information technology, which is an increasingly important perspective in Computer and Information Science. Information technologies are making a transformative impact on various aspects of human life. Studies at HCS address a diversity of related challenges, e.g., by studying human interactions with novel technologies (such as self-driving public transportation vehicles) or exploring solutions for topical societal issues (such as sustainability).

The research is interdisciplinary, with its roots in Computer Science, Cognitive Science, and Design. The main areas of publication are Cognition, HCI and Design, and Knowledge-Based Systems. The research, which is to a large extent externally funded, is conducted at four labs: KMACS (Knowledge Modelling and Cognitive Systems), COIN (Cognition and Interaction), IxS (Interaction and Service Design Research), and HCSEd (Human-Centered Systems Education). HCS has a total of 5 full professors and 45 FTEs.

In 2018–2022, the division produced approximately 180 papers, mostly conference papers and journal articles with an approximately 50/50 split, with some published in top-level venues. The division also has a strong record of making an impact outside academia. In particular, externally funded projects conducted at HCS have produced a number of significant practical outcomes for various non-academic partners.

The research at the division can be assessed as relevant to Computer and Information Science and practically important. Many research groups at HCS are among the national leaders in their respective fields, and some can be highly ranked internationally. The research produces significant output, both within and outside academia.

A potential area for further development is the overall framing and planning of the research at HCS. Research activities at HCS span a very wide range, varying, for instance, from designing a virtual receptionist to managing a fair climate transition. This diversity raises questions such as: "What is the overall focus of the research at the division?" and "According to what criteria can a study be assessed as being or not being within the scope of HCS?"

The self-evaluation report generally describes division’s research as combining the (inter) disciplinary perspectives of Computer Science, Cognitive Science, and Design Research, and being conducted in various areas of study. This provides valuable insight into the conceptual and disciplinary orientations of the research but does not, in itself, sufficiently clarify how the focus and the scope of the research can be described more accurately than as “bridging people and technology”. While such definitions were proposed in the past, their current status is unclear. We encourage the division to further develop the overall framing of its

research. This may be beneficial, for instance, for supporting collaboration (e.g., by helping to position the division as a potential partner in joint research efforts) and strategic planning (e.g., by helping to determine whether a potential collaborative project falls within the scope of HCS).

In addition, while the evaluation materials contain various useful information about the research at HCS, it would be helpful if they also included a systematic, structured overview of the key lines of research at the division (which issue was somewhat mitigated by an oral presentation given at LiU). Such a systematic overview, which seems to be relatively easy to create, could also be a tool for generally supporting awareness and reflection at the division. In particular, it may help to understand how certain issues (e.g., low-impact publications or problems with unspent funds) are manifested across different labs and groups and therefore recognize the need for different solutions.

The outline of research directions for the next five years in the division's report is helpful for understanding the diversity of specific topics and phenomena the division plans to address. The relationship of these topics to the division's strategic goals and challenges, however, could be discussed more explicitly. For instance, it could be clarified how the topics relate to the opportunities and threats identified in the division's insightful SWOT analysis, the evolving landscape of the broad area of "Human-Centered Systems", and the need to strategically collaborate across disciplines and departments.

The panel's recommendations are briefly summarized in the next section.

Recommendations

Further develop the general framing of the research at HCS to more clearly define its focus and scope.

Make the overall structure of current research activities at HCS more explicit to support awareness of, and reflection on, the research at the division.

Ensure that defining topics for future research is aligned with the division's strategic goals, opportunities, and threats.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The overall proportion of high-impact publications at HCS is somewhat below the departmental average (which may be partly due to the fact that some top-level venues in areas relevant to HCS are conference proceedings and newer journals that have not yet been fully ranked). Increasing the number of publications in top-level venues is a key goal of

the division, and several strategies for achieving the goal have been considered. Additionally, the division may consider learning from the experience of the HCS groups and researchers who have successfully published high-impact papers, with the aim of replicating these successes. Furthermore, it is not uncommon for some top-level venues in the general area of HCS to publish papers that report applied studies (e.g., the development of a particular artifact) while also making novel empirical and conceptual research contributions. Producing such papers may be a way for the division to combine its emphasis on applied studies with the goal of having more high-impact publications.

The junior researchers, postdocs, and PhD students we interviewed were generally very positive about the environment at HCS and LiU as a whole. As the reasons, they cited interdisciplinary research, engagement in design activities, and support from colleagues. Junior researchers were also satisfied with the career development support they receive. They had a clear understanding of their career paths, including their next promotion goals and the criteria required to achieve them. Some of the junior researchers demonstrate impressive productivity, impact, and positive momentum in their research. It was also mentioned that becoming an independent researcher may be a challenge, and some junior researchers may need help when a high teaching load prevents them from successfully applying for project funding. Main issues related to PhD education are securing longer-term funding than what external projects typically provide, and making external PhD students, who are mostly based outside LiU, a part of the division's research environment.

The division is involved in various types of collaboration, and it has been especially successful in conducting joint projects with a variety of academic and non-academic partners outside LiU. The established collaboration network with external partners can be considered an important asset of the division. At the same time, the division's collaboration within the university can be further strengthened. As recognized by the division itself, to be more successful in obtaining basic research funding, HCS may need to join forces with divisions and departments that represent more traditional disciplines. In addition, there are other divisions and groups at LiU (e.g., MIT/ITN and SKI/IKOS) that also conduct research in areas relevant to HCS, and the division could further develop its collaboration with them. Like many other divisions evaluated by the panel, HCS would benefit from increased communication and collaboration between its individual labs and groups. There are already substantial efforts in this direction, including seminar series and joint research projects, and we encourage the division to continue and extend this work.

HCS may also more actively engage in promoting the adoption of a human-centric perspective at other divisions. "Human-Centered Systems" as an area of Computer and Information Science does not deal with particular types of technologies but rather represents a particular perspective: ideally, all systems should be human-centric. Panel interviews indicate that there is general interest in learning about, and applying, a human-

centric approach in other divisions. As the main site of human-centric research expertise in the department, HCS could consider extending its efforts to promote a human-centric perspective in the department as a whole.

The division considers recruitment a key issue, which needs to be addressed to prevent the loss of expertise and to efficiently use already received funds. Addressing the challenge requires a coordinated strategy, combining various ways to attract more and stronger applicants. Part of the strategy could involve arranging recruiting activities at conferences, as our interviews suggest that personal contacts at conferences may affect the decision to apply for a position at LiU. HCS actively engages cognitive science students in its research activities, and this engagement can also be a part of the division's long-term recruitment strategy.

While the gender balance of researchers at HCS is more favorable than at some other divisions, there is room for improvement at the level of full professors.

The panel's recommendations are briefly summarized in the next section.

Recommendations

Aim to enhance research contributions of papers reporting applied studies.

Explore opportunities to better support junior researchers in their transition to research independence.

Consider different ways of helping other divisions in the department adopt a human-centric perspective.

Strengthen collaboration with other divisions at LiU that conduct research in the general area of "human-centered systems".

Work on a coordinated strategy to attract more, and stronger, applicants to open job positions in the division (e.g., through recruiting activities at conferences).

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

In addition to three labs conducting research in their respective areas, HCS also comprises a unit/lab (HCSEd), which primarily focuses on teaching but also carries out some research activities. The connection between these activities and the broader research at HCS (and the department as a whole) is not immediately obvious. In particular, studies on Exergames are divided between HCS and SAS because of formal regulations. Interviews conducted by the panel suggest that this organization of research is generally perceived as artificial.

There is a common opinion that central offices, while providing some valuable support, could be more helpful. In particular, they could more efficiently support collaboration with

external partners, e.g., by providing meeting places, establishing contacts, and making it easier to deal with legal challenges, and simplifying the process of submitting grant applications, e.g., by providing information packages for EU projects.

The panel's recommendations are briefly summarized in the next section.

Recommendations

Explore opportunities for optimizing the way the research at HCSEd is related to research activities at SaS and other HCS labs.

Make sure that support functions are aligned with researchers' needs and do not impose excessive burden on the researchers.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The research conducted at HCS represents a centrally important direction of studies at the Department of Computer and Information Science. The division has significant experience and a unique combination of expertise in the general area of "Human-Centric Systems" and conducts impactful and timely studies in this area.

The highly interdisciplinary nature of research at HCS and the division's reliance on externally funded applied projects are inherently linked to both opportunities and challenges. Interdisciplinarity enables HCS to conduct research in novel and topical areas but may also result in a wide diversity of objects of study and a somewhat unfocused disciplinary identity. A focus on applied research, while attracting significant resources and ensuring relevance to real-world problems, may potentially shift the balance away from basic studies that address the division's long-term fundamental research interests. The division is aware of the challenges and has sensible plans for dealing with them.

Panel B Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel composition

Chair
Ann Nowe, Vrije Universiteit Brussel, Belgium
Expertise : Artificial Intelligence / Computer Science

Members
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Expertise: Information Security
Victor Kaptelinin, Umeå University, Sweden
Expertise: Human-Computer Interaction
Katinka Wolter, Freie Universität Berlin, Germany
Expertise: Dependable distributed systems
Sune Karlsson, Örebro University, Sweden
Expertise: Statistics
Thomas Ertl, University of Stuttgart, Germany
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All members participated in the online meetings organised by LiU.

The panel had a preparatory meeting to prepare the visit. During this meeting, we decided on a plan of approach. Each unit was assigned a primary person to initiate the discussions and a secondary person to take notes. The panel compiled a set of generic questions for all units and supplemented them with unit-specific questions. It should be noted that all panel members were actively involved in both the interviews and in the evaluation of all the units.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The general observations and recommendations listed below are intended as suggestions that the divisions and/or the university may explore when planning future work.

The panel is generally impressed by the breadth and depth of computer science research at LiU and its positioning on the national and international scale. The fact that the expertise is spread over several campuses brings some challenges for collaboration between ITN and IDA. While improvements are possible, the panel appreciates the efforts being made, both related to research and education.

The evaluation was overall well organized, and the administrative support was highly appreciated. Nevertheless, the schedule was tight, leaving little room for internal discussion among the panel.

The evaluation units provided relevant information for the site visits and created an open and welcoming atmosphere for discussions with research leaders, junior researchers, postdocs and PhD students. The information presented by the groups could have been more consistent. Some additional information was provided on request; this information could have been provided before the site visit. It would also have been more informative to have the composition (who and which position) of the unit in the material provided, as well as a publication list and an overview of service to the community. Finally, the base funding mentioned in the background material also includes competitive internal funding, which makes the information less transparent.

Although this research evaluation was not targeted at comparing units or individual researchers, differences between the evaluation units became obvious in the self-evaluations and during the discussions with the units. The panel tried to analyze the conditions for the various levels of research excellence and found issues which often have structural reasons beyond the division level.

Financial model

While academic institutions all over the world strive for an increase in basic funding, the panel acknowledges that LiU for historical and other reasons has been struggling with relatively limited governmental funding. The panel encourages the university leadership to work on strategies for improving the basic recurrent funding. This is especially important from the computer science field perspective, where research has significantly grown in quality and quantity during the last years mainly due to external funding.

Other factors influencing the research quality can be identified in various facets of the university and are described below in detail. One general observation is that the university structure from the university administration over faculty, department, division down to a unit is perceived as very hierarchical with the administrative hierarchy standing in the way of effective use of resources. The panel had the impression that more transparency and communication regarding university strategies (like profile areas or major investments) would enable units and researchers to better align with university strategies.

As far as the financial model of the divisions is concerned, we noticed a strong general feeling of *"Earn your own salary"*. PIs have to manage to obtain a combination of teaching and research to pay for their own salary. There are no guidelines on a healthy balance between teaching and research. The model incentivizes divisions to "protect" their teaching share. The panel also noticed a discrepancy in the university financial system between who takes risk and who is allowed to mitigate risk. In practice, the risk for funding shortfall is with the division or lab, and they are responsible for multi-year commitments to employment and research infrastructure. This is not aligned with the practice of taking away a part of the division's funding surplus at the end of the year. The part of the organization that carries the financial risks should also be allowed to mitigate the risks and to plan their finances over multiple years, including making some savings.

Finally, there is a significant dependency on WASP funding, also for permanent positions. The university should set up a long-term plan, in case the WASP funding is phased out, as the units cannot suddenly absorb the cost of all these permanent employees.

Hiring

Success in hiring the best researchers is essential for the university's future. The faculty hiring process at LiU is slow, which may result in the best candidates going elsewhere. The process is managed by a faculty-level appointments board, and the department has no control over how long the process takes. This is a problem especially when hiring entry-level faculty, who often receive competing offers from other institutions. The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

The panel has the impression that the divisions and (to a lesser extent) the department are disconnected from the recruitment process once the position is announced. While

the final hiring decision can be made at the higher level there should be a clear path for the division and department to give input about the selection of candidates.

The university does not have systematic support for dual careers when researchers recruited to the university have spouses who also seek employment in Sweden. More advice could be provided to partners of relocating faculty members on finding employment in and outside the university. The panel heard both good and bad examples in this regard. There is a policy at IDA against married partners working at the same division. While it is good practice to avoid conflicts of interest in the management chain, the current policy seems too strict. It may prevent hiring of the most qualified candidates, and it may result in unfair treatment of married researchers.

Career model

The university does not provide a starting package for most new faculty members. From day one, many are expected to provide funding for their own position from external grants or from teaching full time, unless the unit has a budgetary buffer. This creates a trap for new junior faculty where some have to spend their time teaching, have a gap in publications, and cannot start building their own group. New junior faculty members should be given more time for research in their first 2-4 years at the university, and their teaching load should be increased gradually, starting from, e.g., 0% to 20%. Now, it is fully up to the unit if the new hire can be protected from a full teaching load. Starting grants from WASP mitigate the issue for some new hires in some research areas, but they are not an overall solution.

Most PhD students and postdoc researchers whom we interviewed want to continue their research career at LiU. This is primarily a positive indicator. However, LiU cannot keep them all permanently. There should be clearer advice to starting PhD students and postdocs that most will eventually have to seek opportunities in other Swedish and international institutions or in industry. The illusion that everyone can stay at LiU has probably been created by the career model that does not limit the number of researchers who can progress in the career path, provided they have external funding for themselves and their group. On one hand, the career model enables growth in research fields that are in high demand and avoids harmful internal competition. On the other hand, PhD students and postdocs may be given a false sense of security.

Grant writing support

There could be more systematic university or department-level support for major grant applications such as European projects. The quality of the central support now seems to vary a lot. Currently, each researcher has to learn the application process and format by themselves or rely on informal help from colleagues. Timely advice and review from

an experienced grant writer could save a lot of work and reduce the number of unsuccessful applications.

European project applications often require text about the applying institution. The university and each department should have an easily available text that describes the institution: The text should be regularly updated so that any numerical indicators (e.g., size, ranking) are up to date. Currently, each individual researcher has to write their own version of these texts.

Diversity and gender balance at IDA

The evaluated units are culturally diverse with many international members. Many of them joined because friends and colleagues recommended the university or unit to them. It is a great advantage for LiU to have such a reputation internationally.

Gender balance in most of the evaluated units is poor. While the university is taking some actions on the global level, it would be good to take specific actions for computer science as gender balance is still a concern internationally. The uncertainty of funding for new faculty members is one possible reason why qualified candidates choose not to apply. This is a self-perpetuating problem, and all possible measures should be taken to recruit some women to all levels of the career structure. The panel recommends that the department and division leaders study best practices for equal-opportunity efforts in other universities to develop their own tools to achieve gender balance.

Organization and community creation at IDA

The internal division structure within IDA was originally created for organizing the management of the growing department and especially growing undergraduate education. Over time, the divisions have also become a structure for organizing research in the department. From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research. With that said, none of the groups interviewed expressed an immediate need for changes in the organization.

PhD students and postdoc researchers typically form a community within their own lab or division. They also form networks outside the university through joint projects and doctoral schools. On the other hand, there is less interaction between the divisions within IDA. There could be more support for department members learning to know each other across division boundaries. This could help especially those who are new to

LiU to create connections for both social activities and for future research collaborations.

Web pages and science communication

There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities. The research groups and individual researchers would want to maintain their own pages and make updates without delay. Each group and person should be able to decide what information they want to share besides the uniform basic items. It should be easy for departments and divisions to post news items, such as scientific awards, major grants, and outreach activities, on or linked to the university web pages. Visibility of the research on the web is critically important for the results to have an impact and for the careers of the individual researchers and units.

The university web pages should be structured so that they are reliably indexed by search engines such as Google.

IT support

Buying and maintaining equipment is too complicated and loaded with administrative procedures. Research IT needs more flexibility compared to basic IT services that are provided to everyone. The procurement processes for equipment and online services should support the fast pace and changing needs of cutting-edge research.

When possible, the researchers should use cloud and university data center computing resources to avoid the overhead of managing their own hardware infrastructure.

PhD education

The panel noticed a big diversity amongst the different doctoral schools to which the students belong. While some schools are very well organised and allow students to meet peers from other universities, the planning and announcement of internal PhD courses could be improved. Attending international summer schools should also be valued more. Not only can students attend up to date high level courses by experts; they also build up their research network by attending such events.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The division on Software and Systems covers a broad area of research. It is primarily driven by industrial collaboration and successful third-party funding. The projects in SaS are well connected to industrial needs.

The division consists of four units: three research groups and the teacher group in programming didactics (UPP). A fifth unit has left the division in 2020 and was therefore only partly included in the evaluation of SaS. The division employs six full professors and a total of approximately 50 academic staff.

The embedded systems lab (ESLAB) and the real-time systems (RTSLAB) lab are both led by experienced, successful senior researchers. Both labs have strong leadership with an excellent track record on all indicators. The research topics are novel, publication records are strong, and collaborations show high industry impact. The challenge will be to transfer the knowledge and networks to the next generation of research leaders.

The programming environments lab (PELAB) is composed of four research groups, which cover a wide variety of topics. The lab's structure is slightly fragmented, perhaps to demonstrate academic independence of the group leaders or to reflect the diversity in topics. The SQA, CP and the MOS groups have strong industry links and healthy external funding. The research output of the PELAB is extremely good. Due to the many industry contacts, the impact outside academia is high. One particular highlight is the OpenModelica system simulation, which is an example of sustained technology transfer from research to industry.

The serious gaming group (SG) appears not strong enough as a stand-alone group, and it might be better positioned in the HCS division.

The didactics group (UPP) stands out as it delivers a large proportion of the division's teaching and has no professor leading the unit. Instead, academic supervision of members with academic ambitions is obtained from a researcher in Finland.

Overall, the panel sees many positive aspects in SaS. The research topics, quantity, and impact are very good. The working atmosphere in the groups seems excellent, and the finances are well handled.

Recommendations

There are two aspects that invite recommendations.

The serious gaming researcher should move to HCS. It seems unfair to separate a faculty member from her research peers just because she is married to a member of the HCS group. This may give an unfortunate impression of discrimination against female researchers who marry. Options should be explored for not just solving this specific situation but for developing hiring and management policies that support dual careers and combining a scientific career with having a family.

The UPP group is currently focused on teaching, but group members have themselves found ways to engage in research, which is a remarkable achievement. This development should be strongly supported by the department leadership. There should be an open discussion about whether didactics should be established as a regular research field in the department with senior faculty positions. Alternatively, the connection between research and teaching can be strengthened by affiliating UPP members with a technical research field. Connecting all teachers more tightly to the research in the department would support research-based education and ultimately strengthen research as well.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The Software and Systems division has a solid publication strategy that has produced an excellent track record for many members of the division. Junior members are well supported by the senior faculty.

With respect to recruitment, many positive statements can be made. The division plans for continuity, and as the senior group leaders approach retirement, young staff is hired and eventually appointed as group leaders. The onboarding of new group members works well. The group leaders are clear when communicating career perspectives with PhD students and junior staff. This has led to excellent careers with international exposure and independent research. It also prevents misunderstandings about everyone being able to spend their entire career at LiU and SaS.

The PhD program is well organized and suited to the needs of the students. Academic as well as social support for the PhD students is good. The students are satisfied with the capacity and quality of the supervision. The division has many events, seminars, meetings, fikas, and the students are happy with the working and social environment. In SaS, PhD

students know from the start that academic careers require mobility, and that the number of permanent positions in the division is limited.

Gender balance is a problem throughout the department. One success is that the head of RTSLAB recently recruited a female assistant professor and engaged a well-known female researcher as visiting staff, which are achievements both from a scientific and gender-balance perspective. An observation made here but probably not specific to SaS is that personal networks and role models are important. Notably, a female professor recruited several female new members to the group (a postdoc, junior professor, and guest professor), while male professors recruit mostly male junior staff and students using their networks.

There seems to be an agreement among all interviewed members of the division that all academic staff should contribute to teaching and how teaching and research can be balanced. The UPP unit is an exception as it specializes in teaching and is mostly staffed by very junior people with no doctoral degree. While there is an agreement within SaS about the role of the teaching unit and its place in the funding model, the existence of a unit that conducts almost no research at a university raises questions.

Recommendations

There is quite a significant disparity between the UPP unit and the other units. UPP would benefit from having a senior faculty member as its leader to represent the unit within the department. Targeted recruitment could strengthen the research aspects of the unit. Having said that, the panel found that strategic views presented by a junior member of UPP are quite impressive, and any external recruitment should be balanced with giving current junior staff room to grow into more responsible roles. The panel also recommends strengthening the connection of research and teaching by integrating members of UPP with the existing research units that best suit each of them. The overall goal is to make sure that all teachers participate in research activities at least for a small share of their time.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The conditions for research in the division are very good, and all interviewed members of the division expressed satisfaction. This is largely thanks to the clear expectation management and considerate handling of the budget by all senior members of the division. However, the structures at LiU are in many ways challenging, as discussed in the Panel B – General Observations document.

The division finances are well managed and, in consequence, the budget of SaS is healthy. As in all evaluated units, the dependence on external research funding creates potential traps for junior faculty members who may get stuck with teaching. Integration of junior faculty members into existing research groups in SaS mitigates this risk but does not remove it entirely.

Many of the administrative and IT services have been centralized in recent years. While this works well in some domains, it creates severe problems for research areas that require tailored technical support.

While inflexibility in procurement and administration of research IT is a common complaint throughout the evaluated units, it is a particular pain point in the systems-oriented SaS division. Not only should division members be able to edit the division's web site; they should also be able to play with hardware, try out new hardware and software, and easily acquire a variety of equipment.

Recommendations

The division will face several retirements over the next years, and it will be a challenge to maintain the current high standards when the leadership changes. It is important to actively take care of smooth transitions.

The panel commends the senior faculty member in the division for looking after junior members. Nevertheless, the department and university should provide startup packages that guarantee all new hires the opportunity to spend a significant share of their time on research.

The division should collect data on common issues in administrative and IT support and should jointly be more vocal towards the university leadership. It is particularly important to improve the flexibility of the university procurement processes to enable experimentation.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel has the impression that this unit delivers very high quality of research with high impact outside academia. It has strong industry contacts. Most groups are performing extremely well and have created productive work environments especially for their PhD students and junior members. The panel feels that each group leader cares very well for his or her group, but there is less attention paid to other groups. Within the division, the groups work independently, and while this has many positive aspects, there could be a stronger sense of community, care, and support between the groups. This could be initiated by the division leadership.

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Gender balance in most of the evaluated units is poor. While the university is taking some actions on the global level, it would be good to take specific actions for computer science as gender balance is still a concern internationally. The uncertainty of funding for new faculty members is one possible reason why qualified candidates choose not to apply. This is a self-perpetuating problem, and all possible measures should be taken to recruit some women to all levels of the career structure. The panel recommends that the department and division leaders study best practices for equal-opportunity efforts in other universities to develop their own tools to achieve gender balance.

Organization and community creation at IDA

The internal division structure within IDA was originally created for organizing the management of the growing department and especially growing undergraduate education. Over time, the divisions have also become a structure for organizing research in the department. From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research. With that said, none of the groups interviewed expressed an immediate need for changes in the organization.

PhD students and postdoc researchers typically form a community within their own lab or division. They also form networks outside the university through joint projects and doctoral schools. On the other hand, there is less interaction between the divisions within IDA. There could be more support for department members learning to know each other across division boundaries. This could help especially those who are new to

LiU to create connections for both social activities and for future research collaborations.

Web pages and science communication

There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities. The research groups and individual researchers would want to maintain their own pages and make updates without delay. Each group and person should be able to decide what information they want to share besides the uniform basic items. It should be easy for departments and divisions to post news items, such as scientific awards, major grants, and outreach activities, on or linked to the university web pages. Visibility of the research on the web is critically important for the results to have an impact and for the careers of the individual researchers and units.

The university web pages should be structured so that they are reliably indexed by search engines such as Google.

IT support

Buying and maintaining equipment is too complicated and loaded with administrative procedures. Research IT needs more flexibility compared to basic IT services that are provided to everyone. The procurement processes for equipment and online services should support the fast pace and changing needs of cutting-edge research.

When possible, the researchers should use cloud and university data center computing resources to avoid the overhead of managing their own hardware infrastructure.

PhD education

The panel noticed a big diversity amongst the different doctoral schools to which the students belong. While some schools are very well organised and allow students to meet peers from other universities, the planning and announcement of internal PhD courses could be improved. Attending international summer schools should also be valued more. Not only can students attend up to date high level courses by experts; they also build up their research network by attending such events.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The evaluation unit, STIMA, is relatively small with two full professors and about 30 FTEs of academic staff.

The research at the STIMA division is of good quality and well published. The volume of the research output in relation to the size of the division is hard to judge given the lack of information on actual time (FTEs) available for research. The differences in publishing traditions between statistics (journals focused) and machine learning (conference focused) must also be taken into account. Overall, the volume is judged to be good.

The research is to a large extent driven by applications and done in many successful collaborations with subject matter experts from other disciplines or outside partners. This can be both a strength and a weakness. Working with a diverse set of applications can bring inspiration for method development, ensures that the research is relevant outside of the subjects of statistics and machine learning and enhances the impact outside academia. On the other hand, it can distract from the research in statistical and machine learning methodology which is, and should be, the core competence of the division.

The division aims to bridge the gap between statistics and machine learning and is taking positive steps in this direction. While ambitions in this direction can be seen at other places, the relative size of the division places it in a unique position in a Swedish context.

Recommendations

The division is encouraged to continue placing itself at the intersection of statistics and machine learning and establish itself as a leading research environment. To achieve this a clearer focus on methodological work would be useful. This is not only about doing more methodological work, but also about showcasing what is already done by publishing more in methodologically oriented outlets and where appropriate publishing the methodological and applied contributions as two separate papers.

A clearer focus on methodological contributions in the publications would also enhance the divisions possibilities to obtain external funding for methodological work.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The publication strategy has recently been updated to focus more on highly ranked journals (level 2 in the Norwegian list) and high-quality conferences. This change is commended and appears to have made a difference with a noticeably higher proportion of level 2 publications during 2024.

The division has identified two gaps in the staff structure, a lack of junior researchers and a lack of researchers that truly bridges the gap between statistics and machine learning. To mitigate this the division recently recruited two assistant professors who were given favorable conditions in terms of research time as well as various mentoring activities. In connection with this it is noteworthy that STIMA seems to be relatively satisfied with the recruitment process (except for the slowness) compared to other divisions. It can also be noted that a relatively large proportion of the faculty have no or little time for research and are mainly engaged in teaching at the bachelor's level.

Historically, the volume of PhD students has been low compared to the current level with 9 PhD students. The increase in volume can be attributed to increased external/competitive funding (mainly for machine learning) and a resulting imbalance between the statistics and machine learning programs. There is also a concentration of PhD supervision to a few individuals, which presumably is also related to external funding.

There is an imbalance between statistics and machine learning in the number of faculty involved in research, volume of research and PhD students. At the same it appears that the majority of the teaching is in statistics. There is thus a risk of a disconnect between the research and the teaching.

The division has a large research network both within and outside academia with many collaboration partners.

Except for at the Senior Lecturer level there is a distinct lack of females. The division is aware of this imbalance, which is not unique to STIMA, and is attempting to broaden the recruitment of underrepresented groups.

Recommendations

While the expansion in machine learning research is related to the funding situation, the division should take steps to align the volume of teaching in statistics and machine learning with the volume of research. This could help bring more of the faculty who currently have little research activity into a situation where they can actively contribute to the research and the research environment.

Steps should be taken to engage more faculty into PhD supervision to reduce the reliance on a few individuals. Joint supervision with “statistics” and “machine learning” supervisors could be a useful step in further integrating the subjects.

The proactive steps in terms of strategic recruitments including an internally funded PhD student for statistics, seminars and other joint activities to bring the subjects closer and bridge the gap are commended and it is recommended to put even more effort into this.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The organization of the division into two units, statistics and machine learning, appears to have little effect on how research is organized. Instead, the division expresses an ambition to organize research based on different application domains. While this mode of organizing the research can contribute to the integration between statistics and machine learning there is also a possibility that it makes the methodological component of the research less visible.

It appears, as mentioned earlier, that a relatively large portion of the faculty are heavily engaged in teaching with little time for research. On the other hand, there is a healthy number of Postdocs in the division and two recent hires with tenure track positions and generous allocations of research time.

The level of external grants for research is, according to the financial data made available, relatively small. This might be somewhat misleading as, according to the self-evaluation, much of what is given as “direct government grants” is actually grants obtained in competitive calls (ELLIIT). The actual, relatively stable, “base” funding for research is not available and it is not possible to assess how dependent the division is on competitive grants. It is, however, clear that the obtained grants depend on only a few PIs and there is a dependency on a few individuals.

The research infrastructure appears to be sufficient with relatively good access to computational resources.

Recommendations

Having two units within a relatively small division is likely to increase the administrative burden.

The division should continue to use tenure-track positions when hiring junior faculty but also strive to create conditions that allow all academic staff to engage in research.

The division should continue the mentoring efforts to engage more faculty in grant writing. Both as part of career development and reducing the dependency on a few successful PIs.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division conducts high quality research and is doing well in publishing, especially considering the increased focus on highly ranked outlets. It appears to be a welcoming and nurturing environment for junior faculty and PhD students.

Positioning itself at the intersection of statistics and machine learning makes the division stand out in a Swedish context.

Statistics and machine learning is “everywhere” and statistics/machine learning research, as a tool in applied research or more methodological, is conducted in other divisions and departments of the university. To place itself as the central hub of machine learning the division needs to (as is already done) reach out to other researchers and, when possible, engage in research collaboration.

Panel B Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel composition

Chair
Ann Nowe, Vrije Universiteit Brussel, Belgium
Expertise : Artificial Intelligence / Computer Science

Members
Aura Tuomas, Aalto University, Finland
Expertise: Information Security
Victor Kaptelinin, Umeå University, Sweden
Expertise: Human-Computer Interaction
Katinka Wolter, Freie Universität Berlin, Germany
Expertise: Dependable distributed systems
Sune Karlsson, Örebro University, Sweden
Expertise: Statistics
Thomas Ertl, University of Stuttgart, Germany
Expertise: Visual Computing, Visualization

All members participated in the online meetings organised by LiU.

The panel had a preparatory meeting to prepare the visit. During this meeting, we decided on a plan of approach. Each unit was assigned a primary person to initiate the discussions and a secondary person to take notes. The panel compiled a set of generic questions for all units and supplemented them with unit-specific questions. It should be noted that all panel members were actively involved in both the interviews and in the evaluation of all the units.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The general observations and recommendations listed below are intended as suggestions that the divisions and/or the university may explore when planning future work.

The panel is generally impressed by the breadth and depth of computer science research at LiU and its positioning on the national and international scale. The fact that the expertise is spread over several campuses brings some challenges for collaboration between ITN and IDA. While improvements are possible, the panel appreciates the efforts being made, both related to research and education.

The evaluation was overall well organized, and the administrative support was highly appreciated. Nevertheless, the schedule was tight, leaving little room for internal discussion among the panel.

The evaluation units provided relevant information for the site visits and created an open and welcoming atmosphere for discussions with research leaders, junior researchers, postdocs and PhD students. The information presented by the groups could have been more consistent. Some additional information was provided on request; this information could have been provided before the site visit. It would also have been more informative to have the composition (who and which position) of the unit in the material provided, as well as a publication list and an overview of service to the community. Finally, the base funding mentioned in the background material also includes competitive internal funding, which makes the information less transparent.

Although this research evaluation was not targeted at comparing units or individual researchers, differences between the evaluation units became obvious in the self-evaluations and during the discussions with the units. The panel tried to analyze the conditions for the various levels of research excellence and found issues which often have structural reasons beyond the division level.

Financial model

While academic institutions all over the world strive for an increase in basic funding, the panel acknowledges that LiU for historical and other reasons has been struggling with relatively limited governmental funding. The panel encourages the university leadership to work on strategies for improving the basic recurrent funding. This is especially important from the computer science field perspective, where research has

significantly grown in quality and quantity during the last years mainly due to external funding.

Other factors influencing the research quality can be identified in various facets of the university and are described below in detail. One general observation is that the university structure from the university administration over faculty, department, division down to a unit is perceived as very hierarchical with the administrative hierarchy standing in the way of effective use of resources. The panel had the impression that more transparency and communication regarding university strategies (like profile areas or major investments) would enable units and researchers to better align with university strategies.

As far as the financial model of the divisions is concerned, we noticed a strong general feeling of *"Earn your own salary"*. PIs have to manage to obtain a combination of teaching and research to pay for their own salary. There are no guidelines on a healthy balance between teaching and research. The model incentivizes divisions to "protect" their teaching share. The panel also noticed a discrepancy in the university financial system between who takes risk and who is allowed to mitigate risk. In practice, the risk for funding shortfall is with the division or lab, and they are responsible for multi-year commitments to employment and research infrastructure. This is not aligned with the practice of taking away a part of the division's funding surplus at the end of the year. The part of the organization that carries the financial risks should also be allowed to mitigate the risks and to plan their finances over multiple years, including making some savings.

Finally, there is a significant dependency on WASP funding, also for permanent positions. The university should set up a long-term plan, in case the WASP funding is phased out, as the units cannot suddenly absorb the cost of all these permanent employees.

Hiring

Success in hiring the best researchers is essential for the university's future. The faculty hiring process at LiU is slow, which may result in the best candidates going elsewhere. The process is managed by a faculty-level appointments board, and the department has no control over how long the process takes. This is a problem especially when hiring entry-level faculty, who often receive competing offers from other institutions. The university could consider giving departments the responsibility for running the entry-level hiring process. Until such changes can be made, the appointment board should analyze its operations and minimize all delays between a call closing and an appointment being made.

The panel has the impression that the divisions and (to a lesser extent) the department are disconnected from the recruitment process once the position is announced. While the final hiring decision can be made at the higher level there should be a clear path for the division and department to give input about the selection of candidates.

The university does not have systematic support for dual careers when researchers recruited to the university have spouses who also seek employment in Sweden. More advice could be provided to partners of relocating faculty members on finding employment in and outside the university. The panel heard both good and bad examples in this regard. There is a policy at IDA against married partners working at the same division. While it is good practice to avoid conflicts of interest in the management chain, the current policy seems too strict. It may prevent hiring of the most qualified candidates, and it may result in unfair treatment of married researchers.

Career model

The university does not provide a starting package for most new faculty members. From day one, many are expected to provide funding for their own position from external grants or from teaching full time, unless the unit has a budgetary buffer. This creates a trap for new junior faculty where some have to spend their time teaching, have a gap in publications, and cannot start building their own group. New junior faculty members should be given more time for research in their first 2-4 years at the university, and their teaching load should be increased gradually, starting from, e.g., 0% to 20%. Now, it is fully up to the unit if the new hire can be protected from a full teaching load. Starting grants from WASP mitigate the issue for some new hires in some research areas, but they are not an overall solution.

Most PhD students and postdoc researchers whom we interviewed want to continue their research career at LiU. This is primarily a positive indicator. However, LiU cannot keep them all permanently. There should be clearer advice to starting PhD students and postdocs that most will eventually have to seek opportunities in other Swedish and international institutions or in industry. The illusion that everyone can stay at LiU has probably been created by the career model that does not limit the number of researchers who can progress in the career path, provided they have external funding for themselves and their group. On one hand, the career model enables growth in research fields that are in high demand and avoids harmful internal competition. On the other hand, PhD students and postdocs may be given a false sense of security.

Grant writing support

There could be more systematic university or department-level support for major grant applications such as European projects. The quality of the central support now seems

to vary a lot. Currently, each researcher has to learn the application process and format by themselves or rely on informal help from colleagues. Timely advice and review from an experienced grant writer could save a lot of work and reduce the number of unsuccessful applications.

European project applications often require text about the applying institution. The university and each department should have an easily available text that describes the institution: The text should be regularly updated so that any numerical indicators (e.g., size, ranking) are up to date. Currently, each individual researcher has to write their own version of these texts.

Diversity and gender balance at IDA

The evaluated units are culturally diverse with many international members. Many of them joined because friends and colleagues recommended the university or unit to them. It is a great advantage for LiU to have such a reputation internationally.

Gender balance in most of the evaluated units is poor. While the university is taking some actions on the global level, it would be good to take specific actions for computer science as gender balance is still a concern internationally. The uncertainty of funding for new faculty members is one possible reason why qualified candidates choose not to apply. This is a self-perpetuating problem, and all possible measures should be taken to recruit some women to all levels of the career structure. The panel recommends that the department and division leaders study best practices for equal-opportunity efforts in other universities to develop their own tools to achieve gender balance.

Organization and community creation at IDA

The internal division structure within IDA was originally created for organizing the management of the growing department and especially growing undergraduate education. Over time, the divisions have also become a structure for organizing research in the department. From an outsider's perspective, the current division structure does not follow a clear logic, and there is variation in the size and internal cohesion of the divisions. The panel believes that the current division boundaries will eventually need to be adjusted based on the changing needs and priorities in computer-science research. With that said, none of the groups interviewed expressed an immediate need for changes in the organization.

PhD students and postdoc researchers typically form a community within their own lab or division. They also form networks outside the university through joint projects and doctoral schools. On the other hand, there is less interaction between the divisions within IDA. There could be more support for department members learning to know

each other across division boundaries. This could help especially those who are new to LiU to create connections for both social activities and for future research collaborations.

Web pages and science communication

There is a broad dissatisfaction about the university web pages and how they are managed. The current model does not support the diversity and freedom of swift communication that usually is characteristic to universities. The research groups and individual researchers would want to maintain their own pages and make updates without delay. Each group and person should be able to decide what information they want to share besides the uniform basic items. It should be easy for departments and divisions to post news items, such as scientific awards, major grants, and outreach activities, on or linked to the university web pages. Visibility of the research on the web is critically important for the results to have an impact and for the careers of the individual researchers and units.

The university web pages should be structured so that they are reliably indexed by search engines such as Google.

IT support

Buying and maintaining equipment is too complicated and loaded with administrative procedures. Research IT needs more flexibility compared to basic IT services that are provided to everyone. The procurement processes for equipment and online services should support the fast pace and changing needs of cutting-edge research.

When possible, the researchers should use cloud and university data center computing resources to avoid the overhead of managing their own hardware infrastructure.

PhD education

The panel noticed a big diversity amongst the different doctoral schools to which the students belong. While some schools are very well organised and allow students to meet peers from other universities, the planning and announcement of internal PhD courses could be improved. Attending international summer schools should also be valued more. Not only can students attend up to date high level courses by experts; they also build up their research network by attending such events.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The panel experienced a very well prepared team of MIT researchers. The entire visit was well organized, and the introductory presentation (available as handout) provided valuable information beyond the self-evaluation report. Compared to other evaluation units, MIT is large with 12 professors and 115 FTEs in total. Only recently, MIT launched a new organizational structure with 8 units (research groups) and new roles for leadership and governance. Research quality naturally varies between the units but since the panel neither was asked to compare nor had detailed information to do so, the following remarks relate to MIT as a whole.

MIT addresses a very broad spectrum of scientific fields covering scientific visualization, information visualization, medical image analysis, computer graphics, interaction design, and visual learning. This makes the division certainly unique within Sweden and positions MIT among the top European institutions with a similar breadth and impact (indicated e.g. in CSRankings for Visualization regarding publications). The panel assesses the relevance and novelty of the research topics especially in the visualization domain as high as indicated by many publications in top-level journals and conferences and the high amount of competitive external funding. The four success stories chosen for the self-evaluation are impressive with respect to the breadth of topics (astro-visualization, sparse rendering, material discovery, science communication), the required level of interdisciplinarity, and the achieved publication results (IEEE TVCG, ACM TOG, Phys.Rev.Lett., J.Educ.Comp.Res.). Several of the well-established faculty members and also some of the more recently hired professors are internationally clearly visible and well integrated into their respective community. The head of the division is highly decorated with awards and various commissions of trust as a leader in the field.

The impact of MIT on national academia ranges from university-internal recognition as leader of the Visual Digital Future profile area to founding partner in two governmental Strategic Research Areas and host of the national InfraVis structure funded by the Swedish Research Council and to the leadership of the WASP program of the Wallenberg Foundation.

The impact of MIT outside academia is enormous, of course mostly through the Visualization Center C with its 200.000 visitors per year, but also through its strong links to industry through the Visual Sweden initiative.

Recommendations

The division has made well-argued assessments and SWOT analyses in its self-evaluation and the panel recommends that MIT follows these plans and monitors success. Given its current scientific breadth and interdisciplinary strength, MIT should take the initiative to closer collaborate with those IDA divisions with which there is an obvious overlap (e.g. interaction, gaming, learning). Some MIT members already collaborate with IDA divisions in various research projects including PhD theses and courses, which may serve as a good starting point for closer collaborations in the future.

The panel applauds the MIT 2030 vision of becoming "the natural home for the next generation of human-in-the-loop technologies and methodology in Sweden" but also remarks that due to the ubiquity of AI techniques this goal can only be achieved by close collaboration with all AI initiatives, centers and infrastructure at LiU.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research output seems to follow the publication strategy as reported in the self-evaluation, indicating a significant increase of indexed and top-level publications over the last years. The panel acknowledges that the diversity of the research groups and the dynamical changes in fields like classical visualization require continuous adaptation of publication strategies and might lead to fluctuations in publication quality. However, the recent growth in excellent senior and junior researchers provides the potential to maintain and even further improve the division's international standing.

The early-career researchers whom the panel met all seemed to be very satisfied with their individual situation within MIT regarding supervision, independence, and social integration. They had chosen to come to LiU or stay here for convincing arguments and most had clear perspectives for their career developments. PhD students belong to a variety of different graduate schools with different qualification requirements and different challenges to fulfill those.

Personnel data indicates that a good percentage of female staff is already achieved for PhD students, postdocs, and lecturers. Despite recent prominent hires of excellent female professors, which are applauded by the panel, there is still quite some room for improving gender equality on the senior level.

Regarding the relation between research and teaching, the panel experienced different perspectives from senior researchers, who rate the teaching load as high, and junior researchers who considered their teaching load as acceptable.

Recommendations

The panel recommends that MIT follows its publication strategy as outlined in the "going forward" section of the self-evaluation. New units and younger researchers should be supported and advised to strive for a similar publication quality and quantity as the well-established senior researchers and their groups.

While the panel understands the variety of graduate schools due to requirements of external funding, it also encourages the faculty and the department to better align conditions for PhD students for them to feel more like one cohort rather than belonging to different groups within the same division.

The teaching load seems to be especially pressing for newly hired young researchers who have not been able to acquire their own research funding. The vicious cycle of teaching preventing successful grant applications due to limited time for research leading to an even higher teaching load needs to be disrupted by some startup package for young researchers guaranteed by the university.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

MIT has been proactively renewing its internal organization and adapting it to recent growth. The positioning of MIT in the ITN Department and on the campus Norrköping is explained "historically", and some collaboration with IDA divisions exist (mainly in teaching).

Recent recruitment of highly visible senior researchers from outside LiU and especially of two female professors from the US and Germany is impressive and seems to already strategically address the succession planning in the division leadership.

The external research funding acquired by MIT is excellent (ca. 70 MSEK in 2025); however, the amount of "free faculty funding" as perceived by the MIT leadership is only about 10%

of that. The division would expect that success in external funding could somehow be matched by the university with similar growth rates. The division also feels that it carries a large oad of undergraduate teaching but the current funding model does not honor this enough. Consequently, MIT is concerned about guaranteeing long-term funding for recently recruited faculty.

While the research infrastructure within the division (and specifically in the Visualization Center) appears to be good and adequate (also due to external funding), the panel heard complaints about centralized processes related to procurement, hiring, and internal and external communications.

Recommendations

While the panel understands the historical reasons for distributing computer science (CS) research and education across IDA, ITN.MIT, ISY.CVL, etc., it also sees opportunities for an even stronger international trademark CS@LiU lost at the boundaries of divisions and departments. The panel encourages the LiU leadership to incentivize and support stronger collaboration among the divisions and think of better mechanisms to bridge the gap (as experienced by MIT) between Norrköping and Linköping.

The panel encourages MIT to continue to hire excellent researchers at all levels from outside LiU and internationally. The panel recognizes the difficulties to secure long-term funding for a growing number of senior faculty but, at the same time, it would like to remind the leadership that almost nowhere in the academic world can permanent positions be provided for all excellent junior researchers, even if all of them would like to stay. The MIT as the largest center for visualization research in Sweden should understand its mission also as to qualify researchers for leadership positions in the field at other national and international universities.

The panel is aware of the financial constraints of LiU as a whole and its continuous struggle for increased base funding. Based on our assessment of the research strength of computer science at LiU in general and of MIT specifically, a better and more stable base funding could clearly be justified. While a funding model that is perceived as just by all university members is difficult to achieve, the panel encourages the university leadership to reevaluate the current model regarding fairness with respect to undergraduate teaching load, PhD supervision efforts, and recognition of impact through outreach and community service. Since more than half of MIT's external funding comes from the Wallenberg Foundation, the need for further diversification is obvious. Especially ERC funding could be a viable option given the excellence of researchers on all levels.

While centralization of services might lead to more efficiency and financial savings, it can also lead to detachment and frustration. The panel received consistent complaints – also from MIT – about processes for IT procurement, IT services, hiring, and web pages and recommends considering a decentralization of processes where appropriate. From the panel's own experience, the web pages seem much less informative regarding structure and current research results than those from other academic institutions where units can provide their own updates.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

MIT is a strong division with scientific excellence on an international level and a considerable contribution to LiU's teaching. MIT covers a broad spectrum of research related to visual computing, and it is Sweden's leading research hub for visualization. Together with its Visualization Center C and other outreach activities, MIT is an invaluable asset to the university. The university leadership is advised to acknowledge and support this unique constellation, especially in the upcoming years of succession planning for the division leadership. The panel encourages an even closer collaboration between MIT and IDA divisions in order to explore synergies for joint research initiatives.

Panel C Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of Niclas Kolm, Stockholm University (chair); Alexandra Teleki, Uppsala University, SciLifeLab; Marc Lensink, CNRS & University of Lille, France; Liam McGuffin, University of Reading, UK. Before the visit to Linköping University, the panel had Zoom meetings and provided individual, independent summaries of the provided data packages and self-evaluations that the chair summarised and shared with the panel members. These ensured the panel members were well-prepared for the visit both in terms of preparations for the interview questions and report work. The interview questions were further developed through panel meetings at the beginning of the visit and careful notes were taken during the interviews by all panel members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Beyond the evaluation units, the panel was impressed by the drive and ambition of the leadership in terms of the university's vision for its future. The panel was also impressed by the organisation during the visit, and by the engagement and commitment that went into the preparation of materials prior to the visit.

The panel did not meet the Dean of the Faculty of Science and Engineering nor the Head of the Department of Physics, Chemistry and Biology (IFM). However, based on the available data and interviews, there is an apparent disconnect between the Faculty of Science and Engineering, the department IFM, and the research units (BIOIN, BIOLO/ECOMOD) reviewed by panel C. This is viewed as problematic by the panel. The units are currently placed in a department that seemingly does not align with their vision of research and teaching.

There is no Faculty of Life Sciences (Life Sciences meant here in its broadest meaning). The biologists, bioinformaticians, and biomedical scientists and engineers are scattered over different departments and there is apparently no formal network between them. This leads to a lack of opportunities for researchers in the Life Sciences to network and collaborate.

Excellence in teaching requires continuous review to maintain a connection with current research. There are poor connections between research expertise and teaching leading to suboptimal teaching-research synergies. This is particularly the case for teaching in Bioinformatics. The teaching decisions at LiU appear to be made top-down. The mismatch in research expertise and teaching programmes results in researchers considering starting new programmes or seeking opportunities outside IFM. If such efforts are not consolidated at a department and/or faculty level, there is a risk of sub-optimal use of university resources and teaching expertise.

Moreover, the teaching workload is not balanced, leading to negative impacts on research. New staff may have no teaching responsibilities, which is crucially important for young researchers to pass probation later on. There need to be clear and supported probation and promotion processes, so that the necessary criteria can be met without difficulty.

The panel fears that lack of support for early career researchers is leading to unnecessary stress on the personnel and there is a real fear that they may seek alternate host universities, which would be a loss to LiU.

A returning point in our review has been the apparent under-funding of the evaluated research units. The panel suggests that the university investigates possibilities to remedy this to ensure sustainable research production in both BIOIN, BIOLO/ECOMOD, not least concerning the recruitment of PhD students, and to ensure a sustainable balance between teaching and research among PIs.

Evaluated Unit's Name: IFM.BIOIN Bioinformatics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) Relevance and Novelty of the Research Topics

The BIOIN unit conducts highly relevant and cutting-edge research in bioinformatics, specifically, structural bioinformatics, computational chemistry, and medical bioinformatics. It has strong expertise in biological research and computational modelling, including the development of state-of-the-art methodologies. The unit is internationally recognised for developing impactful software tools used in bioinformatics.

2) Quality of the Research Output

The unit has a high share of publications in top-tier journals, with 44% in Level 2 journals, significantly higher than the LiU average of 21%. Additionally, 84% of publications are open access, increasing research visibility. Overall, the quality of the research output is excellent, yet higher-impact papers involving collaborations with experimental groups would improve the research profile of the unit further.

3) Impact Outside Academia

The unit's research is highly relevant for the pharmaceutical and biotech industries, yet collaborations with industry remain untapped. Despite strong external partnerships with international researchers, structured engagement with local and national industry partners could be improved. More specifically, one avenue for improvement could be to collaborate more frequently with experimental groups working on impactful applied outputs. Expanding industry collaborations is another strategic priority to enhance real-world impact and access alternative funding sources. The panel was inspired by the visit to the Visualization Centre and noted that the BIOIN unit's research on AI and protein structure prediction could have nicely linked together the presented themes.

4) Strategies, Priorities, and Future Research Plans

Moving forward, the unit wishes to strengthen internal collaboration within LiU and increase involvement in teaching to raise its visibility to students but their pathway to do so is not clear in their current department (IFM). Their recent re-location within the department to sit and work closer together has had an extremely positive impact on research integration and collaboration amongst junior scientists in the unit. Diversification of funding sources could help to ensure long-term financial stability. It is the panel's opinion that the unit would be competitive in obtaining high-profile EU funding.

Recommendations

Enhance Internal Communication, Collaboration, and Visibility

There is a clear need for better internal communication and collaboration within the university. We recommend the organisation of regular intra- and inter-departmental seminars and faculty meetings, fostering more informal interactions between research groups. Additionally, the unit could increase its visibility within the university and beyond by enhancing its involvement in teaching, organising outreach activities, and actively promoting research achievements. Strengthening cross-departmental collaboration and securing representation in decision-making committees will further support integration within the university and ensure the unit's contributions are recognised for their worth.

Enhance Collaboration with Experimental and Industry Partners

To maximize research impact, the unit could strengthen collaborations with experimental groups and industry partners, particularly in the pharmaceutical and biotech sectors. Establishing structured engagement with local and national companies could improve applied research outcomes and provide alternative funding sources. Such networking would also have a positive impact on networking and building career opportunities for young researchers in the unit.

Increase Research Visibility and High-Impact Publications

While the unit is already publishing in top-tier journals, a strategic focus on interdisciplinary collaborations—particularly with experimental researchers—could further enhance the quality and impact of research output. Targeting prestigious EU funding opportunities would also elevate the unit's international research profile.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication Strategies

The BIOIN unit has a strong record of publishing in high-impact journals, with 44% of its publications appearing in Level 2 journals, a rate well above the university average. Researchers in the unit have noted that impactful contributions to method development (such as AlphaFold2) are not always published. While these contributions are valuable, they may not always be recognized at the same level as high-impact research papers. Open-access publishing is already a strong practice, with 84% of publications being openly accessible. It was observed that collaborative outputs with experimentalists were quite rare, though these often may lead to papers in high-end journals.

2) Recruitment and Opportunities for Early-Career Researchers

The BIOIN unit lacks a clear recruitment strategy, mainly due to its small size and limited control over hiring decisions at the department (IFM) level. Recruitment of junior researchers is balanced in terms of gender, but senior positions remain male-dominated, with no clear institution-wide effort to address this imbalance. Early-career researchers, particularly DDLS fellows, have expressed concerns about a lack of structured mentoring and career development opportunities. Despite efforts by individual PIs to support junior staff, the absence of a central mentoring system hinders structured career progression and creates unnecessary stress.

3) Quality of PhD Training

PhD supervision within BIOIN is highly regarded among students, with regular meetings and a nurturing research environment. The unit follows an achievable rule-of-thumb target of four articles per thesis, although students have noticed an increased time required for the review process. PhD students face challenges in finding teaching opportunities, as the unit has limited control over university-wide teaching allocations. There seems to be no doctoral school in which all PhD students are enrolled. The discontinuation of the national MedBioInfo doctoral school has been a setback, as students found it highly beneficial for networking and interdisciplinary learning. PhD students supervised by the DDLS fellows are enrolled in the DDLS PhD program, which brings together PhD students from DDLS fellows from different Swedish universities. This gives this PhD student cohort a unique opportunity to network and build their skills, while those outside that network miss out on such an opportunity. Students report a lack of structured career guidance and industry connections. Career fairs organised at LiU are primarily focused on material sciences and industry connections relevant to bioinformatics can not be made there.

4) Academic and Non-Academic Networks and Collaborations

The unit has strong international collaborations but lacks significant engagement within LiU. Most collaborative efforts arise through external contacts rather than structured institutional initiatives. Although the unit has some joint PhD supervision with experimental groups, these collaborations remain limited and have not led to co-authorship on high-impact research outputs. The lack of intra- and inter-departmental events further contributes to the unit's relative isolation and lack of visibility within LiU.

5) Equal Opportunities and Gender Equality

Gender diversity at the junior level is balanced, but senior positions remain entirely male. The unit has consciously hired the under-represented sex in recent recruitments at PhD level when the top two candidates had equivalent qualifications. While faculty hiring is outside the unit's control, there is no clear strategy at the university level to improve gender representation in leadership positions. Efforts have been made to ensure that job postings do not discourage female applicants, but these measures remain informal. The unit reports no systemic bias in recruitment but acknowledges that proactive measures could improve diversity at higher academic levels.

6) Good Research Practice

PhD students receive training in research ethics as part of their mandatory coursework. However, the overall administrative support for research is weak, with slow bureaucratic processes and unclear responsibilities within the department. Researchers note that decision-making within the university is reactive rather than proactive, delaying solutions for essential needs such as workspace allocation and administrative support for grant applications. From their publications it is evident that the unit maintains high research standards, however, it is also clear that administrative inefficiencies create unnecessary burdens on researchers.

7) Research in Relation to Teaching

The BIOIN unit has uneven involvement in teaching, primarily due to structural issues within the university. Teaching allocations are decided at the faculty level, leaving the unit with little influence over course offerings. The lack of a dedicated master's program in bioinformatics further limits opportunities to engage students in research activities. The ongoing effort to develop a DDLS-driven master's program is a step in the right direction, but progress has been slow. Unit members have expressed frustration over the mismatch between their expertise and the university's teaching structure, which does not fully utilise their knowledge in bioinformatics.

Recommendations

Strengthen Publication Strategies and Research Visibility

While the BIOIN unit already performs well in publishing in high-impact journals, we recommend a more strategic approach to ensure that methodological advances, such as those akin to AlphaFold2, are formally published and recognised. Encouraging closer collaboration with experimentalists could further improve research impact and increase publication opportunities in top-tier journals. Additionally, maintaining strong open-access practices and targeting prestigious EU funding programs will help elevate the unit's international profile and visibility.

Enhance Recruitment Practices and Support for Early-Career Researchers

To help build a sustainable research environment, the department (IFM) should develop a clearer recruitment strategy in coordination with its units, ensuring transparency in hiring processes and opportunities for new researchers. Addressing gender imbalances at senior levels requires proactive institutional policies beyond the informal efforts of individual units hiring at the PhD level. Departmental search committees should be put in place to identify gender-balanced lists of candidates for new positions. Furthermore, implementing a structured mentoring program for early-career researchers, particularly DDLS fellows, would provide much-needed career guidance and professional development.

Improve PhD Training and Career Development Opportunities

PhD students benefit from strong supervision within the BIOIN unit, but gaps in teaching opportunities, structured career guidance, and industry connections need to be addressed. Advocating for the establishment of an appropriate doctoral school would restore valuable networking and interdisciplinary learning opportunities. Additionally, the unit could work with the faculty to integrate PhD students into relevant teaching assignments and strengthen bioinformatics-focused career fairs to improve industry engagement.

Expand Academic and Industry Collaborations
To foster greater integration within LiU, the BIOIN unit could initiate structured networking events and seek stronger ties with experimental groups for joint research and co-authorship. Strengthening collaborations with industry—particularly in the biotech and pharmaceutical sectors—could create new research funding opportunities and career pathways for PhD students and postdocs.

Streamline Administrative Support and Research Infrastructure
Inefficiencies in university administration create unnecessary burdens on researchers, creating stress, and slowing down processes related to grant applications, workspace allocation, and other essential needs. The department and university should aim for clarity on administrative responsibilities and more proactive decision-making to enable a more efficient research environment. Strengthening administrative support would allow researchers to focus on excellence in their scientific output rather than overcoming bureaucratic hurdles.

Develop a Coherent Strategy for Teaching and Research Integration
Greater involvement in teaching at LiU would increase the unit's visibility among students and help attract high-quality candidates for MSc projects and PhD studies. Additionally, advocating for adjustments in faculty teaching allocations to better reflect bioinformatics expertise would maximise the unit's educational contribution while fostering stronger research integration.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization
The research unit operates with a high degree of autonomy but struggles with internal integration within the university. The panel notes that the unit appears to be scientifically misplaced and could benefit from relocating to a setting where its research aligns more naturally with other units. Collaboration with other groups within the department (IFM) is limited, and the unit feels isolated from strategic decision-making. Building on this, the lack of clearly structured PI meetings and intra- and interdepartmental seminars focusing, e.g. on bioinformatics or computational biology, further limits opportunities for networking and coordination.

2) Staffing
Recruitment and retention pose significant challenges, particularly due to career progression barriers. The unit reports difficulty in attracting top talent, especially at the PhD level, even in

fields where they conduct excellent research. This could at least partly be due to the lack of visibility in relevant courses at the MSc level that match their research interests. Women remain underrepresented in the unit, especially in senior academic positions, and international staff face additional challenges due to inadequate support systems being in place, for instance, key documents translated into English. Junior researchers and postdocs experience uncertainty regarding long-term career prospects.

3) Funding

The unit relies heavily on external grants, with minimal base funding from the university and allocated without consideration of strategic priorities. Some PIs are highly successful in securing competitive grants but the unit is not fully exploiting the available support for major grant applications.

4) Research Infrastructure

Their proximity to the National Supercomputer Centre, which is based in Linköping, and access to SciLifeLab computational infrastructures, is exceptionally convenient and well exploited by the unit. Overall, the available research infrastructure appears adequate, with the exception that the unit reports difficulties in accessing office space, which has hindered productive research and collaboration.

5) Support Functions

Administrative burdens are a major concern, as researchers must handle many tasks themselves due to a lack of support staff. The unit seeks to reduce the administrative workload, which currently limits research efficiency. An example is that a significant amount of time was spent on finding rooms for newly arriving researchers, something that an efficient administration would have solved proactively.

Recommendations

Organisation - Strengthen Internal Integration and Strategic Positioning

The research unit could consider relocating to a department or faculty where its research aligns more closely with related groups, fostering stronger collaborations and increasing strategic visibility. To enhance networking and coordination, structured PI meetings and regular intra- and interdepartmental seminars could be established. Additionally, the unit should increase its participation in strategic university and department-level decision-making processes to ensure that its research priorities are represented in broader institutional planning.

Address Staffing and Career Development Challenges

The unit faces challenges in attracting and retaining top talent. Addressing career progression barriers by implementing structured mentorship programs and tenure-track pathways would improve retention. Strengthening MSc course offerings aligned with its research focus would improve visibility and recruitment. Furthermore, international staff should receive improved administrative support, including access to key documents translated into English. To support junior researchers, clearer career pathways should be developed, incorporating mentorship programs, grant-writing workshops, and structured discussions on long-term career prospects. The unit could explore the possibility of (co)-funding PhD positions through industry.

Optimise Funding Strategies

The unit would benefit from a more balanced distribution of the base university funding, ensuring that financial resources are allocated in alignment with their research strengths and long-term growth potential. Engaging more actively with the university's grant-writing support services could further enhance the success rate in securing large-scale national and international funding opportunities.

Improve Process for Space Allocation

The process of attributing office space remains a critical issue. Though ultimately solved, the process should be such that newly arriving personnel (including students) have suitable office space allocated upon their arrival. Addressing this issue through coordinated efforts with department administration would provide the unit with a more efficient working environment.

Reduce Administrative Burden for Researchers

Excessive administrative burdens hinder research efficiency, with faculty members handling tasks that should be managed by support staff. Improving access to dedicated administrative personnel to assist with logistics, particularly for new researchers, would allow them to focus on their core, scientific work. Optimisation of centralised systems for managing routine administrative tasks would improve the research possibilities for the unit.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The BIOIN unit conducts highly relevant and cutting-edge research in bioinformatics, with a strong international reputation and expertise.

The panel highlights opportunities for further growth and integration within the university; most importantly a strategic location is essential to provide an environment that aligns with their research and teaching expertise and fosters an environment for interdisciplinary collaborations. This is of utmost importance to retain international top talent and ensure

continued growth. This should be facilitated by efficient administrative support. The unit should also ensure that they embed themselves and effectively utilise existing university-wide support functions.

Overall, while the BIOIN unit demonstrates strong research quality and potential, addressing the organisational, administrative, and strategic issues is crucial for its long-term success and integration within the university.

Panel C Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of Niclas Kolm, Stockholm University (chair); Alexandra Teleki, Uppsala University, SciLifeLab; Marc Lensink, CNRS & University of Lille, France; Liam McGuffin, University of Reading, UK. Before the visit to Linköping University, the panel had Zoom meetings and provided individual, independent summaries of the provided data packages and self-evaluations that the chair summarised and shared with the panel members. These ensured the panel members were well-prepared for the visit both in terms of preparations for the interview questions and report work. The interview questions were further developed through panel meetings at the beginning of the visit and careful notes were taken during the interviews by all panel members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Beyond the evaluation units, the panel was impressed by the drive and ambition of the leadership in terms of the university's vision for its future. The panel was also impressed by the organisation during the visit, and by the engagement and commitment that went into the preparation of materials prior to the visit.

The panel did not meet the Dean of the Faculty of Science and Engineering nor the Head of the Department of Physics, Chemistry and Biology (IFM). However, based on the available data and interviews, there is an apparent disconnect between the Faculty of Science and Engineering, the department IFM, and the research units (BIOIN, BIOLO/ECOMOD) reviewed by panel C. This is viewed as problematic by the panel. The units are currently placed in a department that seemingly does not align with their vision of research and teaching.

There is no Faculty of Life Sciences (Life Sciences meant here in its broadest meaning). The biologists, bioinformaticians, and biomedical scientists and engineers are scattered over different departments and there is apparently no formal network between them. This leads to a lack of opportunities for researchers in the Life Sciences to network and collaborate.

The teaching workload is not balanced, with negative impacts on research; many of the senior staff seem to teach full-time, whereas it is they who should lead the research projects.

A returning point in our review has been the apparent under-funding of the research units under evaluation. The panel suggests that the university investigates possibilities to remedy this to ensure a sustainable balance between teaching and high-impact research among PIs in both BIOIN and BIOLO/ECOMOD, not least regarding the recruitment of PhD students.

Evaluated Unit's Name: IFM.ECOMOD Ecological and Environmental Modelling and IFM.BIOLO Biology

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) Relevance and Novelty of the Research Topics

The BIOLO/ECOMOD unit conducts research across multiple fields of biology, including conservation biology, ethology, evolutionary biology, microbiology, and ecological and environmental modelling. This diversity is a strength, as it enables the unit to address pressing environmental and biological challenges from multiple perspectives. The research has high societal relevance, particularly in areas such as biodiversity conservation, ecosystem modelling, environmental sustainability and antimicrobial resistance. However, the breadth of research topics may sometimes lead to fragmentation, making it difficult to establish a clear strategic focus. The recent merger of BIOLO and ECOMOD provides an opportunity to align research directions more effectively and foster interdisciplinary synergies.

2) Quality of the Research Output

The unit produces a healthy volume of publications, but a substantial proportion appear in lower-impact journals such as PLOS One and Scientific Reports. While these journals ensure accessibility and broad dissemination, there is a concern that they may not sufficiently enhance the visibility and prestige of the unit's research nor reach readership in relevant scientific communities. Some high-impact publications in journals like Nature Communications, Nature Ecology & Evolution, Ecology Letters and PLOS Genetics indicate that the potential for publishing in top-tier venues exists.

3) Impact Outside Academia

BIOLO/ECOMOD has strong connections with government agencies and contributes to policy-related research. The CellMicro subdivision has furthermore taken its innovation to a spin-off company and is to embark on clinical trials. While these contributions are valuable, the unit lacks structured strategies for maximising their impact outside academia. Industrial

collaborations are limited, and there is potential to engage more with private sector partners, particularly in ecological modelling and environmental monitoring.

4) Strategies, Priorities, and Future Research Plans

The unit faces challenges related to recruitment, funding, and workload distribution. A decline in external research funding accompanied by a preference for hiring postdocs over PhD students has led to grave concerns about the long-term sustainability of the research pipeline. In autumn 2025, there will be extremely few active PhD student left in the entire unit. Additionally, the heavy teaching responsibilities of most faculty members may seriously limit research capacity.

Recommendations

Refine Research Focus and Publication Strategy

While the unit's broad expertise is valuable, clearer thematic alignment may enhance cohesion and impact. While the unit publishes regularly, many articles appear in lower-impact journals. Avoiding "low-end" publications and targeting more top-tier journals would improve visibility and recognition and potentially increase the chances of attracting external funding.

Improve Research Sustainability

The dramatic decline in PhD recruitment threatens long-term research capacity. Increasing PhD studentships must be an urgent priority and balancing faculty teaching loads through shared responsibilities and course optimisation would support a sustainable research environment.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication Strategies

The BIOLO/ECOMOD unit has a diverse research output, covering multiple fields in biology and ecological modelling. However, a significant proportion of publications appear in lower-impact, broad-scope journals such as PLOS One and Scientific Reports. While these journals provide visibility, they may not always enhance the unit's research prestige. There is also a noted tendency to prioritise quantity over quality, with concerns about "low-balling" publications. The self-evaluation and the interviews clarified that the unit is aware of these challenges and is discussing strategies to balance publication impact and accessibility.

2) Recruitment and Opportunities for Early-Career Researchers

Recruitment within the unit is constrained by funding limitations, particularly for PhD students, as there is not enough faculty nor external funding available for doctoral positions in the unit. PIs often prefer hiring postdocs over PhD students due to financial constraints. There is a striking imbalance of senior versus junior staff in the unit, with a disproportionately large number of mid-career researchers. Junior researchers and assistant professors face challenges securing tenure-track opportunities, particularly regarding their research-teaching balance.

3) Quality of PhD Training

The PhD programme within the unit is very small and declining, with a significantly lower number of doctoral students in comparison to the number of faculty members. Supervisors are supportive, and students report good mentoring experiences within research groups. However, a lack of structured PhD training courses specific to their research needs is a common concern. Many PhD courses are repurposed from MSc programmes, making it difficult for students who are continuing from their MSc at LiU to access specialised training. Additionally, the unit lacks a strong peer network, with some students expressing concerns about isolation and a lack of social and scientific engagement with peers.

4) Academic and Non-Academic Networks and Collaborations

The unit has some strong collaborations with government agencies and contributes to research that is influential to policy. However, academic collaborations within Linköping University remain limited. While there are productive collaborations outside the university, internal integration is weak, partly due to the inherent structural separation of the Life Science research units throughout LiU. The apparent lack of institutional support for networking and collaboration among Life Scientists limits the unit's ability to establish broader interdisciplinary connections.

5) Equal Opportunities and Gender Equality

Gender balance within the unit varies across different career levels. While PhD students are predominantly female, senior academic positions remain male-dominated. There is no formal strategy in place to address gender disparities in faculty hiring. Efforts to encourage diverse hiring practices are largely ad hoc, with no university-level initiatives to create balanced recruitment. Although gender diversity is acknowledged as an issue, there is little proactive effort to address it systematically.

6) Good Research Practice

PhD students receive training in research ethics as part of their mandatory coursework. The panel notes that there was not enough time to evaluate this thoroughly, but the lab tour suggested that sound research practices are being followed.

7) Research in Relation to Teaching

Many faculty members are on full-time teaching contracts, requiring them to obtain external funding to buy out time for research. This creates imbalance and is a significant barrier for faculty who need time to conduct high-quality research. Appointments with a disproportionate teaching load jeopardise the competitiveness of those researchers to secure external funding. The teaching appears to be spread over the full year also at the individual level, giving the researchers no dedicated blocks of time to focus on research.

Recommendations

Enhance Publication Strategies

The unit should prioritise publishing in higher-impact journals while maintaining an open-access policy. Encouraging increased impact, supporting more targeted journal selection, and providing internal peer review mechanisms would improve research visibility and prestige.

Improve Recruitment and Career Opportunities

Increasing funding for PhD positions and/or increasing the incentive to recruit PhD students with existing funding is crucially important in the unit to drive coherent research programs, build career portfolios, and share the teaching assignments of the unit on all career levels.

Strengthen PhD Training and Community

Expanding specialised PhD courses and fostering PhD networks, for instance, through a well-defined doctoral program, would enhance doctoral education. Developing structured training programs and interdisciplinary engagement opportunities would improve both academic and social support for PhD students.

Expand Academic and External Collaborations

Internal collaboration exploiting the diversity of the unit has the potential to create unique research topics with targeted funding opportunities. The unit could strengthen internal collaborations within Life Sciences at LiU and leverage interdisciplinary opportunities. Institutional support for networking and structured Life Science partnerships would enhance integration and research impact.

Promote Equal Opportunities and Gender Balance

A formal gender equality strategy in faculty hiring is crucial for resolving the gender imbalance, particularly at the senior level. Implementing structured recruitment policies and institutional diversity initiatives would support a more balanced and inclusive research environment.

Improve Research-Teaching Balance

Reducing excessive teaching loads, while ensuring protected research time, would enhance research quality. This is especially important for early-career researchers. Revising workload distribution and securing institutional support for more research-focused contracts would improve research output, leading to increased competitiveness for external funding.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization

The merger of BIOLO and ECOMOD has been well received; many researchers were collaborating before the integration. The CellMicro subdivision may be less integrated with the unit based on the collaborative map produced by the unit. There are mixed views on whether to formalise subdivisions within the unit. While some researchers prefer to maintain flexibility, the unit head sees potential benefits in formalising subdivisions to improve organisation and fund allocation. The unit operates within IFM, but there is a real sense that the department-wide structure is not well aligned with biological sciences. There is interest in creating a more unified Life Sciences faculty at LiU, encompassing all branches of the Life Sciences field, to strengthen biology-related research.

2) Staffing

The unit has a relatively balanced gender distribution, with approximately 60% men and 40% women, though recent recruitments have been predominantly male. The unit faces a preference for hiring postdocs over PhD students due to cost-effectiveness and immediate research productivity. In addition, teaching responsibilities are high, requiring researchers to secure external funding to "buy themselves out" of teaching obligations. This creates an imbalance where most researchers seem overburdened with teaching, limiting their research productivity.

3) Funding

The unit relies heavily on external funding, as there is little faculty co-funding for PhD students. A significant concern is the reduction in base funding over the past two years, which has placed additional financial strain on the unit. While the unit has secured grants from major funding organisations in the past, there is concern about the long-term sustainability of funding in light of the heavy teaching load. There is an ongoing effort to diversify funding sources, including securing international grants and industry partnerships, but the current financial model remains unstable.

4) Research Infrastructure

The unit has access to strong research infrastructure, including well-equipped core facilities for microscopy, mass spectrometry, and animal studies. However, recent cuts to lab space, which were implemented as a cost-saving measure, may present challenges to the growth of the unit in the future. The unit expresses the desire to have access to drone capabilities.

5) Support Functions

The unit rates the administrative support as adequate for their needs.

Recommendations

Organisation

The unit should assess the benefits of formalising subdivisions while maintaining flexibility for researchers. However, in the view of the panel, the unit is currently too small to warrant such a subdivision. Strengthening the integration of CellMicro within the unit could improve collaboration. Additionally, exploring the creation of a unified Life Sciences faculty, encompassing all branches of the Life Sciences field, will enhance the effective operation of Life Sciences research at LiU.

Staffing

Efforts should be made to improve gender balance in recruitment, particularly at senior levels. The unit must maintain an adequate number of PhD students enrolled in suitable programmes. They could explore the possibility of (co)-funding PhD positions through industry. The high teaching burden on researchers should be addressed by exploring alternative funding models. The unit could more effectively allocate teaching amongst staff to free up time for research. Optimisation of taught courses for more effective use of researchers' time could also be investigated. In terms of future recruitments, possibilities such as approaching potential external Wallenberg Academy Fellows could be considered to bring in cost-effective and competitive research.

Funding

Diversifying funding sources through national and international grants remains crucial for financial stability. Increasing faculty funding for PhD students and reassessing recent base funding reductions could help ensure long-term sustainability.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The BIOLO/ECOMOD unit produces high-quality research with societal impact, which should be nurtured. Ensuring the long-term sustainability of the unit necessitates strategic action to address challenges related to publication strategies, recruitment, and funding.

Increasing PhD recruitment, improving the balance between teaching and research responsibilities, and exploiting untapped intra- and inter-unit research synergies must all be urgent priorities and would enhance the unit's research visibility and competitiveness.

Panel D Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
- D2. IFM.HALV – Semiconductor Materials
- D3. IFM.MDESIGN – Materials Design
- D4. IFM.NANO – Nanostructured Materials
- D5. IFM.PLASM – Plasma and Coatings Physics
- D6. IFM.TEOFY – Theoretical Physics
- D7. IFM.TUNNF – Thin Film Physics

The evaluation process started well before the physical meeting at LiU. For each evaluation unit, a shared document was created, allowing all panel members to collaboratively collect, organize, and review information for each division. In preparation for the on-site interviews, the panel developed a set of guiding questions for all units as well as others tailored to each unit. These questions served as the basis for the discussions during the interviews. The reviewer suggested by the unit was assigned as the lead for this unit, also taking the lead in coordinating input from the rest of the panel and drafting the report.

Each interview session began with the panel chair introducing the panel, followed by brief introductions of the panel members and the members of the unit present. In the discussion with the senior representatives, they were asked to give a concise (10 minute) presentation considering the structure of the unit, long-term funding plan, and career-development. The designated lead then initiated the questioning, but all other panel members contributed to the discussion. Notes were taken individually by all panel members throughout the interviews to ensure comprehensive documentation. Most of the panelists attended in person and one participated online. At the end of each day, the panel convened at the hotel to discuss the outcomes of the interviews and summarize key points and observations. This daily debriefing ensured that all important information was systematically captured, discussed, and collected. Finally, each report draft was carefully read and amended by each panelist, with the changes approved by the lead panelist. Overall, this clear and efficient process allowed for a robust evaluation of each unit.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Observations:

The panel has the impression that the department's operational methods are very different from those of most other universities and research institutes with which most of the panel is familiar. This primarily concerns the fact that not even the salaries of full professors are covered by public funding. There are only a few exceptions where this occurs, and only to a very limited extent. In our view, this has serious consequences:

(i) There is a lot of pressure put on the researchers' shoulders striving for continuous funding to pay their own salaries as well as those of their coworkers. This lowers the outcome of projects, since otherwise more young people could be hired. It is very often reported that one project is not even enough to feed a single PhD student. There seems to be limited information about funding opportunities from Sweden and Europe, and possible support for finding funding opportunities by the administration is not well known in some divisions. Overall, we have observed that a significant portion of researchers, across all experience levels, is dissatisfied with their current situation.

(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

(iv) Since all groups /(sub)units are self-supported and self-contained, there are no overall decisions taken towards common strategies, potential changes of directions, etc. There is also

a lack of communication from the department to the divisions and the units below regarding a common and unified research strategy. And there is no common concept of how to maintain and share facilities and to recruit and pay technicians. Who decides about investments? Central facilities without sufficient technicians cannot provide maintenance and funding opportunities; technicians themselves cannot be paid from projects, and permanent positions are not available. Also, who decides on the teaching? Several units complain about not having access to teaching. We could not elaborate whether the faculty makes its own decisions on how to distribute the university money to the divisions, and how the teaching opportunities for staff members of the divisions are organized.

In essence, the department appears to us as an umbrella of freelancers that organize themselves in smaller or bigger groups. Only in exceptional cases (basically by one division), the system is regarded as advantageous, since it allows for growth and for creating positions in an independent manner. The current system has enabled Swedish research to benefit significantly from the contributions of scientists from a particular group of countries. However, recent political developments pose challenges and it is not clear how these changes will impact the future of the research landscape in Linköping.

A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
- Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.
- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

This research unit investigates electronic, magnetic, and photonic properties of semiconductors and nanostructures. The unit works on three topics: dilute-nitride and dilute-bismide nanowires for solar cells and single photon sources; semiconductor nanostructures for opto-spintronics; and magnetic and spin properties of halide double perovskite semiconductors. Being in a new research area, they seek funding in Sweden and the EU to advance quantum device development and manage the Swedish Interdisciplinary Magnetic Resonance Center (SIMARC). The discontinuation of excellence contracts for senior professors poses future challenges for the unit, particularly as many are nearing retirement and some research topics are stagnant due to funding constraints. The unit has shown strong scientific output and collaborations with institutions in Japan, the US, and Korea for samples but relies heavily on these external sources. Funding for some projects has ended, necessitating strategic decisions regarding future support. More collaborations within Sweden and Europe could enhance their research and a more unified and clear future strategy should be developed.

The research unit has achieved strong scientific output, producing significant contributions to the field. However, due to the above mentioned constraints, research output in future may decline. It should be balanced by a more proactive approach to attract financing and publishing newer topics. The unit should look for a career development plan for junior researchers, inhibiting their independence. Junior members should more actively look for external funding opportunities and seek more university administrative support.

To enhance its impact beyond academia, the unit should explore collaborations with industry and commercialization efforts for practical applications of its research. The unit's future research aims to leverage the outcomes of fundamental studies to explore new spin phenomena and develop innovative prototype opto-spintronic devices. While the researchers possess the ideas and expertise, resources for personnel, equipment, and measurements are currently not adequate. The unit should revisit and prioritize its research goals to attract research funding while aligning with the available resources and the unit's interest in fundamental science and also expanding into "applied science".

Recommendations

- Refine research strategy;
- Strengthen collaborations and expand collaborations in Sweden and Europe to secure additional funding;
- Increase the number and involvement of PhD students and postdocs;
- Enhance recruitment and mentorship for young researchers.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop

their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The unit has a strong tradition of publishing in high-impact journals, but reduced funding may threaten future publications and the unit's prospects. To support early-career researchers, mechanisms for obtaining funding and fostering independence should be established. Currently, there is only one PhD student. This raises concerns about the research environment and workload distribution and lack of exchange between their peer group. While the unit has a solid history of collaborations, expanding partnerships in Sweden and Europe as well as in industry, is crucial for securing additional funding and research opportunities. Ensuring equal opportunities and gender equality in recruitment and career advancement is important, though the small group size complicates assessments. A clearer long-term strategy for good research practices is needed for the time following retirement of senior members. Finally, limited teaching opportunities hinder student attraction for thesis work at the unit.

Recommendations

- Enhance international visibility and explore new research directions;
- Hire younger researchers through international competitions and provide starting grants for independent research;
- Include regular progress check-points for PhD students and encourage participation in broader networks, conferences, and summer schools.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The research unit is small, comprising two professors, one associate professor, one assistant professor, one PhD student, and one Postdoc. It experiences a good research environment but challenges are related to size of the group. There are concerns about sustainability after the upcoming retirement of the senior professors and whether the younger researchers can maintain the unit. Since the professor salaries consume most external funding, there is only little left for new research initiatives or recruiting additional PhDs and postdocs. Although the unit has ample equipment, operational costs are not secured, and the unit currently also covers the expenses for maintaining the Swedish Interdisciplinary Magnetic Resonance Center (SIMARC).

Recommendations

- Limited faculty funding has a significant negative impact on Researchers. Faculty funding should be increased. Our suggestion is to consider limited permanent faculty positions at the department to support a large part of their salary.
- The unit can improve on synergies with the other divisions/units to get new opportunities.
- Check the possibility for a financing model for SIMARC, maybe nominal user fees should be introduced.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel D Report

Evaluated Unit's Name: IFM.HALV Semiconductor Materials

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
- D2. IFM.HALV – Semiconductor Materials
- D3. IFM.MDESIGN – Materials Design
- D4. IFM.NANO – Nanostructured Materials
- D5. IFM.PLASM – Plasma and Coatings Physics
- D6. IFM.TEOFY – Theoretical Physics
- D7. IFM.TUNNF – Thin Film Physics

The evaluation process started well before the physical meeting at LiU. For each evaluation unit, a shared document was created, allowing all panel members to collaboratively collect, organize, and review information for each division. In preparation for the on-site interviews, the panel developed a set of guiding questions for all units as well as others tailored to each unit. These questions served as the basis for the discussions during the interviews. The reviewer suggested by the unit was assigned as the lead for this unit, also taking the lead in coordinating input from the rest of the panel and drafting the report.

Each interview session began with the panel chair introducing the panel, followed by brief introductions of the panel members and the members of the unit present. In the discussion with the senior representatives, they were asked to give a concise (10 minute) presentation considering the structure of the unit, long-term funding plan, and career-development. The designated lead then initiated the questioning, but all other panel members contributed to the discussion. Notes were taken individually by all panel members throughout the interviews to ensure comprehensive documentation. Most of the panelists attended in person and one participated online. At the end of each day, the panel convened at the hotel to discuss the outcomes of the interviews and summarize key points and observations. This daily debriefing ensured that all important information was systematically captured, discussed, and collected. Finally, each report draft was carefully read and amended by each panelist, with the changes approved by the lead panelist. Overall, this clear and efficient process allowed for a robust evaluation of each unit.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Observations:

The panel has the impression that the department's operational methods are very different from those of most other universities and research institutes with which most of the panel is familiar. This primarily concerns the fact that not even the salaries of full professors are covered by public funding. There are only a few exceptions where this occurs, and only to a very limited extent. In our view, this has serious consequences:

(i) There is a lot of pressure put on the researchers' shoulders striving for continuous funding to pay their own salaries as well as those of their coworkers. This lowers the outcome of projects, since otherwise more young people could be hired. It is very often reported that one project is not even enough to feed a single PhD student. There seems to be limited information about funding opportunities from Sweden and Europe, and possible support for finding funding opportunities by the administration is not well known in some divisions. Overall, we have observed that a significant portion of researchers, across all experience levels, is dissatisfied with their current situation.

(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

(iv) Since all groups /(sub)units are self-supported and self-contained, there are no overall decisions taken towards common strategies, potential changes of directions, etc. There is also

a lack of communication from the department to the divisions and the units below regarding a common and unified research strategy. And there is no common concept of how to maintain and share facilities and to recruit and pay technicians. Who decides about investments? Central facilities without sufficient technicians cannot provide maintenance and funding opportunities; technicians themselves cannot be paid from projects, and permanent positions are not available. Also, who decides on the teaching? Several units complain about not having access to teaching. We could not elaborate whether the faculty makes its own decisions on how to distribute the university money to the divisions, and how the teaching opportunities for staff members of the divisions are organized.

In essence, the department appears to us as an umbrella of freelancers that organize themselves in smaller or bigger groups. Only in exceptional cases (basically by one division), the system is regarded as advantageous, since it allows for growth and for creating positions in an independent manner. The current system has enabled Swedish research to benefit significantly from the contributions of scientists from a particular group of countries. However, recent political developments pose challenges and it is not clear how these changes will impact the future of the research landscape in Linköping.

A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
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- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The division is structured into three independently led units: Unit 1 focuses on wide bandgap semiconductors for solid-state quantum systems; Unit 2 works on epitaxy and characterization of novel semiconductor materials for high-frequency and power electronics; and Unit 3 explores silicon carbide and low-dimensional materials like graphene for energy and environmental applications. While SiC remains a key focus in two units, basic research on this material has declined as it matures into established technology. However, adjustments to the research directions in recent years have been minor, and the commitment to environmental or sustainable materials have not been substantiated. The units partially shifted from power electronics to quantum materials about 10-15 years ago, introducing graphene and Ga_2O_3 epitaxy. While the units share resources, their directions are not much aligned and projects seem to contribute to separation between the researchers across the units.

The division has produced 307 papers, with 67% being open access and 83% resulting from international collaborations, including co-authored publications with industry and the establishment of four spin-off companies. Although there are strong networks of informal collaborations and some recent funding, the division lacks a clear research strategy, with vague overall targets predominantly driven by funding needs rather than fostering visibility or advancing research topics. Senior scientists acknowledge that parts of their research fields face strong competition but remain optimistic about future funding opportunities.

Recommendations

- Develop more specific and focused research visions for each unit.
- Include a reorganization of units in the division strategy to promote new topics and secure funding for new equipment.
- Create a cohesive research strategy across units to align with current LiU core areas (e.g., Advanced Functional Materials) and ensure financial sustainability.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research culture of the division, historically successful, is currently challenged by financial constraints and an overwhelming number of senior scientists (10 professors and lecturers, plus 4 emeriti) compared to junior researchers and students. Most senior staff must self-fund their positions due to a lack of university support, making it difficult to hire early-career researchers who struggle to compete for funding. Consequently, young university students are often kept as postdocs for maintenance roles, limiting their scientific independence and career prospects. The low number of PhD students inhibits team building, but they engage in some common activities. There are no corresponding activities organized for postdocs. Despite a high international academic reputation of the division in wide-bandgap materials, external grants and division head count are declining, and funding opportunities are hindered due to a lack of flexibility in research topics. The division also faces gender imbalance, with only 16% female staff and a predominately male group among younger researchers. Teaching opportunities are minimal due to low student numbers, and some senior staff members do not participate, affecting visibility and development opportunities for junior faculty, who need teaching experience for career advancement.

Recommendations

- Address the age structure issue with too many senior scientists struggling to secure funding.
- Use retirements to streamline activities toward broader topics with sustainable funding.
- We recommend not to continue promoting master and PhD students to assistant or lecturer levels; hire external junior scientists instead.
- Support development of young researchers into independence.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The division consists of three historically independent units that have developed primarily based on funding opportunities, relying heavily on senior faculty to procure their own projects and funding. This structure has resulted in a flat hierarchy with no common strategy for resource acquisition or maintenance, hindering strategic decision-making and collaboration among units. The dominance of senior scientists restricts the hiring of junior researchers, who are mainly employed to support senior projects and maintain equipment, creating a challenging environment for new ideas and career growth. Junior positions are often filled through internal promotions, leading to a low number of PhD students and limited mentorship opportunities for early-career researchers. Additionally, the division sees a decline in third-party financing and the maturity of research topics like SiC for power electronics have shifted focus from research to technology. New academic partners as well

as participation in bigger consortia are actively sought to secure funding for the novel areas. International collaborations and the service for preparing substrates and templates generate revenue. However, funding primarily covers salaries, making it difficult to maintain or acquire new equipment or to implement new research topics. The lack of a research strategy, the broad range of current topics, as well as infrastructure challenges, including the closure of the IFM mechanical workshop, further complicate operations.

Recommendations

- We recommend addressing organizational concerns alongside funding issues.
- Develop a cohesive vision across the units to strengthen the overall division.
- Hire new assistant professors through international competition and grant them freedom to explore innovative topics.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel D Report

Evaluated Unit's Name: IFM.MDESIGN Materials Design

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
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- D7. IFM.TUNNF – Thin Film Physics

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- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
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- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Materials Design division at Linköping University aims to conduct high-quality, application-driven fundamental research focused on developing innovative materials for sustainable applications. Their research spans several key areas including (1) predictive and explanatory simulations for materials design; synthesis and processing of 1D, 2D, and 3D materials (using powders, thin films, plasma, and wet-chemical methods); (2) energy storage and conversion materials; (3) development of AI models for predicting material stability. A future work will focus on water purification and the creation of sustainable materials through life-cycle assessment and collaboration with industry partners.

The division is led by a professor (Johanna Rosén), supported by two associate professors and assistant professors, alongside postdoctoral researchers and PhD students. The group aims to establish four sub-units by this year, before summer 2025. The group has a clear focus and emphasizes good publication strategies. Their research is published in highly-ranked journals, and the group is internationally very visible.

However, the division faces challenges, such as a shortage of materials science students in LiU. Additionally, the department is recruiting an assistant professor and four PhD/postdoc positions through the WISE program. However, the specific division where these positions will be allocated has not been decided yet. Decisions on major future research directions are made by the Division Head. However, group members are encouraged to collaboratively discuss, influence, and participate in the planning process. The division members also welcome individual ideas for proposals and projects.

Recommendations

- The division is encouraged to explore more possibilities of applying for other EU projects than the ERC scheme.
- The division is encouraged to communicate as a role model their good research strategy to other divisions.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The division is well-known for its collaborative work and appealing to students due to its strong connections and excellent facilities. The researchers feel a pleasant, collaborative

research spirit, and Prof. Rosén providing an encouraging role model for young female researchers that want to pursue an academic career has led to a good gender balance. PhD students benefit from numerous meetings, seminars, and interactions within AFM, creating a dynamic and engaging learning environment. Establishing a similar network with social events and additional activities for postdocs would be beneficial. While there may not be enough courses of interest for PhD students, summer schools present an excellent alternative. Overall, the working conditions in the division are supportive and positive, something that students truly appreciate. Many postdocs aspire to continue their academic careers at Linköping, but they will face challenges in securing enough independence and funding in the future, as academic opportunities remain limited. A career office could provide valuable support in navigating these challenges.

Recommendations

- The division is encouraged to create a more formal career development program for the employees, also outside the current group (see general comments and recommendations).
- Hiring external young faculty will provide new ideas and keep up diversity in the division, making it successful also in future.
- The postdocs are encouraged to organize social and scientific meetings within the department.
- The PhD students are missing more courses that need to be provided on the faculty level.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Members of the division benefit from the freedom to pursue projects that align with their interests, thriving in a strong collaborative environment that encourages idea generation and attracts further funding. The division has successfully secured financial support through grants from VR, ERC, KAW, SSF, WISE, and other sources, enabling an associate professor position to mentor a PhD student.. Additionally, an assistant professor has been nominated to apply for a KAW fellowship. This collaborative atmosphere nurtures original research proposals, particularly in 2D materials design, including layered borides, where Johanna Rosén's recognized expertise enhances visibility in the field. However, teaching opportunities remain limited, especially for younger researchers, who primarily advise PhD students without involvement in master's or bachelor's programs. While assistant professors are motivated to explore their research interests and gain independence, the absence of a structured career development system hinders their ability to secure grants and effectively mentor students.

Recommendations

- Continue fostering a supportive and innovative environment to maintain high-quality environmental research.
- Establishing units can strengthen junior faculty's responsibilities and academic freedom, but a consistent research strategy across the division should be maintained.
- Recruiting talented individuals recommended by peers could be an effective way to attract fresh, skilled students.
- Encouraging young PhDs to pursue mobility during their study to broaden their academic experience.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel D Report

Evaluated Unit's Name: IFM.NANO Nanostructured Materials

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
- D2. IFM.HALV – Semiconductor Materials
- D3. IFM.MDESIGN – Materials Design
- D4. IFM.NANO – Nanostructured Materials
- D5. IFM.PLASM – Plasma and Coatings Physics
- D6. IFM.TEOFY – Theoretical Physics
- D7. IFM.TUNNF – Thin Film Physics

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Each interview session began with the panel chair introducing the panel, followed by brief introductions of the panel members and the members of the unit present. In the discussion with the senior representatives, they were asked to give a concise (10 minute) presentation considering the structure of the unit, long-term funding plan, and career-development. The designated lead then initiated the questioning, but all other panel members contributed to the discussion. Notes were taken individually by all panel members throughout the interviews to ensure comprehensive documentation. Most of the panelists attended in person and one participated online. At the end of each day, the panel convened at the hotel to discuss the outcomes of the interviews and summarize key points and observations. This daily debriefing ensured that all important information was systematically captured, discussed, and collected. Finally, each report draft was carefully read and amended by each panelist, with the changes approved by the lead panelist. Overall, this clear and efficient process allowed for a robust evaluation of each unit.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Observations:

The panel has the impression that the department's operational methods are very different from those of most other universities and research institutes with which most of the panel is familiar. This primarily concerns the fact that not even the salaries of full professors are covered by public funding. There are only a few exceptions where this occurs, and only to a very limited extent. In our view, this has serious consequences:

(i) There is a lot of pressure put on the researchers' shoulders striving for continuous funding to pay their own salaries as well as those of their coworkers. This lowers the outcome of projects, since otherwise more young people could be hired. It is very often reported that one project is not even enough to feed a single PhD student. There seems to be limited information about funding opportunities from Sweden and Europe, and possible support for finding funding opportunities by the administration is not well known in some divisions. Overall, we have observed that a significant portion of researchers, across all experience levels, is dissatisfied with their current situation.

(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

(iv) Since all groups /(sub)units are self-supported and self-contained, there are no overall decisions taken towards common strategies, potential changes of directions, etc. There is also

a lack of communication from the department to the divisions and the units below regarding a common and unified research strategy. And there is no common concept of how to maintain and share facilities and to recruit and pay technicians. Who decides about investments? Central facilities without sufficient technicians cannot provide maintenance and funding opportunities; technicians themselves cannot be paid from projects, and permanent positions are not available. Also, who decides on the teaching? Several units complain about not having access to teaching. We could not elaborate whether the faculty makes its own decisions on how to distribute the university money to the divisions, and how the teaching opportunities for staff members of the divisions are organized.

In essence, the department appears to us as an umbrella of freelancers that organize themselves in smaller or bigger groups. Only in exceptional cases (basically by one division), the system is regarded as advantageous, since it allows for growth and for creating positions in an independent manner. The current system has enabled Swedish research to benefit significantly from the contributions of scientists from a particular group of countries. However, recent political developments pose challenges and it is not clear how these changes will impact the future of the research landscape in Linköping.

A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
- Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.
- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division *Nanostructured Materials* is led by Magnus Oden (full professor), with two senior lecturers, Emma Björk (senior associate professor) and Lina Rogström (associate professor). The division is rather small (10 people as of December 2023, while the latest staff count amounts to about 20 persons). The main research focus areas are hard coatings and mesoporous materials. There are currently no sub-units but a plan to divide the division into two research units is underway. Overall, the division is doing rather well, and it is visible outside LiU. The scientific community working on hard coating thin films knows the group and its legacy very well. However, the strategy for future expansion increasingly relies on the development of the Mesoporous Materials unit (led by Emma Björk). The division is strongly connected to the program FunMat-II that is related to surface engineering for cutting tools. This program provides funding and includes outreach to public and PhD engagement. It seems that researchers of the division benefit largely from this funding source.

Regarding hard coatings, the team originally led by Magnus Oden works on synthesis (and characterization together also with partners) on industry relevant systems, however, the scientific interest in this area is somewhat declining. The division excels in integrating deposition systems with in-situ studies of coating growth using X-ray scattering. Strong ties with industry allow exchange / interaction with the company for the division members and the students. New topics such as focusing on the synthesis of nanoporous materials for sustainable applications (electrocatalysis) and medicine (drug delivery) on the basis of high-surface area (mesoporous) materials are slowly expanding. There is a plan to build an electrocatalysis lab, but relevant experiments must be carried out with collaborators outside the campus site. The division also uses synchrotron beam time for structural characterization. The strategy is viewed as a positive development and the PI has demonstrated that she is capable of producing interesting work in these areas. However, more funding will be needed to establish these research directions in the division with the necessary and proper infrastructure. Several critical methods and devices should be established and provided within the division.

The scientists of the division are flexible in looking at the future of the research areas in terms of societal needs and adapting to new lines of research. For example, interest in hard coatings will decrease over the years due to the decline of combustion engines and the rise of electric cars. Nevertheless, the hard coating unit will be preserved due to the presence of the senior scientist (Lina Rogström) and the adjunct professor due to stable funding situation irrespective of the predicted gradual decline in science; so it is not surprising that this activity is still considered.

Recommendations

- Evaluate whether hard coatings are still a timely research topic for the division.
- The infrastructure and capabilities of the electrocatalysis lab should be improved to sustain the new research topics.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

According to their own words, the division researchers spent about 70 % of their scientific activities on running projects and 30 % on free research. The publication output, and with this also the time to fund a new topic, seems to be impeded by a slow review and publication process within the division, which the members are clearly aware of. All members of the division are involved in the publication process. Close relation to companies such as Seco Tools, where the adjunct professor is also hired, seems not to impede publishing even in the areas of joint research.

The division has been smaller, but it is currently growing. Still, hiring more (senior) personnel is strongly conditioned by external funding. As in many of the divisions, the staff members are to a great extent former students of the division. While career talks with the division head are in place, some staff seem to not consider the outside opportunities in academia, industry, and other directions. The division head supports independent work of the junior researchers. However, having young researchers hired on a permanent engineer position cannot be considered a motivating career path and a promising position to apply for funding. In general, the junior scientists lack information about career paths and opportunities, and they are not sure of their own role. PhD students benefit from help both at the University and the associated company. They mainly focus on their project, but there is overall a good working culture. Lack of facility for electrocatalysis experiments or some important characterization methods (solid-state NMR) is highlighted as a problem, but collaboration with other groups (e.g., at Norrköping campus) still allowed progress. The students participate in the available activities in the IFM Department, however, the PhD program is said to not necessarily match interests. Overall, some more structured career advice would be beneficial. But it is very encouraging that graduated students from the divisions are in high demand.

The division has shown good collaborations within IFM (TEOPHY and TUNNF) and ITN, which also led to joint funding applications. Further collaboration extends to the medical school (Emma Björk). Members of the division might benefit from new shared infrastructure MyFab for materials preparation and characterization. Industrial collaborations are quite strong and also involve joint master thesis projects. The adjunct professor also stands for this part. The division has an excellent gender balance (50%), with the two female senior lecturers acting as role models. The staff is young and diverse. Despite the relatively small number of professors and docents, the division seems to have a fair amount of teaching that also helps them to get new students. However, the adjunct professor could be more involved in teaching. International postdocs are challenged as teaching in Swedish is mandatory for bachelor classes, yet required for becoming a lecturer.

Recommendations

- The division would benefit from a publication strategy including speeding up preparation time and publishing for funding applications.

- A consistent and realistic research and staffing strategy across the division should be maintained.
- The career path of young researchers should be clearly defined, and they should have a better view regarding their role and their career opportunities.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The panel considers that the creation of smaller units within the division could effectively create barriers that will impede adjustment of research topics across them, and might leave some of them in an unhealthy condition when funding issues should arise. In general, it will make it more difficult to establish further innovative research directions.

There is no clear strategy for funding applications. The division is looking for project opportunities to work with other Swedish universities, but they take little initiative to enhance their collaboration to obtain a project in the near future. The submission of an EU-funded consortium is currently under preparation. The strategy to publish more and faster might not be sufficient alone to get more grants, without considering also strong leadership and international visibility as prerequisites. The panel considers the division to be in a transition where additional funds also from the faculty/government would be very helpful for them to adjust their topics and mitigate individual fluctuations in funding.

The age structure and ratio of senior/junior scientists is good, and the division head gives the junior researchers freedom for research. Yet, the strategy to promote independence is not very clear. Though one of the senior staff also was abroad before returning to LiU, the external view and ideas on the current topics seems limited. Recruiting new faculty members within the current funding system is nearly impossible due to a lack of allocated funds. The “next candidate” for a research unit, an external postdoc from abroad, is now permanently employed as senior research engineer, which is not a proper career path. The division regularly hosts master and PhD students, mostly international, from which many stay in EU industry or academia afterwards. Infrastructure maintenance as well as renewal and extension of equipment (atom probe, FIB auxiliaries) is a core concern of the division and strategies for solving these issues should be envisioned.

Recommendations

- Rethink the planned separation of the division into units, instead consider merging some of their activities with other divisions, to keep a focused and sustainable appearance.
- Enhance efforts to grow further in personal and funding in particular in the mesoporous materials area.
- Seeking funding opportunities from EU sources is a good step forward (medical application subject), but additional infrastructure support is urgently needed to develop the catalysis area. Without funding and suitable infrastructure, this particular topic will be difficult to maintain.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

N/A

Panel D Report

Evaluated Unit's Name: IFM.PLASM Plasma and Coatings Physics

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
- D2. IFM.HALV – Semiconductor Materials
- D3. IFM.MDESIGN – Materials Design
- D4. IFM.NANO – Nanostructured Materials
- D5. IFM.PLASM – Plasma and Coatings Physics
- D6. IFM.TEOFY – Theoretical Physics
- D7. IFM.TUNNF – Thin Film Physics

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Each interview session began with the panel chair introducing the panel, followed by brief introductions of the panel members and the members of the unit present. In the discussion with the senior representatives, they were asked to give a concise (10 minute) presentation considering the structure of the unit, long-term funding plan, and career-development. The designated lead then initiated the questioning, but all other panel members contributed to the discussion. Notes were taken individually by all panel members throughout the interviews to ensure comprehensive documentation. Most of the panelists attended in person and one participated online. At the end of each day, the panel convened at the hotel to discuss the outcomes of the interviews and summarize key points and observations. This daily debriefing ensured that all important information was systematically captured, discussed, and collected. Finally, each report draft was carefully read and amended by each panelist, with the changes approved by the lead panelist. Overall, this clear and efficient process allowed for a robust evaluation of each unit.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Observations:

The panel has the impression that the department's operational methods are very different from those of most other universities and research institutes with which most of the panel is familiar. This primarily concerns the fact that not even the salaries of full professors are covered by public funding. There are only a few exceptions where this occurs, and only to a very limited extent. In our view, this has serious consequences:

(i) There is a lot of pressure put on the researchers' shoulders striving for continuous funding to pay their own salaries as well as those of their coworkers. This lowers the outcome of projects, since otherwise more young people could be hired. It is very often reported that one project is not even enough to feed a single PhD student. There seems to be limited information about funding opportunities from Sweden and Europe, and possible support for finding funding opportunities by the administration is not well known in some divisions. Overall, we have observed that a significant portion of researchers, across all experience levels, is dissatisfied with their current situation.

(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

(iv) Since all groups /(sub)units are self-supported and self-contained, there are no overall decisions taken towards common strategies, potential changes of directions, etc. There is also

a lack of communication from the department to the divisions and the units below regarding a common and unified research strategy. And there is no common concept of how to maintain and share facilities and to recruit and pay technicians. Who decides about investments? Central facilities without sufficient technicians cannot provide maintenance and funding opportunities; technicians themselves cannot be paid from projects, and permanent positions are not available. Also, who decides on the teaching? Several units complain about not having access to teaching. We could not elaborate whether the faculty makes its own decisions on how to distribute the university money to the divisions, and how the teaching opportunities for staff members of the divisions are organized.

In essence, the department appears to us as an umbrella of freelancers that organize themselves in smaller or bigger groups. Only in exceptional cases (basically by one division), the system is regarded as advantageous, since it allows for growth and for creating positions in an independent manner. The current system has enabled Swedish research to benefit significantly from the contributions of scientists from a particular group of countries. However, recent political developments pose challenges and it is not clear how these changes will impact the future of the research landscape in Linköping.

A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
- Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.
- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The *Plasma and Coatings Physics* Division is dedicated to advancing plasma processes for the synthesis of thin films and nanostructures. Their research comprises innovation in hard coatings, semiconductor devices, and catalytic materials for energy applications. The division emphasizes translating research findings into industrial adoption and entrepreneurship. Historically, the division is recognized for its pioneering work on HiPIMS. Since 2010, the method is also employed to efficiently produce nanoparticles. Today the division head is predominantly focused on nanoparticles, while the associate professor has shifted his attention to semiconductor growth for high-power electronics. The division's strength lies in its robust collaborations with industry, having established six spin-off companies over the past 25 years.

The division has produced 67 publications and 4 patents in the past five years, which is commendable given the size of the team but could be improved. The share of co-authored publications with companies is well represented and formalized through NDA agreements. The division is proactive in disseminating its research activities and organizes monthly online workshops to network with leading European countries, providing a platform for ongoing EU projects. The division is actively pursuing external funding opportunities at both national and international levels. However, the impending retirement of the senior professor and the lack of faculty funding present challenges. Upon his retirement, the group will be focused around a single professor with a low number of students residing at the campus, which leaves them “under-critical” regarding robustness against variations in funding success.

The division currently shifts their research emphasis from hard coatings to applications within the semiconductor industry and is likely to get interest from industry in this area. Collaboration involving a shared industrial PhD student has already started. However, the division lacks expertise in semiconductor materials characterization and device fabrication, so without proper partners from academia, this approach will remain limited. Another idea is to apply this technique to produce thin metal oxide nanoparticle films for catalysis with an associated startup company. But generally, it remains unclear how a critical size necessary to form a sustainable research activity can be achieved with the current measures.

Recommendations

- The division should merge with another division to stabilize the “under-critical” situation, mitigate shortages in technical support, and release synergies (e.g. for the TEM equipment).
- Increasing efforts should be put into collaboration in EU projects.

- Look for in-house synergies or partners to cover the necessary equipment and infrastructure for research.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Most of the PhD students and postdoctoral researchers in the division are coming from industrial partners; they primarily work remotely and group meetings take place online. The number of academic PhDs is currently limited due to a shortage of funding. The division has proposed merging with TUNNF, but progress has been slow. This merger needs to be expedited to facilitate collaboration and create a positive scientific environment for both employees and students.

The team within the division is pleased with the equipment available for growing films and nanoparticles. Publications are placed in journals that are important for the community. The industrial PhD candidates appreciate the benefits of working in both industry and academia, viewing academia as a more flexible environment, which has positive aspects but also leads to a lack of clear direction. Conversely, the postdocs feel that there is a lack of organized work with well-defined tasks and scientific direction.

Unfortunately, there seem to be no teaching opportunities for the senior associate professor at LiU. He provides voluntary lectures at KTH and some students from there have made their thesis in the division. Both PhD and postdoc researchers have expressed concerns about the lack of technical support. For the PhD students, future career plans are uncertain, while the postdoc has a clear intention to return to their company. In any case, a career development plan for all employees is needed to provide guidance and support.

Recommendations

- A clear plan should be established between the industry and the PhD students/postdocs concerning publication expectations.
- Teaching opportunities at LiU should be provided for every division of IFM. A series of lectures by the division heads could provide visibility of each division for the students.
- We recommend creating an informative document that outlines the opportunities and responsibilities for the PhD students and postdocs.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The division is small and consists of seven members: one professor, an associate senior professor, a research engineer specializing in TEM, and four members associated with the industry (PhD students and postdocs). Most group members are from companies, with half of them not working locally at LiU, making it challenging to maintain a cohesive group with regular in-person meetings. Consequently, meetings are held online, severely limiting interaction among division members despite group meetings taking place every other week.

It seems that the industrial PhD candidates are not fully integrated into the division's work and responsibilities, such as equipment management. Nonetheless, the division members work collaboratively within the division to ensure operations run smoothly. PhD students and postdocs seem to not fully embed themselves into the academic university life and activities such as teaching, seminars, or contact to other students and postdocs. Furthermore, their ultimate industrial aim often does not align with pursuing careers in academia.

There is a perception that the division's activities are not strongly connected to LiU. To address this, it would be beneficial to connect with peers in similar work environments (between industry and academia) to provide guidance on career paths and challenges, even before they begin their work.

Apart from the unclear future of the division due to the ongoing retirement of the division head, there is a lack of basic funding. Relying on grants may not be sufficient as long as current funding primarily focuses on core topics and industrial collaboration, and not on new ideas and emerging new topics. There are first applications on these new directions, but the division is still in an unstable state.

Recommendations

- As mentioned earlier, we recommend that the division merges or adjusts itself to provide stable conditions for the new semiconductor thin film research. In parallel, funding opportunities should be followed even at this early stage of research to ensure continuity in staffing and scientific progress.
- The staffing situation is very variable and relies heavily on external PhDs, which makes long-term planning challenging particularly for such a small division.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel D Report

Evaluated Unit's Name: IFM.TEOFY Theoretical Physics

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

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Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

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(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

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A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
- Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.
- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The division consists of 48 researchers. It is divided into 5 units, four of them headed by a full professor, one by an associate professor. The division chair, Igor Abrikosov, has the overall lead, taking decisions down to the specific research directions. Their research spans a broad range of topics from fundamental to applied projects, based on a network within academia and established contacts with industry.

Igor Abrikosov, leading *Physics at Extreme Conditions*, is the internationally most active and most well-known senior researcher, with an excellent track record. He built up the large group and is still involved in many or most of the research topics, putting the Theoretical Physics Division as a strong player on the European research landscape. Abrikosov is the overall decision maker, also contributing the biggest share to the finances of the division. The successful operating model of the division is a "matrix", allowing every (sub)unit to participate in every other's projects, which span very relevant and timely topics, often chosen after funding opportunities and/or requests by collaborators.

The unit of Björn Alling, *Theory of Disordered Materials*, joined in 2017, being split off from the Thin Film Division. With this move, all major theory aspects of materials science in the department are unified under one roof. *Ab Initio Methods and Energy Materials* is led by Sergei Simak with a wide portfolio of recent research highlights. Rickard Armiento is responsible for the *Materials Design and Informatics* unit, dealing with various high-throughput and database aspects, for example hosting the largest database on point defects. *Nanophysics and Non-Linear Optics* is headed by Irina Yakimenko. Her publication record of the reporting period is rather limited (4 papers in Journal of Physics: Condensed Matter from 2018 - 2023 according to her ORCID account).

The division is an exceptional example that can cope well with the given overall situation of the department and the competitive environment. It has always managed to acquire substantial funding that not only allowed for a steady growth, but also to promote many young researchers and to keep them in the group. Overall, they have an excellent publication record with the majority of papers in high-level journals (~40% in Q1). We appreciate very much the attitude to not only strive for high-impact papers, but to also choose most decent journals like Phys. Rev. B, being the "home base" for good solid-state research. The 84% open access rate is excellent. The fact that 87% of publications are with international collaborators is an excellent sign for internationality. However, it is difficult to judge the portion of their contribution to the research ideas.

Recommendations

- Rethink the structure in view of the next retirement(s), for example closing the *Nanophysics and Non-Linear Optics* unit. Nanophysics is partly covered by the other units already, while non-linear optics is not in the focus of the division.
- The division's focus is quite broad. We recommend each unit to adopt a more targeted strategy to enhance their focus.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The group is publishing in top international journals. As pointed out above, it is very good that not only the journals with the highest impact are considered, but also those most relevant to the field.

The recruitment procedure described, e.g. announcements, interviews, etc., is state-of-the art overall. However, it is very surprising that gender aspects do not seem to play any role. As a severe underrepresentation of female researchers affects any research environment, this aspect has to be taken seriously. The group attributes the lack of women to the over-competitive research environment.

Although the final decisions are taken by the Division Chair, pathways to independent research are actively supported.

Introducing PhD students to internationally visible fundamental research is a cornerstone of PhD training. Exposing some of them to industrial research projects (e.g. in FUNMat, Sandvik) enables good contacts concerning future job opportunities. At the time of writing the report, the division has 12 active PhD students; not very many considering the number of staff members, but a good number for the PhD students to interact.

The division has an excellent network of international collaborations and connections to industry as evidenced by the high number of collaborative publications.

With the steady growth of research projects and professorships in the entire department, it is clear that not every professor (including assistant, associate, and full professors) or docent will have the opportunity to teach a course. It seems that this division is more strongly involved in teaching than others, being responsible for 14 courses at the master and bachelor level that are aligned with research in the division or in related fields of theoretical physics.

Recommendations

- The division should come up with a clear strategy of how to overcome the gender imbalance in a reasonable time frame.

- We recommend the division to use their network to attract more talented students from abroad.
- We recommend that the division implements a clear unified career development plan for their tenure-track researchers.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

While the organization of the division was unclear from the written report, it was clarified during the discussions.

There are approximately, equal numbers of experienced and young researchers (postdocs, PhD students), making the structure somewhat imbalanced. This reflects the overall visible strategy of keeping and promoting group members. The panel does not consider this as a healthy development.

The division has exceptional funding from many different external sources, the amount being even doubled during the reporting period. In 2023, it amounted to 22.9 mio SEK. It seems, however, that not all advanced staff members contributed to a similar extent.

The group has access to several supercomputing facilities. Since Euro-HPC resources are for free, this provides an advantage compared to experimental groups that depend on the purchase or renewal of equipment and allows the team to invest in personnel.

Recommendations

- We recommend that the division assists their students in developing possible research career paths.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel D Report

Evaluated Unit's Name: IFM.TUNNF **Thin Film Physics division (D7)**

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel D Evaluation Process

Panel D had the task of evaluating the following units:

- D1. IFM.EFM.EFMFEM – Functional Electronic Materials
- D2. IFM.HALV – Semiconductor Materials
- D3. IFM.MDESIGN – Materials Design
- D4. IFM.NANO – Nanostructured Materials
- D5. IFM.PLASM – Plasma and Coatings Physics
- D6. IFM.TEOFY – Theoretical Physics
- D7. IFM.TUNNF – Thin Film Physics

The evaluation process started well before the physical meeting at LiU. For each evaluation unit, a shared document was created, allowing all panel members to collaboratively collect, organize, and review information for each division. In preparation for the on-site interviews, the panel developed a set of guiding questions for all units as well as others tailored to each unit. These questions served as the basis for the discussions during the interviews. The reviewer suggested by the unit was assigned as the lead for this unit, also taking the lead in coordinating input from the rest of the panel and drafting the report.

Each interview session began with the panel chair introducing the panel, followed by brief introductions of the panel members and the members of the unit present. In the discussion with the senior representatives, they were asked to give a concise (10 minute) presentation considering the structure of the unit, long-term funding plan, and career-development. The designated lead then initiated the questioning, but all other panel members contributed to the discussion. Notes were taken individually by all panel members throughout the interviews to ensure comprehensive documentation. Most of the panelists attended in person and one participated online. At the end of each day, the panel convened at the hotel to discuss the outcomes of the interviews and summarize key points and observations. This daily debriefing ensured that all important information was systematically captured, discussed, and collected. Finally, each report draft was carefully read and amended by each panelist, with the changes approved by the lead panelist. Overall, this clear and efficient process allowed for a robust evaluation of each unit.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Observations:

The panel has the impression that the department's operational methods are very different from those of most other universities and research institutes with which most of the panel is familiar. This primarily concerns the fact that not even the salaries of full professors are covered by public funding. There are only a few exceptions where this occurs, and only to a very limited extent. In our view, this has serious consequences:

(i) There is a lot of pressure put on the researchers' shoulders striving for continuous funding to pay their own salaries as well as those of their coworkers. This lowers the outcome of projects, since otherwise more young people could be hired. It is very often reported that one project is not even enough to feed a single PhD student. There seems to be limited information about funding opportunities from Sweden and Europe, and possible support for finding funding opportunities by the administration is not well known in some divisions. Overall, we have observed that a significant portion of researchers, across all experience levels, is dissatisfied with their current situation.

(ii) The current system leads to inbreeding. Very often, people stay in the same place for their entire academic life, from master's thesis to full professor. In many cases, they have either never experienced a research environment abroad or have returned after a short period. As a result, the maturity and independence of assistant and associate professors is often not at the same level as it is in other places on an international scale. Moreover, we don't see clear criteria and plans for tenure-track positions and no special support for assistant and associate professors in their career strategy. There is a natural tendency of younger researchers to continue in the group after doing their PhD or postdoc just to benefit from hands-on experience on the equipment and to work in an environment they are more used to. This is, however, not a sustainable model for academics anymore, as they cannot attract external grants. On the other hand, while tenure-track options are generally valued by the panel, there is a general lack of "fresh blood", as well as "fresh ideas" that bring new life and opportunities to research.

(iii) Another consequence is a massive gender imbalance, in some cases even zero females in all peer groups. We find that in contrast to Sweden having always been a role model for family support and gender awareness, here there are no measures or incentive programs in place, neither within the divisions nor on the department, faculty, or university level.

(iv) Since all groups /(sub)units are self-supported and self-contained, there are no overall decisions taken towards common strategies, potential changes of directions, etc. There is also

a lack of communication from the department to the divisions and the units below regarding a common and unified research strategy. And there is no common concept of how to maintain and share facilities and to recruit and pay technicians. Who decides about investments? Central facilities without sufficient technicians cannot provide maintenance and funding opportunities; technicians themselves cannot be paid from projects, and permanent positions are not available. Also, who decides on the teaching? Several units complain about not having access to teaching. We could not elaborate whether the faculty makes its own decisions on how to distribute the university money to the divisions, and how the teaching opportunities for staff members of the divisions are organized.

In essence, the department appears to us as an umbrella of freelancers that organize themselves in smaller or bigger groups. Only in exceptional cases (basically by one division), the system is regarded as advantageous, since it allows for growth and for creating positions in an independent manner. The current system has enabled Swedish research to benefit significantly from the contributions of scientists from a particular group of countries. However, recent political developments pose challenges and it is not clear how these changes will impact the future of the research landscape in Linköping.

A major goal of the presidency is to go for interdisciplinary projects. We are wondering how such new structures would be supported if the basic support for the units is completely lacking? They all struggle with their own problems. We emphasize, however, that materials science, bridging physics, chemistry, engineering, mathematics, and informatics, is interdisciplinary by itself.

Suggestions:

- Create a body representing the divisions to address common strategies and challenges to overcome problems within the department in a bottom-up fashion.
- Increase governmental resources for base-funded faculty to at least cover their full salaries.
- Rethink the size of divisions / units in view of synergies, thereby possibly lowering administrative tasks, but also in view of personnel costs.
- Rethinking the names of the divisions to more explicitly convey their activities and what distinguishes them from other divisions could help create a strong sense of identity.
- Create common strategies for promoting and hiring people with a gender balance model and better define the role of people at different career levels.
- Explore more possibilities for sharing facilities, their maintenance, and technical staff.
- Seek for substantial EU funding opportunities to increase international collaboration and improve the funding situation.
- Make teaching opportunities more transparent to guarantee fair distribution.

- Make web pages more informative and structural/organizational information easier to find and retrieve.
- Coordinate projects at the unit, division, and department levels. The overall freedom of individual members of the units to pursue various research topics can otherwise result in internal competition for the same funding grants.
- We recommend that the next evaluation will include an introductory presentation by the department head. This will provide context for the entire structure and outline the department's overall strategy.
- Implement structured career counseling, leadership, and mentorship programs.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Thin Films Physics (TFP) division is organized in five units (Electron Microscopy of Materials, Functional Materials, Fundamental Science of Thin Films, Materials Optics, and Nano Materials Science), performing research in thin-film processes, hard and wear-resistant coatings, and multilayered structures including modern materials such as MXenes. The division has a long tradition in thin films and coatings with strong expertise and temporary achieving leadership position in its research field. It is still very productive in terms of scientific output, with many publications, high citation impact, as well as patents. The exploration of 2D materials (e.g., MXene, metallenes) is a strategic research direction for the future development of TFP. The electron microscopy facilities hosted by the division play a critical role for the development of such research. However, the division itself lacks expertise in the envisaged applications in catalysis and energy storage/conversion.

Recent funding has been secured in the 2D materials (also in collaboration with the Materials Design division), and also for thin film structures for X-ray optics, that further strengthens these research directions. Thin films for industrial applications in hard and tribological coatings are successfully attracting industrial funding, in particular by the big and long-term consortium FUNMat-II, but the topics are not of primary scientific interest anymore, and this could lead to a misallocation of staff and resources. The division head indicated that the organization is relatively flat and flexible, making it easier to adapt to changes. Increasing diversification within the division requires a clever strategy that goes beyond identifying potential opportunities for future collaborations. Only some research areas seem to be sustainable, others need to be reconsidered which might be challenging considering the tradition and the age structure of the senior personnel. Overall, a unified strategy for further innovation and new ideas would help the division to replace funding for old topics with more innovative ones also tackling high-impact areas.

Recommendations

- The new topics should be fostered also with their envisaged applications in particular for energy storage/conversion.
- The hard coating activities should be re-assessed in terms of future relevance for the division, not just “potential opportunities for future collaborations/funding"
- It should be considered whether the existing fundamental research approaches could provide impact in other (contemporary) research areas.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The division employs a strategic journal selection and dissemination via preprint repositories and data-sharing initiatives to enhance research impact; but their current internal manuscript reviewing policy slows down the process. The division intentionally promotes its own students to the senior scientist positions. This recruitment culture in part hinders diversity, mobility, and coherence in research. Junior researchers supervise their own students and publish independently, but their topics are based on funding opportunities and utilizing the division's equipment rather than on a division-wide strategy. Some early-career researchers lack information about mentoring, leadership, and supervision programs, while others are aware of such resources, indicating inconsistent communication within the division.

The division advised and hosted 18 PhD students over the assessment period (2018-2023). Supervision as well as participation in the PhD school and unit/division meetings have been highlighted by the interviewed students. But despite alumni having started careers in academia, industry, and research institutions, the PhD students are a somewhat uncertain about their future path. The division hosts a rather low number of female researchers (16%). A number of division members are lecturers; they report rather limited teaching opportunities (mainly at the later MSc stages in the curriculum), as classes in physics seem to be phased out in the faculty.

Recommendations

- Improve the research culture to foster new ideas and sustainable topics across the unit boundaries;
- Improve the gender equality;
- Encourage mobility of the junior researchers, especially after the PhD period, and establish career paths for researchers from outside the division.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

In the last years, the division decreased in size due to units transforming into other divisions (D3, D4, and D5); also a professor left with his group, moving to Uppsala.

The division has established a strong research infrastructure, the acquisition of high-end electron microscopes supported by the university, and access to large research facilities. The

unit providing electron microscopy research (with a staff of five) manages the infrastructure operation and serves as a central facility for these services based on a cost-sharing model, which does not lead to full accounting regarding the administration, maintenance, and staff involved. This shifts the focus of the staff away from their own research. Aging equipment poses a risk of failure, with limited resources for repair or replacement. Since other units also have specialists on their staff, it could be advantageous to combine this expertise. The division would agree to merge with D5 (PLASM) for scientific reasons, but is reluctant for financial reasons. A board of division heads to make decisions and discuss strategic initiatives with the department head would help to efficiently manage central facilities and share resources and provide a comprehensive strategy for departmental infrastructure.

The division seeks improved IT support to better meet research-specific needs and access specialized software.

Recommendations

- Consider reducing the number of lecturers (e.g., through retirements) to reduce funding pressure;
- Explore merging the NANO, PLASMA, and TUNNF divisions to create critical mass and stronger momentum;
- Strengthen central facilities (e.g., for electron microscopy) within the department and provide means for maintaining and updating experimental equipment beyond collecting user fees, e.g. by a board of division heads.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Panel E Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel was composed of 6 members:

Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain

The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.

The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report.

The interview for E1 Kemi took place on Wednesday, 2025-04-09 in the morning. The panel members first exchanged with the senior PIs, Daniel Aili and Thomas Ederth, then with a junior PI who just joined the division, and finally with 3 PhD students and a post-doc.

The preliminary report for E1 BBIOBIO was written by Souhir Boujday and amended by Sven Lidin, then submitted for validation to all the panel E members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel noted that the groups we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact, several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibility to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups, assistant lecturers may start without any financing. This practice appears wasteful. New coworkers must be given the best conditions to thrive for the benefit of both themselves, the unit, and the university. The panel was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in limbo waiting for key equipment. While the panel is well aware of the sometimes-cumbersome route public acquisition protocols require, young scientists often are not.

The panel strongly recommends

The establishment of startup funds for young scientists to ensure that the investment the university makes has the highest probability of paying off.

The establishment of an increased minimal level of research time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

To clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is a benefit and a challenge alike for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of resources, it is vital that bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which activities are conducted where, or, when necessary, investing in double sets of key equipment. Relevant infrastructure requires long-term planning, and the panel is not aware of any roadmap for infrastructure at Linköping University or, indeed, any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends

The establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.

The creation of an infrastructure roadmap for expensive equipment and the creation of infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students, and when teaching becomes highly concentrated to a limited number of units and, at these units, to a limited number of academic staff. The situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, provides financial diversity that provides some protection against sudden change and exposes bachelors and master's students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments were much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research.

The panel recommends

The establishment of a plan for better using the unique competence generated in research to benefit education at Linköping University.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spin-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends

The establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Relevance and novelty of the research topics covered by the evaluation unit

The Division of Biophysics and Bioengineering comprises two units: Molecular Physics and the Laboratory of Molecular Materials. Both units conduct high-level research and are deeply rooted within LiU. They collaborate with divisions on the Linköping campus as well as on the Norrköping campus.

The Molecular Physics unit, led by Thomas Ederth, focuses on advancing methodologies for studying marine bioadhesion and developing fouling-resistant polymers, with particular emphasis on innovative approaches to biofouling prevention. Bioadhesion research, reliant on interdisciplinary collaborations, was heavily delayed by COVID-19. The unit's expertise in vibrational spectroscopy has also fostered long-term partnerships at LiU, particularly with the Laboratory of Organic Electronics (LOE). The strength of this collaboration is demonstrated by substantial joint scientific output and the recruitment of a shared research engineer.

The Laboratory of Molecular Materials (m2Lab), led by Daniel Aili, focuses on developing bioresponsive materials for medical, clinical, and industrial applications. Research spans biomaterials, bioengineering, and medical device development, including novel peptides, bioresponsive liposomes, and nanocomposites for drug delivery, biosensing, 3D cell culture, and organ-on-chip disease models, particularly for cancer. The lab is also actively engaged in regenerative strategies for wound healing and the development of advanced wound dressings. This expertise is exemplified by Prof. Aili's leadership of the MED-X framework project *HEALiX – Advanced Wound Care Materials for Non-Healing Wounds*, funded by the Swedish Foundation for Strategic Research (SSF) with a substantial grant of 32 MSEK over five years.

The division recruited very recently, in 2024, a new faculty member, Pierfrancesco Pagella to strengthen bioengineering efforts. His brings a complementary expertise in organ-on-chips and developmental biology supporting the creation of 3D bioengineered human tissues with perfusable vasculature, innervation, and immune cells.

Quality of the research output

Overall, the unit's research activity is breakthrough and highly innovative. The visibility and scientific leadership currently rely heavily on a single person, who is also highly engaged and plays an active role in strategic research areas and university research centres, Linköping University needs to ascertain conditions for long term healthy growth of these activities.

The m2Lab unit is also highly successful in securing major grants and funding, including, among others, an ERC Consolidator Grant awarded to D. Aili. During the visit, the committee noted the cohesion and internal collaboration within the division—elements that were not clearly conveyed in the self-evaluation document. One key factor contributing to the unit's success in attracting grants, as highlighted during the visit, is the presence of a clear research strategy and the ability to work with stable, long-term funding.

Impact outside academia

The m2Lab, through Daniel Aili is strongly efficient in terms of translating fundamental research into societal impact effectively. This unit has a strong track record of successful research commercialization, exemplified by the creation of spin-off companies such as ArgusEye AB, S2Medical AB, and Virenc AB.

Strategies, priorities and future research plans

The division demonstrates a clear strategy and a strong vision for the development of projects that are closely aligned with global healthcare challenges and at the forefront of current needs in terms of innovation and societal translation. To achieve this, the unit relies on strong collaborations, particularly with clinicians, which are essential for conducting cutting-edge research in the life sciences.

The three main projects are: **Advanced Tissue and Disease Models**—which includes, in addition to Daniel Aili, the division's latest recruit, Pierfrancesco Pagella—**Precision Biomaterials**, and **Sustainable Healthcare Solutions**.

To support these efforts, the unit applies a pooling strategy at its level, allowing it to maintain stable funding to initiate and advance projects, and thereby be in a position to secure significant medium-term funding. However, the need for strong institutional support is consistently emphasized.

Recommendations regarding the direction and quality of research

The two units are not equivalent in terms of the research areas they cover. The Molecular Physics unit demonstrates excellent scientific activity, and a strong balance is achieved through close collaboration with the LOE. The m2Lab, led by Prof. Daniel Aili, covers a wide range of cutting-edge research topics and makes significant contributions to the field, despite relying on the leadership of a single PI. To sustain this level of excellence and ensure long-

term continuity, it would be strategic for LiU to strengthen the unit by recruiting an additional PI with expertise in related areas.
The division has recently welcomed a young PI, Pierfrancesco Pagella, who benefits from a supportive environment that enables him to develop his research program and pursue major funding opportunities. However, his expertise complements rather than reinforces the broad research spectrum currently overseen by Prof. Aili. As such, further reinforcement remains necessary.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

• Publication strategies

The results from the unit are published in relevant journals.

Despite its small size, the unit maintains a substantial scientific output. Publications appear in journals with a strong interdisciplinary focus and meet the criteria for high visibility and solid reputations, including *Analytical Chemistry*, *Langmuir*, *Advanced Materials* series journals, *Biofabrication*, *Biomacromolecules*, and the *ACS Applied* series journals.

The division is also highly active in conference presentations, patents, and innovation initiatives.

• Recruitment

Regarding PhD students and post-doc, the unit has been quite successful in recruiting both from LiU and abroad which makes a nice balance local and international student.

For faculty members, the unit is small and just recruited an excellent junior PI in 2024.

• Opportunities for early-career researchers to develop their originality and independence

Again, BBIOBIO is a small division, so the unique newly appointed professor was given enough scientific and economic support from the unit to develop his research and prepare for an ERC grant application.

The PhD students and post-doc are given enough freedom in their work. Through Forum Scientum, some established collaborations with PhD students from other units which is remarkable.

• **Quality of the PhD training**

The quality of PhD training was given significant attention in the self-evaluation document. PhD students express a high level of satisfaction with their research environment. The research schools, especially Forum Scientium research school, play a key role in fostering connections both within and across units and are viewed very positively by the students for their valuable impact on collaboration and networking.

The facilities are shared with another unit, which encourages frequent interaction between students from both groups, including joint biweekly group meetings.

• **Academic as well as non-academic networks and collaborations**

As previously mentioned, the unit is well integrated both within Linköping University (LiU) and externally. Numerous collaborations are in place with another unit on the Linköping campus, MOLYT Molecular Surface Physics and Nanoscience, as well as with the Laboratory of Organic Electronics (LOE) in Norrköping. There is also a strong synergy with the medical school, which notably led to the recruitment of Pierfrancesco Pagella.

Finally, the unit maintains close ties with the industrial sector, as many start-ups have been founded by former PhD students and postdoctoral researchers. To further strengthen these connections, the unit has also appointed an Adjunct Associate Professor, Dr. Michael Delahay, from AstraZeneca.

• **Equal opportunities and gender equality**

Gender equality is inherently challenging to assess in a small unit led by three male PIs. However, at the student level, there is a clear and proactive commitment to inclusion and diversity, with a balanced gender representation.

• **Good research practice**

Scientific rigor is a core component of doctoral training within the unit. All PhD students are enrolled in structured research schools and mandatory courses that emphasize responsible research practices, including research integrity and workplace ethics. Regular weekly meetings cultivate a collaborative research environment and provide PhD candidates with a valuable forum for scientific discussion, peer support, and critical feedback. This culture reinforces high standards and encourages publication in reputable, peer-reviewed journals known for their scientific quality.

• **Research in relation to teaching**

The unit is actively involved in teaching at both the bachelor's and master's levels, with a primary focus on the Engineering Biology and Chemical Biology programs. All PIs serve as examiners and course coordinators for advanced-level courses such as *Biomedical Materials*, *Biosensor Technology*, *Biotechnology Manufacturing*, *Molecular Physics*, and *Surfaces and Interfaces*.

The close alignment between teaching and the division's research activities enhances the educational experience and ensures content remains current and relevant. Guest lecturers from clinical and industrial sectors are regularly invited to provide real-world perspectives. In addition, the division supervises approximately 10 to 20 bachelor's and master's thesis projects each semester.

Recommendations regarding the research culture

BBIOBIO demonstrates a strong research culture, and its strategic approach is clearly yielding results in terms of grant success and a diverse scientific output. This strategy is underpinned by access to stable funding, which allows projects to mature and positions the unit to secure major external grants. The successful track record of senior researchers also creates a supportive environment for the integration and development of early-career PIs. Sustaining this dynamic will be essential for the unit's continued growth and success.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

• Organization

The current organizational structure of the unit is well-suited to its size and functions effectively. The inclusion of early-career researchers and the constructive interactions with other divisions sharing the same facilities contribute positively to the unit's environment. Maintaining these dynamics will be important going forward.

• Staffing

The unit hosts a significant number of PhD students and post-docs, reflecting its success in securing competitive research funding. It maintains a well-balanced staffing structure, and despite the limited number of PIs, doctoral candidates report receiving strong supervision. They also express high satisfaction with the numerous opportunities for scientific exchange and interaction within the unit.

• **Funding**

BBIOBIO performs well as it has been successful in securing external funding, with a large portion provided by m2Lab. Although faculty funding is relatively small in proportion to the unit's total budget (4 MSEK for 2025, compared to an average of about 10 MSEK in external funding), it remains crucial for the unit as it comes with no usage restrictions. This funding is primarily used to cover the costs of facilities and technical and administrative staff. However, the variability of this funding raises concerns within the unit, as it complicates long-term planning and sustainability.

• **Research infrastructure**

The unit is supported by a dedicated local infrastructure, owned and managed by the division, which includes instruments and facilities for sample preparation and analysis. Additionally, it has access to centralized resources at the department and faculty levels (core facilities), as well as national infrastructure (test beds) and international large-scale research facilities, such as neutron sources.

• **Support functions**

The unit has support functions at all levels. However, the need to increase the capacity of administrative staff, to help reduce bottlenecks, has been expressed multiple times. More proactive support is required, particularly to respond to international calls and in terms of communication and maintaining web pages.

Recommendations regarding the conditions for research

In terms of organization, staffing, and funding, the unit benefits from excellent research conditions and a strong organizational dynamic. As for research infrastructures, maintaining a local infrastructure is becoming increasingly challenging, and it would be beneficial—this extends beyond the scope of this unit's evaluation—for LiU to make greater efforts toward the shared use of equipment and resources. Regarding support functions, the unit benefits from appreciated logistical assistance. However, the lack of staff and the increasing number of procedures often lead to significant delays, which hinder the division's momentum and are particularly detrimental in highly competitive international contexts.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Although small in size, BBIOBIO is a highly impactful unit, both in terms of its scientific output and visibility. It has benefited from institutional support for the recruitment of a promising early-career PI—support that will need to be sustained moving forward.

To maintain its momentum, the unit requires continued investment, particularly in the renewal of its research infrastructure. Additionally, access to dedicated technical support, such as shared lab managers—potentially in collaboration with divisions like MOLYT, which shares the same facilities—would significantly enhance operational efficiency.

Preserving the expertise and capabilities developed within the unit is essential to maintaining LiU's strong international standing in this field.

Panel E Report

Introduction

A brief presentation of the Panel, the Panel's way of working, and the research area(s) that are included in the Panel's commitments.

The panel was composed of 6 members:

Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain

The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.

The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report.

During the visit and the interview of E2, after a quick introduction of each of the Panel member, we first listened to the three senior PI's: Fengling Zhang (EFM-BIO), Niclas Solin (EFM-BIO, Division Responsible), and Feng Gao (EFM-OE). Pr Solin presented orally an overview of the Division without considering the EFM Unit set aside for the Panel review. Then the Panel asked several questions, with Olivier Renault as the principal reviewer being the driver of the interview. After one hour of discussions, the three junior staff were interviewed: Alexander Gillet, Jesper Jacobsson, and Xiaoke Liu, the first two being very new in the Division. The Panel had an open discussion with them during 45 min. Then the two PhD students Julia Morat and Muyi Zhang together with the three post-docs Nakul Jain, Hongjin Li and Shah Ekramul Alom were interviewed for about 45 min.

The preliminary report for E2 EFM was written by Olivier Renault and amended by George Hadziioannou, then submitted for validation to all the panel E members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the Panel as well as regarding department, faculty- and/or university management levels.

The panel noted that the groups we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact – several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibilities to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups assistant lecturers may start without any financing. This practice appears wasteful. New coworkers must be given the best conditions to thrive for the benefit of both themselves, for the unit and for the university. The panel was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in a limbo waiting for key equipment. While the panel is well aware of the, sometimes, cumbersome route public acquisition protocols require, young scientists often are not.

The panel strongly recommends

the establishment of startup funds for young scientists to ensure that the investment the university makes has the highest probability of paying off.

the establishment of an increased minimal level of research-time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

to clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is a benefit and challenge alike for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of resources, it is vital that bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which activities that are conducted where, or, when necessary, investing in double sets of key equipment. Relevant infrastructure requires long term planning, and the panel is not aware of any roadmap for infrastructure at Linköping University, or indeed any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends

the establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.

the creation of an infrastructure roadmap for expensive equipment and the creation of infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students and when teaching becomes highly concentrated to a limited number of units and at these units, to a limited number of academic staff the situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, provides financial diversity that provides some protection against sudden change and exposes bachelors and masters students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments where much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research.

The panel recommends

the establishment of a plan for better using the unique competence generated in research to benefit education at Linköping Univeristy.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spinn-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends

the establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Introduction

The Electronic and Photonic Materials (EFM) laboratory is relatively new as it underwent several structural changes during the time period 2018-2023. At present EFM consists of two research units, with somewhat overlapping research areas but strongly dedicated to sustainable devices: EFM-Biomolecular and Organic Electronics (EFM-BIO) and EFM-Optoelectronics (EFM-OE). EFM has also a third unit (Functional Electronic Materials) being not part of Panel-E, therefore this report is not reflecting the EFM Division as a whole. See page 8

Both Units gather a relatively small number of scientists (9 PI's, 1 ResEng, 10 PhD, 22 post-docs) in a rather unbalanced way (only 5 scientists in EFM-BIO), however the quality of the research output reaches a very high-level at LiU with figures that by far exceed the performances of other evaluation units. Here, some threats are highlighted regarding the conditions of the research, especially regarding the infrastructures and organization.

Observations and analysis

I) Relevance and novelty of the research topics covered by the evaluation of EFM Division (2 units)

Unit 1: Biomolecular and Organic Electronics (EFM-BIO), has two research axes: organic photovoltaics & protein-based materials applied to organic electronics and photonics. It looks like multiple projects are ongoing there, one being outside LiU, but overall, the research is strongly towards sustainability with strong and very differentiating aspects such as: the development of protein-based materials for applications in electronics and photonics; the development of a generic methodology for protein functionalization combining mechanochemistry and aqueous self-assembly of proteins.

Unit 2: Optoelectronics (EFM-OE), highlights two activities: first, organic semiconductors with in particular the development of robust hole-transport materials for efficient and durable perovskite solar cells. The second activity is around perovskite materials aimed at developing efficient and long-lasting organic optoelectronic devices such as solar-cells, light-emitting diodes, photodetectors, X-ray detectors. A particular attention is paid on the understanding of degradation mechanisms of perovskite-based devices and on the development of lead-free perovskite materials, which are for sure key developments in the field for sustainable applications.

II) Quality of the research output

The bibliometric analysis of EFM clearly sets the Division by far on to the top of LiU as a whole, with 81% of the articles indexed in Clarivate WOS published in Q1 journals, the average at LiU being 48% and 52% in the Faculty of Science and Engineering (FSE). The citation impact is at a very high level, with a field-normalized citation rate (an article level metric) of 2.2, to be compared to 1.1 for LiU and 1.4 for the FSE: this means that the articles published by EFM Division are 220% more cited than expected. Also, the share of journal articles of the Division (which constitutes 96% of the publication volume) with international co-authorship is 86%, again much higher than the average of LiU (59%) and of the FSE (67%). The articles of EFM are published in Q1-journals such as Advanced Materials, Nature Communications, ACS journals and Nature Energy. It is also worth noting that five book chapters were also written in the period, reflecting the novelty, the high scientific level and international recognition of the research performed at EFM Division.

Another peculiarity of EFM Division regarding the quality of its research output is the number of the PhD certificates of 25 awarded in the period 2018-2023, the largest by far compared to all other Divisions at LiU, a large part of these PhD grants being obtained from the China Scholarship Council (CSC).

Overall, the Panel acknowledges a strongly diversified competitive fund raising successfully conducted by the PI's at different Swedish agencies and foundations (of which small ones such as Wennergren and Carl-Trygger foundations) and EU Framework Programs. The Panel finds that the strategy of EFM division in reporting the research and innovation outcomes is outstanding in nature and should carry on that way, but is also aware of the though work load and pressure on the shoulders of PI's in general, especially junior PI's, as elaborated further below.

III) Impact outside academia

The Panel finds that the impact of EFM outside academia is excellent to outstanding and characterized by three successful start-up companies. Namely, regarding EFM-BIO unit, **Ligna Energy** was created for developing the use of lignite as energy storage, whereas **Epishine AB** works for printed organic solar cell technology converting indoor light into reliable power sources. Within EFM-OE unit, **LinXhole AB** was established to develop patentable hole-transport materials. The high impact of EFM research outside academia is also testified by science communication and public engagement, with actions such as internet videos and public events promoting public awareness on organic solar cells or lead-free perovskite materials.

IV) Strategies, priorities and future research plans

Two new PI's are expected to be recruited by the OE unit to set up two novel research activities, one on time-resolved optical spectroscopy, the other related to AI-guided lab-automation for accelerated materials screening, both involving new infrastructures. The Panel thinks these new directions are very promising.

Recommendations

I) Relevance and novelty of the research topics

The Panel notes the high relevance and originality of all topics covered by the evaluation Unit, strongly oriented towards sustainability, but is also aware of the high competing research in the field of perovskite and the huge challenge of lead-free perovskite materials.

II) Quality of the research output

The panel finds that the strategy of EFM division in reporting the research and innovation outcomes is outstanding in nature and should carry on that way.

III) Impact outside academia

The Panel thinks the high impact of EFM outside academia should be pursued in the future.

IV) Strategies, priorities and future research plans

The panel thinks the new research directions offered by the recruitment of two junior PI's are very promising but strongly recommends that LiU provides the conditions for more integrated, cross-division research especially involving the Norrköping campus.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) **Publication strategies.**

The publishing strategy of the EFM division is targeting quality and quantity, a scientific production driven for sure by the large number of PhD granted during the period and by the multi-disciplinary, successful research directions and the diversity of scientific collaborations worldwide. The average number of articles per scientist per year is 10, with a 81% share of articles in journals that belong in Q1 in at least one subject category. This figure highlights the necessary role of team work and partnerships prevailing in the publication strategy of EFM Division.

2) **Recruitment, Opportunities for early-career researchers to develop their originality and independence.**

The recruitment strategy of EFM division is highly, of not exclusively dependent on external funding. Due to the very high impact of research at EFM, the Division is able to attract promising young scientists who successfully apply for external funding. Two new PI's have

started brand new research areas (spectroscopy and AI) that complement the existing skills of the Division. However, it is clear that the slow procurement process experienced by the junior PI's is a major hurdle for an efficient start of new research directions as it also hampers in some cases critically applications to ERC grants.
The recruitment strategy of EFM also reflects a certain team spirit which can be seen with the joint funding, by all PIs, of a principal research engineer position in order to keep the laboratory work at a high level. Young researcher's development at EFM is helped by the philosophy of the Division to keep the international character of the Units. Additionally, the talents are encouraged to get expressed by various and diversified opportunities provided for them to develop their soft skills including teaching, dissemination, communication, networking and management.
In overall, the recruitment strategy resulted in three new positions at EFM consisting of only 8 academic staff of which 2 Professor Emeriti, which for sure will significantly strengthen the scientific attractivity and research quality. The Panel appreciates the efforts of the EFM division for creating such opportunities for the development of young researchers and engineers.

3) **Quality of the PhD training**.
At EFM, PhD students are closely supervised in a collegial approach where, besides the PI's being the supervisors (enable by the docent degree), PhD student must also have a co-supervisor and a mentor. Therefore, at EFM, both leadership and collegiality are strongly intermixed in the PhD training scheme. The team organizes an individual study-plan to follow up progress. PhD students are also strongly encouraged to meet other researchers at LiU by joining either graduate schools *Forum Scientium* or *Agora Materiae*, where they get the opportunity to present their work to a diverse audience, which certainly help them explaining better and with clear ideas what they are doing. The Panel notices the absence of regular seminar series within the Division, despite important overlaps in the research areas amongst Unit OE and Unit BIO: this could contribute to diversifying the opportunities offered to the PhD students in their training scheme. The Panel suggests pursuing and intensifying the original way of training of PhDs and Post Docs performed at EFM, while better including them in regular meetings with agreed periodicity and shared between all units of EFM Division. It also encourages cross-division meetings for targeted shared research areas.

4) **Academic as well as non-academic networks and collaborations.**

The EFM has built robust, long-standing collaborations with local, national and international scientists having complementary expertise both in academia and industry.

A vast network of collaborators is involved: in Sweden, collaboration with different groups at LiU, Chalmers and Uppsala Universities. European collaborators are from very diverse locations such as Poland, France, Italy, Belgium, whereas at the international level China, Australia and California in the US are involved. The future strategy of EFM to reinforce the

collaborative research is first by increasing joint grant applications, then by conducting regular collaborative meetings and finally enhancing digital collaborations. Outside academia, EFM is linked to three start-up companies, of which **Epishine AB** which is training an industrial PhD student. The Division has some plans to further increase the non-academic collaborations schemes, of which courses given to young researchers in commercialization of research. The Panel finds that the EFM division is successfull in academic and non-academic networking, and strongly encourages effective collaborative work within the Division itself in the future, benefiting from the new PI positions with highly complementary skills.

5) **Equal opportunities and gender equality**.
The numbers show that there is a rather unbalanced share amongst the EFM faculty staff (68% men vs 32% women) and the PhD students (similar shares). At the PhD level there is some balance on the gender.

6) **Good research practice**. The research practice at EFM division as reported in all sections of the present document is unique, original and very efficient.

7) **Research in relation to teaching.**
The EFM division has amongst its Units some kind of unbalanced contribution to undergraduate teaching, as this is currently involving mainly one PI from BIO Unit in chemistry areas, whereas the Division encompasses physics and engineering-related disciplines through the OE Unit. The new teaching program in Materials Science decide by the University will not be beneficial to PI's of the OE Unit, therefore the heavily unbalanced research/teaching ration at EFL will remain as it is currently and will not participate to the PhD recruitment efforts. The Panel is expressing concerns regarding the lack of diversification of the teaching programs suited to most EFM PI's and expects positive outcomes for the recruitment of good PhD students and contributions to finance of the Division.

Recommendations

Publication strategies.

The Panel finds that the publication strategy of EFM is original and efficiently implemented. It is suggested to pursue this strategy !

Recruitment, Opportunities for early-career researchers to develop their originality and independence.
The Panel recommends a better distribution of teaching duties. The Panel is also concerned by the long procurement processes experienced by young PI's and strongly calls for a global strategy at LiU to improve this, in order to secure outstanding PI's at LiU.

Quality of the PhD training.

The Panel suggests pursuing and intensifying the original way of training of PhDs and Post Docs performed at EFM, while better including them in regular meetings with agreed periodicity and shared between all units of EFM Division. It also encourages cross-division meetings for targeted shared research areas.

Academic as well as non-academic networks and collaborations.

The Panel finds that the EFM division is successful in academic and non-academic networking, but would also strongly encourage, given the strong overlaps of the research areas, increasing efforts towards networking and collaborations outside the Division and especially with the Norrköping campus. The Panel also thinks that increasing support from the central administration of the LiU for writing/coordinating the networking efforts in general would be welcome.

Equal opportunities and gender equality.

NA

Good research practice. The Panel suggests continuing this way and if possible, to help other divisions of the LiU in implementing the same practice!

Research in relation to teaching.

The Panel is expressing concerns regarding the lack of diversification of the teaching programs suited to most EFM PI's and calls for urgent action from LiU to establish a suitable Master Program involving most of the PI's in the Division.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) **Organization.** Still, for the Units concerned, one can observe an unbalanced contribution of both Units to the research outcome resulting, at least partly, from a much smaller academic staff in EFM-BIO than EFM-OE, and with more teaching involved in the BIO Unit. This discrepancy is expected to worsen in the future with the recruitment of two new PI's in OE Unit. Despite both Unit encourage PhD students to attend group meetings of the other Unit, there are no joint meetings organized and therefore it may be difficult for the PhD student to make the decision themselves. The Panel acknowledges the collaborative work between both BIO and OE Units regarding the funding of the new research engineer, and strongly encourages similar win-win actions in the future.

2) **Staffing.** The EFM is successful at obtaining external grants both for early academic faculty and PhDs/Post docs. Details are reported already on the previous section page 5.

3) **Recruitment, Opportunities for early-career researchers to develop their originality and independence.** This being said, it is clear that maintaining the PI's positions only with external grants may be difficult to sustain, and younger PI's may find better research conditions elsewhere.

4) **Funding.** The EFM Division has outstanding track record of substantial external completive funding, with a share of 62 to 70%, however a large part were secured by one PI. The annual income is shared between these external grants and from faculty research funding from LiU. The main funding sources for large grants are highly diversified with contribution from EU (ERC, Horizon), VR, SSRF, the Wallenberg Foundations, the Swedish Energy Agency, Vinnova, FORMAS, and Marie Sklodowska-Curie actions. It is also remarkable that OE Unit secured several prestigious large research grants including one ERC Starting grant, one ERC Consolidator grant as well as five large Wallenberg grants. Other interesting funding schemes, enabling the investigation of relatively freely-selected research problems, involve smaller foundations (Wenner-Green or Carl-Trygger foundations); these foundations often provide support to junior PI's. The Panel thinks such a level of diversification in the external funding is remarkable and should continue as such.
   Regarding faculty contribution to the funding of research at EFM, the system has changed in 2023, with funding no longer allocated to PI's personally but to the Division as a whole, meaning that at times some PI's very successful in obtaining external grants had no faculty support. This system resulted in a budget deficit at EFM, the faculty grants being essential for covering some of the running costs not considered by the external funding. Despite the budget of EFM will be in 2024 for the first time in many years approaching a net balance with no deficit, still the internal funding system does not favor the robustness of the Division towards unexpected expenses.

5) **Research infrastructure.** The EFM currently relies on intrinsic research infrastructures (RIs) as well as on "extrinsic" infrastructures. Intrinsic RI's are, for example, instruments and systems needed on a daily basis for the research activities, while extrinsic ones are using characterization instruments outside of the EFM for which access is granted through internal collaborations. Intrinsic RI's are suffering from obsolescence which reflects the more global situation at IFM as a whole. However, efficient intrinsic infrastructures are crucial for the research performed at EFM which is exclusively experiment-based; these are used both for device fabrication/analysis (namely, deposition systems, materials /surface treatments) and raw materials synthesis; since the handling of perovskite materials requires inert atmosphere, and synthesis uses

inflammable solvents, glove boxes and fume hoods are essential components of the RI's intrinsic to EFM. It appears however that the current state of the ventilation systems, which reached its lifetime, prevents from installing additional fume hoods and storage facilities that meets safety standards. Characterization through intrinsic RI's is also a crucial aspect of the research activity at EFM; there are basic characterization instruments used on a more or less daily basis, such as UV-Vis spectrometry and fluorometry, that reached their technical lifetime without funding envisioned yet for their replacement : for instance, DSC-TG and AFM are no longer available at the LiU campus, with DSC-TG being currently performed at Chalmers (nearly 300 km away). The situation looks worrying especially considering that research grants cannot usually be used for investment in such RI's. Other basic physical characterization tools, including NMR, mass spectrometry, electron microscopy, X-Ray diffraction and ellipsometry are available at the IFM, while crucial XPS is accessible through a local research group and was totally lost when LOE moved to Norrköping campus.

6) **Support functions.** The EFM is happy with the administrative support but asks for more internal funding and more "understanding" regarding small Swedish foundations in their ability to distribute postdoctoral scholarships. The Division also would like more support for mentoring of young researchers and even PI's.

Recommendations

Organization:

The Panel thinks the EFM Division should think about organizing, from time to time, more inclusive, shared events, including cross-division meetings on common research areas and/or strategic meetings amongst academics to set up collaborative actions. Beyond cross-division meetings, the Panel thinks a real transition should happen in the research organization for areas shared by different units (eg, LOE in organic electronics); Although discussions do take place, an organized common approach to research is lacking.

Staffing:

The Panel finds that, even if the EFM appreciates the support from LiU, the LiU could be more helpful in contributing with internal funds to the PI's activity and also diminishing the administrative burden of the EFM management, of which related to the issue of grants obtained from small Swedish foundations.

Funding:

The Panel finds that the asymmetry in the funding resources puts the EFM division in a difficult position for attracting the best faculty and even maintaining some excellent junior researchers. So corrective action from the LiU is urgent and desperately needed.

Research infrastructures:

The Panel is very much concerned about the critical situation of the intrinsic RI's needed for performing high-quality research in a context where the OE Unit is expected to increase its activity with new PI's. The Panel is calling for more awareness and effective action from the Faculty to support the EFM in the replacement of basic facilities and maintenance of technical knowledge. Maintaining accessible for the EFM state-of-the-art shared physical characterization tools is also essential, and it is not clear what is the strategy in the future in this respect. More generally the Panel would strongly urge the Faculty, with the support of LiU, to set up a roadmap towards a large user facility dedicated to physical, cutting-edge characterization, to which all Departments would contribute and manage in a jointly manner, and consider getting inspiration from similar existing platforms in Europe and worldwide.

Support functions:

The Panel finds that the support for mentoring of young researchers and even PI's should be effectively strengthened, given the workload involved in applying for external grants.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

To strengthen research continuity and support for both senior and junior scientists, the panel recommends establishing a baseline level of core funding for all research groups. This would provide stability during funding gaps and help prevent the decline often triggered by the loss of external grants. The unit also needs to ensure equitable and timely start-up support for junior researchers, regardless of existing group resources. Streamlining procurement processes is essential to avoid delays that undermine early research progress.

Panel E Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel was composed of 6 members:

Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain

The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.

The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report.

The interview for E3 Kemi took place on Tuesday 2025-04-08 in the morning. The panel members first exchanged with the Professors and senior Assoc. Professors, then with junior associate Professors, and finally with PhD students.

The preliminary report for E3 Kemi was written by Sven Lidin and amended by Souhir Boujday, then submitted for validation to all the panel E members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel noted that the groups we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact, several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibility to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups, assistant lecturers may start without any financing. This practice appears wasteful. New coworkers must be given the best conditions to thrive for the benefit of both themselves, the unit, and the university. The panel was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in limbo waiting for key equipment. While the panel is well aware of the sometimes-cumbersome route public acquisition protocols require, young scientists often are not.

The panel strongly recommends

The establishment of startup funds for young scientists to ensure that the investment the university makes has the highest probability of paying off.

The establishment of an increased minimal level of research time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

To clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is a benefit and a challenge alike for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of resources, it is vital that bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which activities are conducted where, or, when necessary, investing in double sets of key equipment. Relevant infrastructure requires long-term planning, and the panel is not aware of any roadmap for infrastructure at Linköping University or, indeed, any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends

The establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.

The creation of an infrastructure roadmap for expensive equipment and the creation of infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students, and when teaching becomes highly concentrated to a limited number of units and, at these units, to a limited number of academic staff. The situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, provides financial diversity that provides some protection against sudden change and exposes bachelors and master's students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments were much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research.

The panel recommends

The establishment of a plan for better using the unique competence generated in research to benefit education at Linköping University.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spin-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends

The establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

• Relevance and novelty of the research topics covered by the evaluation unit

The research within the evaluation unit is exceptionally broad in scope, given the limited size of the groups involved. To cover chemistry in its entirety with 20 professors and lecturers is a formidable challenge, and the self-evaluation also points out that there are unavoidable gaps in what can be covered. In order to deliver high-quality research, the individual groups need to be highly focused, and this leads to a certain amount of insularity of the individual groups within chemistry. The research topics covered are highly relevant; mechanisms of chemical vapor deposition, CO_2 sequestration, forensic science, Alzheimer's disease, *etc*., are areas where chemistry at Linköping is making an international impression.

Much of the research in chemistry is also linked to activities outside of the evaluation unit, e.g., in medicine, physics, biophysics, materials science, and environmental sciences. This means that chemistry as a subject is better represented at Linköping University than what appears at first glance, but it also means that the picture is even more fragmented.

A large impetus for renewal comes from outside of the evaluation unit from the host of collaborative partners, but it is difficult to discern the unique directions of chemistry itself. This is an illustration of the difficulty in achieving success with limited capacity and large external expectations. Chemistry in the evaluation unit at Linköping University is doing too much with too little.

• Quality of the research output

Before commenting on the quality of the research output from the evaluation unit, it is important to note the share of the total output within chemistry at Linköping University. The output from chemistry is roughly 2/5 chemical sciences, and 1/5 of each of medical sciences, biological sciences and other subjects, but unit's share of the total Linköping University output in chemical sciences is less than 10%. This is a surprisingly low number that indicates a highly unusual structuring of the research at Linköping University. It makes it a little difficult to assess how chemistry is doing, but clearly the division of chemistry is subcritical.

Research at the unit is patchy, and most collaborations are with partners outside of the unit. This is a natural consequence of the breadth of activities compared to the relative size of the unit, but it leads to a lack of cohesion within the unit. While there are clear areas of strength, many of the research-active senior staff at the unit are engaged in projects managed at other units at Linköping University or elsewhere. This makes strategy difficult and leads to a

weakened scientific impact. Given the expectations of the unit to be the basis for teaching chemistry at Linköping University, it is further challenging to change the overall scope of the activities considering the fact that the unit is expected to cater for competence in teaching over the full scope of modern chemistry.

• **Research impact outside academia**

The professors and senior lecturers at the unit are struggling to maintain research activities, and it is clear that the system is rather harsh; since research groups are small, losing a grant often means losing all resources for research as the support from university sources is strongly dependent on success in attracting external funding. Thus, the way back is difficult, given the amount of teaching needed to cover the cost of a salary. The time available for pursuing outreach activities of any kind is very limited, and hence, the research impact outside of academia is likewise small.

• **Strategies, priorities, and future research plans**

The senior researchers at the unit appear trapped in a vicious circle where the subcritical economy limits vision and makes strategic work very difficult. The stable source of income is from teaching, and therefore, the breadth of competence must be maintained as focusing will come at the cost of reduced funding from teaching. There is a relatively large body of seniors who are outside of the group of "active faculty members" as defined in the self-evaluation, and since many in this group are relatively close to retirement, renewal of positions might pose an opportunity, but there are no clear plans at the unit and there is an expectance that university management will consider organizational changes to help the unit.

Recommendations regarding the direction and quality of research

This unit lacks the strength of a cohesive entity. Given the constraints of dependence on income from teaching and the need to cover a comprehensive competence area with very limited resources, it is difficult to see how this unit can develop the strategy and vision needed for change. Linköping University should consider how a restructuring may help the individual scientist in this unit to find a robust local environment from which to build independent research stronger. The opportunities in having a large teaching assignment are obvious; teaching provides first-hand access to good local student candidates for master's projects and PhD, and teaching is also a dependable income. However, in a system where even a temporary shortage of external funding leads to a very high teaching load, coursework becomes a dead end to the detriment of both research and education. The panel is aware of the economic difficulties in providing a more generous base funding to guarantee possibilities for teachers to continue research work at a level where they may compete for external funding, but the present system is wasteful.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

• Publication strategies

The results from the unit are published in relevant journals.

It would be misleading to discuss the output from the research unit in terms of publication strategies. The breadth of activities across diverse research fields precludes any meaningful discussion about this. It suffices to note that the four most frequent journals for chemistry are Journal of Vacuum Science and technology (15), Acta Neuropathologica communications (7), The Journal of Physical Chemistry C (7) and Drug Testing and Analysis (5). All these journals are classified as 1 in the Norwegian level list, and in the JIF system, three of the journals are classified as Q2 journals while Acta Neuropathologica is a Q1 journal. It may be useful for the visibility of the unit to aim for more publications in level 2 journals (Norwegian system) or Q1 journals (JIF), but to implement a strategy for this would be challenging given the diversity of the scope.

• Recruitment

The unit has been quite successful in recruiting PhD students directly from the teaching programs. For the research active staff, the direct contact with students is clearly beneficial. Naturally, there is a supply of high-quality international students, but a mixture of local and global recruitment is to be preferred to exclusive recruitment from abroad.

For senior staff, the unit recruits primarily according to educational needs. In a small unit, where resources are stretched to the limit, this restricts the development possibilities and the strategic choices possible. That being said, the quality of the recruitment procedure is high, and once the field of research is chosen, the unit has successfully attracted excellent staff.

• Opportunities for early-career researchers to develop their originality and independence

The newly appointed professors are given full freedom to develop their own programs, but economically, the support is limited. The funding system is challenging and even punitive; losing external financing has dramatic consequences since university funding, to some extent, is based on the ability to attract external funding. In a unit where each group is small and often a single senior scientist is responsible for supplying external funding, the economy is fragile.

• **Quality of the PhD training**

The PhD students are enthusiastic about their environment. They are clearly involved in the inner life of the unit, and they are given free rein in developing their own train of investigations within their programs. The research schools are an important tool for contacts between PhD students within the unit and between units, and the students are very positive about the impact of the schools.

• **Academic as well as non-academic networks and collaborations**

The researchers at the unit are all involved in collaborations with other actors outside the unit. This is clearly a strength and a necessity. Important collaboration partners include Forensic Science, TEMA-M, plasma physics, and WCMM.

• **Equal opportunities and gender equality**

There is a clear awareness of the importance of inclusion and diversity, and the gender balance is fair at all levels.

• **Good research practice**

All PhD students are introduced to good practices through the compulsory PhD courses covering this and workplace ethics. The weekly meetings in the unit foster a good collaborative spirit among the researchers and are particularly important for the PhD candidates.

• **Research in relation to teaching**

Teaching is a very large part of the activities at the unit. There is a strong connection between teaching and PhD candidate recruitment, but the balance between teaching and research is rather uneven between the groups in the unit.

Recommendations regarding the research culture

The main challenge is to find a less severe funding model. The fact that a period of weak funding almost automatically leads to a permanent situation of strongly reduced economic conditions is dysfunctional and leads to a very stressful situation for all staff at the unit.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

• **Organization**

The present organization is not conducive to high-quality research. It is clear to the panel that the highly heterogeneous nature of the activities leads to scattered efforts without a clear strategy.

• **Staffing**

The relationship between the number of senior researchers (professors and lecturers) and the number of PhD students is extreme. With about 20 FTEs of seniors and 11 PhD students, in general, every second senior researcher supervises a PhD student. This is anomalous in chemistry where, generally, the group of PhD students outnumbers the senior staff. This relation may also be the cause of the relative paucity of postdocs in the statistics. 2 postdocs out of a grand total of 40+ FTEs at the division is a very low number.

The balance between teaching and research is rather extreme, with a number of staff being fully financed by teaching duties. Teaching can be a resource for a unit, but in this case, the requirements for coverage of the entire area of chemistry becomes a constraining for how research can develop within the unit.

• **Funding**

The unit performs well with respect to national third-party funding. The external funding makes up about 55% of the total funding, with the Swedish Research Council as the single biggest contributor. The possibilities for EU funding are less well explored by the evaluation unit. The framework programs make up only 3% of the total research budget. The economy of the evaluation unit appears a little vulnerable, with large-scale variations in income over the years.

• **Research infrastructure**

The evaluation unit has good access to relevant research infrastructure but lacks the manpower to support other groups within their own areas of expertise. This signals, again, that the economy in numbers is not really present. Chemistry is traditionally very infrastructure-dependent, and Linköping University supplies well-working facilities, and the research groups also have good access to relevant national infrastructure

• **Support functions**

The unit benefits from the infrastructure that functions well for the researchers and PhD candidates. The administrative support is not considered as important as the technical support.

Recommendation regarding the conditions for research

The general recommendations for conditions for research applies with particular emphasis for this unit. It is wasteful to employ talented coworkers without supplying sufficient resources to allow them to be productive.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The unit was born out of a need to supply cohesive education in chemistry at LiU. The needs to couple the teaching activities to research were not met at the time, but over the years, individuals at this unit have achieved some success in research despite difficult conditions. Still, the success of these individuals is fragile and dependent on continuous external support for each individual. Lacking cohesion also constitutes lacking redundancy.

Panel E Report for E4.IFM.MOLYT

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel was composed of 6 members:

Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain

The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.

The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report.

The preliminary report for E4 Molyt was written by Olli Ikkala and amended by Toribio Fernández Otero, then submitted for validation to all the panel E members.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel E noted that the groups that we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact – several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibilities to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups assistant lecturers may start without any financing. This practice appears **wasteful. New coworkers must be given the best conditions to thrive for the benefit of both themselves, for the unit and for the university. The panel** was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in a limbo waiting for key equipment. While the panel is well aware of the, sometimes, cumbersome route of the public acquisition protocols require, young scientists often are not. Such a situation is not in favor of securing at LiU young talents with a highest scientific potential.

The panel strongly recommends:

The establishment of startup funds for young recruited scientists to ensure that the investment that the university makes has the highest probability of paying off.

The establishment of an increased minimal level of research-time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

To clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is both a benefit and challenge for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of advanced resources, it is vital that the everyday bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which activities that are conducted where, or, when necessary, investing in double sets of key equipment. Relevant infrastructure requires long term planning and the panel is not aware of any roadmap for

infrastructure at Linköping University, or indeed any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends:

The establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.

The creation of an infrastructure roadmap for both expensive equipment and the creation of "everyday" infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students and when teaching becomes highly concentrated to a limited number of units and at these units, to a limited number of academic staff the situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, providing financial diversity that provides some protection against sudden changes and exposes bachelors and master students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments where much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research from the local/national industry.

The panel recommends:

The establishment of a plan for better using the unique competence generated in research to benefit education at Linköping University.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spin-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends:

The establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Evaluated Unit's Name :E4. IFM.MOLYT

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

E4 Molyt specializes in nanomaterial designs, surface modifications for biomedical sensing, biorecognition, and design and optimization of the physicochemical properties of nanoparticles, especially aiming at biomedical imaging and therapy. The research aims at interdisciplinary science between (nano)materials science and biomedicals along strategic research areas at LiU.

1) Relevance and novelty of the research topics covered by the evaluation unit
Biomedical research is among the cores of interdisciplinary nanomaterials research to allow imaging, recognition, and therapies and is thus highly competed and topical. Therein Molyt is topic-wise well positioned with its expertise and interdisciplinary connections.

More concretely, the emphasis of the Unit is in MRI contrast agents, new imaging techniques, nanoprobes for local analysis, and immunotherapies. They are well motivated, especially as Gadolinium based contrast agents are known to be toxic and immunotherapies are strongly globally pursued. The Unit is developing alternative nanoparticles, such as CeO(Gd) nanoparticles with potentially less harmful side effects. A benefit was emphasized wherein the nanoparticles are effectively removed from the body during 24 h, thus reducing the unwanted accumulations. The Unit is described to have competitive edge in the field of the characterization, e.g., CT and XPEEM. Therein, the emphasis, so far, seems to be in-vitro research. The time-line for the clinical translations into the "Phases I-III", was not clearly articulated. An emerging research direction deals anti-cancer vaccines allowed by the expertise of a junior PI.

2) Quality of the research output
Several scientific success stories were disclosed. However, their uniqueness within the global highly competed research did not appear completely clear and concrete description of them would have been welcome.

3) Impact outside academia
The research has led to a startup-up company Spago Nanomedical AB and the Unit collaborates with SAAB. The Unit is active in social media and participates in policy papers. Whether the suggested theranostics could indeed allow clinically accepted approaches in real-world settings would involve major impact. This may not, however, not be reached in the next years, taken the scientific, technological, and regulatory challenges, also involving large financial requirements in this complex setting.

4) Strategies, priorities and future research plans
The Unit keeps the present research focus, additionally combining machine learning. Also possibilities to develop anti-cancer vaccines are suggested, though not mentioning in any details. A strategy towards impact within theranostics was to work extensively in-

vitro but also to work on “critical patients”, allowed by close collaborations with the medical collaborations.

Recommendations

The Unit is well positioned in a relevant field. Clarifying the competitive edge for the competitors would be needed to specify the uniqueness, also clearing the roadmap steps and required finances for clinical translations.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication strategies

The Unit shows a ability to publish in multidisciplinary solid scientific forums, and in some cases in more highly ranked journal such in Nature Communications and Angewandte Chemie. Altogether they published 78 articles in 2018-2022, which is decent volume. The head of the Unit has published altogether 138 articles, some of them in highly ranked journals such as Nature Photonics, Angewandte Chemie, Journal of American Chemical Society, NanoLetters, and Carbon

2) Recruitment, Opportunities for early-career researchers to develop their originality and independence

Junior researchers are encouraged for independence. Three early career researchers have been recruited in the Unit.

3) Quality of the PhD training

Since 2018, 6 PhD´s have been grown, out of which 1 is female. This is a modest number.

4) Academic as well as non-academic networks and collaborations

The Unit collaborates strongly, especially with Center for Medical Image Center and Visualization, and LiU Cancer Network. There exists extensive academic collaborations nationally, and with, e.g., Norway and China

5) Equal opportunities and gender equality

The fraction of male was 50%. Among newly graduated PhD´s 1 of 6 was female. The average age of PhD thesis was 33

6) Good research practice

Based on indirect evidences, the research practices are sound. Interdisciplinarity seems proper, also evidenced by the informal discussions and coffee breaks among persons with different skills and backgrounds, and connection to the Medical School. Some of the relevant devices are at the Medical School, also supporting interdisciplinarity.

7) Research in relation to teaching
The Unit teaches six courses at LiU. Students are incorporated in the teaching.

Recommendations

The performance is solid, even if global visibility might still be increased. Taken the size of the Unit, the number of the educated PhD´s could be higher.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization
The seniors of the Unit consist of Professor Kajsa Uvdal, associate professors Zhangjun Hu and Carolina Brommesson, and assistant professors Jiwen Hu and Johan Karlsson.

2) Staffing
Altogether the Unit consists of 12 persons, based on their web-page. One PI is responsible for the Master Program in Experimental and Medical Engineering and also director of Agora Material Graduate School.

3) Funding
Funding is based solely on Swedish sources. The role of EU and international fundings could be increased, supposing that the research is internationally competitive. Therein, the Unit hoped promoted support from the Central Administration to master the EU funding applications. There is an overarching challenge to find funding for PhD students and post docs.

4) Research infrastructure
The Unit describes infrastructure and expertise on a wealth of characterization techniques, especially large infrastructure applicable for in-vitro studies. Therein, the Unit is well connected to large infrastructure, such as Max IV (Lund) and Elettra (Trieste) and Center for Medical Image Center and Visualization (local). Related to biomedical studies, the Unit collaborates with the Medical School.

5) Support functions
Beyond lecturing 6 courses, the other support of the Unit to the University is not described in detail.

Recommendations

The Unit is positioned to combine materials science and biomedicals. Within this extremely competitive field, the Unit could increasingly identify its specific strength to achieve global visibility, also based on international funding. The connection to large infrastructure is particularly appreciated related to early in-vitro studies. In the final clinical studies, their role may, however, be reduced, wherein the emphasis of biomedical translational studies will be increased.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Overall, the Unit seems to have solid performance, though globally unique profiling and visibility could be increased, perhaps in even more visible journals. The roadmap for clinical translation and underlying collaborations and fundings should be clarified.

Panel E Report for E5 IFM.SAS

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel was composed of 6 members:
Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain
The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.
The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report. There was a very positive and collaborative atmosphere during the interviews of the SAS Unit.
The SAS unit was formed in 2017 from originally independent research groups upon merging while maintaining a flat organizational structure with strong internal collaborations. The senior PI´s evidenced strong international leadership in the area in the field of polymeric actuators, which the Panel finds proper, based on their excellent scientific and fundraising achievements. In a broader context, these grand achievements could allow the Unit to even further increase its societal visibility in the Swedish and global technological environment. Bringing sensors and actuators from basic research to real commercial success stories remains among their main concerns in the future. There is a clear commitment to promoting the impact of the SAS Unit. They consider themselves part of a small Unit and wish to maintain a flat hierarchy with strong internal collaborations. Junior PI's (3) express concerns regarding a lack of technical support, wherein they often find themselves juggling various tasks and responsibilities, leaving them with little time to think deeply and develop their new scientific and technological ideas. Despite regularly attending Unit and Division Meetings to present their work, they report having limited internal collaborations, except for specific measurement tasks. They are proud of the collaborations and supportive connections within the Unit.

The overall strategy of the Unit appears to involve PI´s, who have started as postdocs within the Unit, next becoming PI´s, getting funds for PhDs and research, and not having a huge deficit in the Unit to ensure stable growth. The interviewed PhDs students (3) feel comfortable in this environment, as the Unit is small and allows close interactions. There is a strong sense of confidence and supportive mindset, receiving proper support from (co-)supervisors. The main issue relates to insufficient technical support for the upkeep of the infrastructure.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel E noted that the groups that we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact – several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibilities to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups assistant lecturers may start without any financing. This practice appears wasteful. **New coworkers must be given the best conditions to thrive for the benefit of both themselves, for the unit and for the university.** The panel was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in a limbo waiting for key equipment. While the panel is well aware of the, sometimes, cumbersome route of the public acquisition protocols require, young scientists often are not. Such a situation is not in favor of securing at LiU young talents with a highest scientific potential.

The panel strongly recommends:

The establishment of startup funds for young recruited scientists to ensure that the investment that the university makes has the highest probability of paying off.

The establishment of an increased minimal level of research-time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

To clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is both a benefit and challenge for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of advanced resources, it is vital that the everyday bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which activities that are conducted where, or,

when necessary, investing in double sets of key equipment. Relevant infrastructure requires long term planning and the panel is not aware of any roadmap for infrastructure at Linköping University, or indeed any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends:

The establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.

The creation of an infrastructure roadmap for both expensive equipment and the creation of "everyday" infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students and when teaching becomes highly concentrated to a limited number of units and at these units, to a limited number of academic staff, the situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, providing financial diversity that provides some protection against sudden changes and exposes bachelors and master students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments where much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research from the local/national industry.

The panel recommends:

The establishment of a plan for better using the unique competence generated in research to benefit education at Linköping University.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spin-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends:

The establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Evaluated Unit's Name: IFM.SAS Sensor and Actuator Systems

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Sensors and Actuators Systems (SAS) Unit concentrates on applied sensor science, actuator development, bionics and science of transduction, chemical and biosensor systems, and optical devices.

1) Relevance and novelty of the research topics covered by the evaluation Unit

In general, the area of advanced sensors and actuators is ubiquitous, spanning applications, *e.g.*, in aeronautics, satellites, self-driving cars and vehicles to environmental and biomedical devices. There is an increasing demand to seamlessly integrate advanced sensors and actuators into information and materials systems to enable autonomous operations and information systems, also incorporating machine learning and artificial intelligence. In this context, the development of new actuating and sensing technologies is at the cornerstone of emerging future technologies. The integration of advanced sensors and actuation within materials systems could indeed facilitate "embodied intelligence". Therefore, the focus of the SAS unit is both timely and relevant, as they work on emerging cutting-edge actuating and sensing devices geared towards technological applications.

The panel recommends that the Unit continue its efforts to maintain its leading position on the development of actuators and micro-actuators, making progress on the development of related technologies.

2) Quality of the research output

SAS has a strong tradition of publishing in highly ranked journals: Science, Advanced Materials, Advanced Functional Materials, Science Advances, and others. Most papers are coauthored by additional researchers from around the world, reflecting the global collaboration of the Unit. The Unit is worldwide acknowledged as one of the leaders in the field of electrochemical actuators and micro-actuators, and is also well regarded in the sensor domain. Those two points underpin the Unit´s high efficiency in getting funding from national and international sources. Over the years, there has been a decline in the publication volume of the Unit due to the retirements of two staff members and the repositioning of two others. Such changes are not uncommon in a competitive and volatile research environment.

The Unit is aware of the present lack of success stories in commercialization (patents, products, and spin-off companies), but is optimistic about achieving positive outcomes in the near future.

The panel recommends pursuing fruitful ways of opening new funding doors and patenting the new materials, devices (actuators and sensors), licensing the patents or generating new spin-off companies where the students can be incorporated.

3) Impact outside academia

The SAS partners contribute, e.g., to outreach activities towards high school students. The strong interest of the Unit in technology transfer is endorsed by its collaboration with 10 national and international industrial partners.

The panel recommends an even stronger involvement of the Unit in outreach activities to further strengthen community engagement and interest in science, as supported by their scientific/technical excellence. Additionally, the panel encourages the Unit to leverage industrial collaborations to foster co-authored patents and creation of new technological products.

4) Strategies, priorities and future research plans

The Unit leaders would like to stay organizationally as flat as possible, fostering strong internal collaborations, "as being world leaders…" in actuators and sensors. They see no major need to alter their future scientific priorities; instead, they intend to further stimulate the creation of technologies and spin-off companies. This increased focus on entrepreneurship and innovation is seen as a way to capitalize on their existing strengths and to advance their impact to the industry.

The panel recommends strengthening the efforts to patent innovative actuators and sensors, alongside establishing spin-off companies. Involving PhD students as both patent co-owners and as invention co-owners could enhance both their mobility and the recruitment dynamics within the Units´ culture.

Furthermore, greater efforts towards societal visibility within the sensing/actuating community at Sweden and Europe is advised, as suggested by the scientific excellency of the Unit. This aligns to reinforce its influence and scientific reputation in the broader scientific and industrial landscape

Recommendations

The panel recommends the following actions to strengthen the position and capabilities of the Unit:
-Maintain international pre-eminence: promote the efforts to uphold the unit's status.
-Develop and patent innovations: increase the efforts on the development and patenting of new actuators and sensors, with the final goal of generating spin-off companies where the students can be incorporated,
-Engage new industrial partners: actively seek new industrial partners to co-author patents and foster collaborative innovation.
-Enhance societal visibility: commit to a higher level of societal leadership within the national and European sensing/actuating community to strengthen influence and position of the unit

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as

1) Publication strategies

The SAS Unit demonstrates strong competency in publishing highest rank (Q1) journals. Both production (105 papers, 8.53 per FTE) and quality exceeds the LiU average. A significant proportion of those publications includes international co-authors, highlighting the Unit's collaborative efforts on a global scale. The citation impact is also high, 12% of the papers in the top 10%. The trend is towards publishing in Open Access journals (80 % in 2022)

The panel recommends that the SAS unit continue its successful publishing trajectory while striving for greater uniformity across groups within the Unit. This increasing consistency could foster a more cohesive research environment.

2) Recruitment and opportunities for early-career researchers to develop their originality and independence

These are critical points for the continuous success and development of the Unit. The Unit has successfully recruited PhD students and postdoctoral researchers, many of whom have been successfully promoted to junior PI's. However, the current ratio of PhD student (3) to PIs (7) is concerning. Upon recruitment of new junior PI´s, the starting packages and conditions should be paid proper attention.

Panel recommendation: the starting conditions of junior PI´s should be paid proper attention to allow a fluent start during the critical first few years to foster continuing success.

3) Quality of the PhD training

The Unit demonstrates a strong commitment to integrate the science and technology vision into its student training programs. Junior members actively participate in the education and training of students, fostering an inclusive and collaborative learning environment. Over the past several years, the unit has successfully granted eight PhDs, with an expectation of 1-2 PhD graduates each year moving forward, indicating a robust and sustainable growth in doctoral education. Joint educational efforts with other universities have been adopted, for example with Vienna, La Sapienza, and Ferrara, sharing students and courses.

Panel recommendation: To continue recruiting more PhD students.

4) Academic as well as non-academic networks and collaborations

The SAS unit is involved in different networks, either at LiU (5 Departments and 1 Center), Sweden (9 Universities, Schools and 10 Research Centers), abroad (10 Universities and Research centers) and companies (10 in Sweden and abroad). This constitutes a dense scientific and technological network requiring a great effort.
Maintaining and enhancing this dense network requires maintaining a significant ongoing effort, which is critical for growth and impact. Continued engagement in these

collaborative networks will provide access to new research opportunities, funding sources, and the sharing of best practices across disciplines. It will also facilitate the development of innovative projects and technologies, allowing the unit to remain at the forefront of scientific advancements.

Panel recommendation: this effort must be continued

5) Equal opportunities and gender equality

The gender balance is not yet fully ideal, as 2/3 are males. But within the highly competitive field, one cannot always follow the best gender balance conditions in the pressure of the availability of the best candidates.

Panel recommendation: the efforts to get a full gender balance must be continued

6) Good research practice

The Unit balances properly research with the student' education. PhD students are mainly trained by junior PIs for good experimental practices, following the laboratory safety rules, research integrity, and good research practices. Examples are disclosed in the report, signaling that such approaches are taken seriously. Still, a permanent laboratory engineer would improve the practices. To further strengthen the sense of community and cohesion within the Unit, regular group meetings and annual SAS days are organized. These gatherings allow for valuable discussions around current research themes while also providing opportunities for participants to socialize and build relationships. Such initiatives help to cultivate an inclusive atmosphere that promotes collaboration and mutual support

The report also highlights extensive collaboration, which amplifies the impact of the Unit's research and education endeavors.

Panel recommendation: to continue as today, potentially with laboratory engineering staff.

7) Research in relation to teaching

The staff members teach 5 courses, which is reasonable, presenting a good research/teaching balance. Junior PIs and PhD students expressed some complaints concerning high teaching duties (also related to the salary requirements), *i.e.,* leaving little time for thinking and research activities.

Panel recommendation: Teaching/research/supervision balance requires constant reconsideration at the Unit and LiU level

Recommendations

The panel recognizes that the Unit is fulfilling its objectives and maintaining a strong performance overall. More balanced publication results from the different research groups should be beneficial for the Unit.

Efforts to recruit more PhD students are recommended to get a balanced student/PI ratio.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization

The head of the Unit is Professor Edwin Jager, the other seniors include associate professors Mats Eriksson, Jens Eriksson, Donatella Puglisi, Mike Andersson, assistant professors Jose Gil, Shayan Mehrayeen and Abdul Qadeer. They have weekly SAS Unit meetings for presenting results, discussing projects, practicing talks for the next conferences, and sharing scientific information of general interest. They also organize a 24 h annual lunch-to-lunch meeting for deep scientific and organizational discussions. They aim at a greater integration of the different research groups.

Even a stronger integration of the different research groups should be beneficial for a stronger Unit, in particular to provide cohesion between the senior and junior PI´s.

2) Staffing

The Unit (15 members) has a balanced mix of seniors and juniors PIs, alongside international representation among its members. Junior PIs were recruited largely from previous postdocs at the Unit. However, the panel recommends that when recruiting the next junior PI´s, the Unit consider sourcing candidates also from outside its current ranks. This external recruitment strategy is advised to mitigate the risk of inbreeding ideas. Bringing in fresh talent and new ideas from outside the Unit can stimulate new research directions and creative thinking, ultimately enhancing the Unit's output and impact. In addition, the panel shares the concern regarding the lack of technical staff expressed within the Unit.

The panel suggests strengthening external recruitment of PI´s. The incorporation of a technician should contribute to a higher unit efficiency.

3) Funding

The Unit has several Swedish, EU, and US funding schemes. The panel specifically appreciates the unique connection to US NSF (even if the present situation is volatile). Considering the acknowledged international leaderships of the Unit on electrochemical micro-actuators some ERC grant (starting and/or consolidator) should be expected.

To continue as today with the addition of applying for some ERC grant in the next future.

4) Research infrastructure

A credible in-house infrastructure exists within SAS, complemented by extensive use of large-scale devices. Technical support would be welcome to boost the efficiency.

The panel agrees with the need for technical support of the devices.

5) Support functions

The Unit appreciates, and regularly uses most of the support functions provided by LiU (GPO, LiU-IT, IFM´s- visits and stipend-teams, or communication units). Nevertheless, the growth of the LiU-Central-Com contrasts to the lower support for research critical functions like technicians. They are required to maintain a good infrastructure and a safe working environment. Those functions are now (improperly) assumed by PhD students and postdocs, and training on those subjects must be re-started for each new generation of PhD students/postdocs.
The panel recommends a reduction of the bureaucratic procedures, changing positions of some of the most inefficient staffs could be considered. Technician positions assigned to the Unit could increase research efficiencies helping with bureaucratic procedures.

Recommendations

The panels recommends:
-A stronger integration of the different research groups;
-Recruiting also from outside the Unit;
-Applying for some ERC grants;
-LiU grants to upgrade the research infrastructure and to update medium scale equipment needed for everyday research;
-A reduction of the bureaucratic complexity, and
-A technician positions assigned to the Unit.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel considers that the SAS Unit is strong with good performance records in a relevant scientific and technological field.
We do not see strong pressures towards major changes whenever the Unit maintains its success in the competed research funding landscape.
The specific recommendations for the Unit were underlined above alongside with the general recommendations stated as General Observations.
The societal impact could be increased by organizing outreaches, meetings, schools, workshops, and public events within the research and technological areas of sensors and actuators.

Panel E6 Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel was composed of 6 members:
Souhir Boujday, Professor, Sorbonne University, Paris, France, Chair
Georges Hadziioannou, Emeritus Professor at University of Bordeaux, France.
Olli Ikkala, Distinguished Professor, Aalto University, Finland
Sven Lidin, Professor, Lund University, Sweden
Olivier Renault, Chief Scientist, Leti Institute, CEA-Grenoble, France
Toribio Fernández Otero, retired Professor, Polytechnic University of Cartagena, Spain
The research areas in Panel E include: functional soft matter, chemistry, nanobioscience, materials for medical imaging and treatments, surface science, organic electronics, and sensors.
The panel's work commenced a few weeks before the visit. A preliminary Zoom meeting was held, and we decided to appoint a primary reviewer and a secondary reviewer for each unit. The reviewers studied the files of these units in depth and completed a preliminary report, highlighting, in particular, the key points to be addressed on-site and the questions the committee wishes to raise during the visit. Next, all panel members discussed all Panel E preliminary reports in face-to-face meetings. During the visit, the lead reviewers were given a significant amount of interview time. Afterwards, all members were involved in completing the questions and writing up notes, which were used in compiling the final report.
The panel had a lively discussion (appx. 45min) with the junior PIs of the LOE. The PIs unanimously were very happy with the environment of the LOE in general, especially the fact that they are part of the management and have the freedom of operations in general. They do regret the fact that they cannot be more involved in teaching at the bachelor and engineering master's level, especially in the emerging field of Organic Electronics. They hope that a corrective action will take place at the LiU level soon. Then the panel discussed with the senior PIs (appx. 45min). Here again the spirit of the discussions was positive, indicating the happiness and the chance the senior PIs have to perform their research and development in a prosperous LOE environment. Again, the issue of limited teaching at the level of bachelor and master came up. They find themselves at a disadvantage, not having access to endogenous LiU potential master and graduate level (PhDs). Then the panel had visits to the chemistry laboratories, clean rooms, and the electronic plants laboratory.
Finally, the panel met with 5 PhD students, including only one Swedish student! They expressed their happiness and satisfaction, especially from the fact that they are not simply operators but main actors in performing their research work towards their PhD.
The panel concluded the visit with a wrap-up session (around a quick lunch) with the director Prof Mats Fahlman.

The preliminary report for E6LOE was written by George Hadziioannou and amended by Olivier Renault, then submitted for validation to all the panel E members.

The panel visited the LOE division at Norrköping campus on 8/4/2025 from 8:15-12:30h. During the first 30 min we had an introduction/discussion by/with the Director Prof. Mats Fahlman and the founder of the LOE Prof. Magnus Berggren (Visio). The discussion covered some minor clarification of factual issues but mainly the dynamics of the LOE and the strategy (past/present/future) associated.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluations of the units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel noted that the groups we evaluated seem to suffer from a lack of stable funding. While some groups thrive on an abundance of third-party funding, there is little basic support. This appears unfortunate as outside of the very strong environments, there is no buffer capacity when individual researchers are between grants. In fact – several groups stated that losing grants tends to be a one-way street. Once you are out of funding, it is very difficult to reverse this, leaving scientists without any possibilities to conduct research.

The situation is exacerbated for junior scientists. In the financially strong groups, again, there are funds to provide starting packages for newly appointed junior scientists, while in less well-financed groups assistant lecturers may start without any financing. This practice appears wasteful. New coworkers must be given the best conditions to thrive for the benefit of both themselves, for the unit and for the university. The panel was dismayed to find that some young scientists who had secured starting packages had to wait for very long procurement processes and were left in a limbo waiting for key equipment. While the panel is well aware of the, sometimes, cumbersome route public acquisition protocols require, young scientists often are not.

The panel strongly recommends

the establishment of startup funds for young scientists to ensure that the investment the university makes has the highest probability of paying off.

the establishment of an increased minimal level of research-time for scientists to avoid creating two disjoint sets of academic employees – those who teach and do no research and those who do research and have teaching only as a marginal activity.

to clearly prioritize young scientists in the procurement processes of Linköping University.

The existence of two functional campuses is a benefit and challenge alike for Linköping University. The distance between the two sites is no great hurdle for scientific collaboration or shared students, but for the efficient pooling of resources, it is vital that bread-and-butter infrastructure is available at both sites. This may be achieved by careful planning of which

activities that are conducted where, or, when necessary, investing in double sets of key equipment. Relevant infrastructure requires long-term planning, and the panel is not aware of any roadmap for infrastructure at Linköping University, or indeed any centrally financed scheme for acquiring key infrastructural capabilities.

The panel recommends

the establishment of a long-term plan for how the two campuses should develop to maximize collaboration and avoid developing competing activities at the two sites.
the creation of an infrastructure roadmap for expensive equipment and the creation of infrastructure platforms where equipment and technical staff for support can be made available.

While education falls outside the scope of LiRE25, the access to teaching is of fundamental importance for the health also of research at a university. Teaching can be very beneficial to attract local students, and when teaching becomes highly concentrated to a limited number of units and at these units, to a limited number of academic staff the situation is far from optimal for either research or education. That all researchers have some engagement in teaching and all teachers have some engagement in research provides knowledge transfer between the two activities, provides financial diversity that provides some protection against sudden change, and exposes bachelor's and master's students to the PhD programs of the University. It was clear to the panel that units with substantial teaching assignments were much more successful in attracting PhD students with training from Linköping University than those with limited exposure. While a good proportion of internationally recruited PhD students is highly beneficial for the quality of a research program, a total lack of locally trained students tends to make retention harder and leads to a disconnect between education and research.

The panel recommends

the establishment of a plan for better using the unique competence generated in research to benefit education at Linköping University.

Linköping University has units that are singularly successful in taking research results into patents and patents into start-up companies. While this ability is somewhat dependent on the context of research and some activities require much longer times than others for the creation of successful spin-offs, the pooling of know-how and financial resources from successful activities could provide additional impetus for activities that are beneficial for the university in terms of perception from students and the general public, even if the University cannot be a recipient of direct funds from such activities.

The panel recommends

the establishment of a non-profit organization for the management of patents and seed-funding for startup companies.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Introduction.

The Laboratory of Organic Electronics (LOE) is a new outstanding division that evolved from a small research unit, with a few promising young scientists in the mid-2010s, to its present (2024) configuration of nine independent research units manned by ~150 scientists, students, and support staff. The themes covered by the division are the synthesis of organic and hybrid functional materials, the modeling and characterization of their properties as well as an array of applications areas including energy harvesting and storage, catalysis, printed electronics, photonics, bioelectronics and plant bioelectronics. It is remarkable to notice that the strategy of the LOE's research spans from fundamental research to commercialization with a common care for the research and development of environmentally friendly materials for sustainable technologies.

Observations and analysis

I) Relevance and novelty of the research topics covered by the evaluation of LOE division (9 research units and 1 technical unit).

From the outset the panel finds that the research themes covered by LOE are novel, beyond the beaten paths and trend setting in the general field of the emerging science and technology in Organic Printed and Flexible Electronics (OPFE) which enables to meet important challenges for our society in energy, environment, security, or health sectors and Internet of Things (IoT) all by taking care of the sustainability, and the use of natural recyclable materials resources.

The LOE has a holistic and original approach in coverage of knowledge, expertise, infrastructure, and human resources needed for guaranteeing an efficient execution of the emerging science and technology in OPFE. The LOE division is composed of the following 13 skills-related groups:

1) ***Catalysis and Self-Assembly,*** with the combination of heterogeneous catalysis and nanomaterial self-assembly, this unit aims to develop more efficient synthesis of sustainable food, chemicals, and materials. Moreover, the general aim is the development of fundamental principles in making any type of heterogeneous catalyst more efficient. More specifically, the aim is to develop new heterogeneous catalysis-based methods for amino acid production.

2) ***Conjugated Polymer Chemistry,*** this unit aims to develop green chemistry for the chemical functionalization of conjugated polymers. At the same time, they explore photo- and

electroactive stimuli-responsive materials by the incorporation of functional groups into conjugated polymers to tailor their interactions with external stimuli (ex. biological systems). Also, they develop green synthesis of conjugated polymers using bio-based building blocks and enzyme catalyzed functional group transformations.

3) ***Electronic Plants****,* this unit aims to enable new discoveries in plant science that can lead to more sustainable food production and to plants that can adapt to a changing climate. Also, they develop new technological concepts for communication with the biological world.

4) ***Functional π-Materials****,* this unit develops conjugated organic molecules and polymers. Their principal aim is the introduction of extra/new functions to conjugated molecules and polymers via the self-assembly principles. Their main interest is the formation of self-assembled nanostructures and their influence/tuning of electronic and ionic transport properties. Furthermore, they test these new materials by their incorporation to various devices for application in solar fuel production, solar energy conversion, and membrane separation.

5) ***Green Polymer Chemistry****,* this unit aims in developing green synthetic chemistry methods for functional and sustainable biobased polymeric materials.

6) ***Materials design and optimization****,* this unit aims to advance the understanding of electronic, optical, and structural properties of organic and hybrid materials by applying quantum chemical simulations and materials modeling. They test their findings/understanding by the cooperation with experimental units. More precisely they study the charge transport, excited-state phenomena, and molecular interactions with as final aim the optimization of materials design and their applications to flexible electronic systems and devices.

7) ***Organic Bioelectronics****,* the aim of this unit is elucidation of fundamental processes in biochemistry and physiology, as well as the development of tools for next-generation therapies, human-machine interfacing, blurring the border between living and technological systems.

8) ***Organic Energy Materials****,* this unit is aiming at the design of organic materials with a specific function for energy transport, energy conversion, and energy storage. It is composed by three research subgroups, namely, a) the organic energy storage (OES), b) the organic energy harvesters (OEH), and c) the organic electrochemical device (OED). The research in this unit spans from fundamental research on materials to their implementation in energy devices such as organic batteries, organic redox flow batteries, electrolysers, thermoelectrics, and piezoelectrics.

9) ***Organic nanoelectronics****,* this unit specializes in the creation of new multifunctional materials and their studies in electronics and energy harvesting. The unit involves several disciplines such as chemistry, physics, materials science, and device engineering.

10) ***Organic photonics and nano-optics****,* this unit develops nanooptical concepts based on unique features provided by organic materials like redox-tunable conducting polymers. They aim to use these materials to redox-tunable metasurfaces, reflective displays, and tunable radiative cooling systems.

11) ***Soft Electronics****,* this unit develops materials, concepts and devices for soft and elastic electronics. Namely, the soft neural interfaces, bioelectronics, deformable displays, and thermoelectrics.

12) ***Surface Physics and Chemistry****,* this unit uses and adapts advanced surface science techniques both in-house and at synchrotrons to explore how chemical and physical structure of organic and hybrid organic materials affects their electronic structure. Moreover, the unit endeavors into the exploration and understanding the functionality of the materials when used to real device applications.

13) ***Theory and modelling***. This unit has the same activities as the number 6 above namely the ***Materials design and optimization!***

From all the above it is evident that the LOE division is endeavoring in very relevant and extremely new research themes/subjects setting the path for other investigators to follow them!

Some highlight themes are covered by well-structured units (groups) such as the ***Electronic Plants,*** the ***Organic Bioelectronics,*** and the ***Organic Energy Materials.*** These three former units employ very efficiently all the capacities that the LOE provides and wherever the competences and infrastructure are missing, they are complementing them by joining endogenic (within LiU) and exogenic nationally and international top level relevant institutions.

The chemistry within the LOE division is spread out too many separate units (groups). The research conducted is of relevance and enables good synergy for the fundamental synthetic developments and applications of the entire division. This synergy will be more efficient by creating a more global synthetic unit (group).

The theory, modelling and simulation units are very relevant but spread out on the entire LOE division. Certainly, this theme is of extreme relevance to the LOE division but spreading out and conducting experimentations within the area of theory, modelling and simulation is not very efficient and consumes resources/infrastructure economy. A better use of the competences and expertise is advised.

II) Quality of the research output

It is very clear that the publishing strategy of the LOE prioritizes the quality over quantity, resulting in fewer but more comprehensive excellent to outstanding research papers thus yielding higher impact in academia and society. Journal articles constitute 98% of the publication volume of LOE, 72% of these articles, indexed in Clarivate Web of Science, are published in Q1 journals (ex. Nature Nanotechnology 2020; Nature Communications 2022; Science 2023; Nature 2024). This demonstrates the excellence of the LOE output.

The excellent quality of the research of LOE is also testified by outstanding competitive fund raising such as in the last three years (2022-2024) 7 out of the 15 starting grants in Natural and Engineering Sciences awarded to LiU by the Swedish Research Council (VR) has gone to LOE. In addition, 3 out of the 5 ERC starting grants in Natural and Engineering Sciences awarded to LiU during 2021-2023 also went to LOE.

The panel finds that the research excellence obviously facilitates the training of excellent researchers (PhDs and Post Docs) a long-term benefit for the society.
The panel finds that the strategy of LOE division in reporting the research and innovation outcomes is outstanding in nature and should be continued as such!

III) Impact outside academia

The panel finds that the impact of LOE outside Academia is excellent to outstanding. Examples of successful start-ups include the Cellfion (LOE, KTH) and the e-NeuroPharma project (LOE, Lund) based on the research and development cellulose membranes. The research results on the fundamental understanding of the doping processes in organic semiconductors allowed the invention of the next-generation conducting polymers which was instrumental for the founding of the n-Ink start-up. Those spin-out activities are the best way of creating real-world impact from the research results. *The panel encourages the continuation of these activities.*

IV) *Strategies, priorities and future research plans*

The panel was impressed by the overall present and future strategy of the LOE as well as the evolution the last fifteen years. The prospects are very bright for the future in a prosperous and dynamic environment.

Recommendations

For the recommendations see above in each section the highlighted text in italic.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) **Publication strategies,** the publishing strategy of the LOE division is focused on quality over quantity, preferring fewer but more comprehensive papers leading to excellent research and yielding higher impact to academia and society. The LOE nurtures the cooperative and synergetic research of various units(groups) in achieving a common goal. Putting thus into work the multi/inter-disciplinary LOE environment together with the extensive network of collaborations. The LOE puts together the necessary competences in addressing more complex research questions and exploring them with sufficient depth to yield the type of breakthroughs that can lead to publication in the absolute top journals which at same time form the basis for patents and successful start-ups*. The panel finds that the publication strategy of LOE is original and efficiently implemented. It is suggested to pursue this strategy!*

2) **Recruitment, Opportunities for early-career researchers to develop their originality and independence***.* The LOE division follows the rules and regulations of the LiU/Sweden. The division has been very successful in hiring excellent young academics who had/have prospered in the research environment provided by LOE. They have been very successful in hiring very good PhD students although it has been very hard to get good candidates from Europe especially from Sweden. Hiring post docs has been more time-consuming taking care always to get the best ones. The LOE does not recruit senior staff (with few exceptions) since it is difficult to compete financially with other national and international institutions! To overcome this difficulty the LOE established an overall system to hire young researchers early in their career and help them to develop into rising stars for further evolution within the division or elsewhere. Operationally the LOE established an original tenure track career path including two paths, type 1 hiring of assistant professors who start a new strategy for LOE research area, and type 2 hiring of assistant professors that do research in existing areas within LOE. The criteria for the hiring are the research skills including the ability to clearly communicate complex ideas in oral and written form as well as guiding / supervising graduate students and post docs, the personality who fits the LOE environment, (i.e. embrace the practice of collaborative research and are willing and able to share responsibility for the LOE environment), and last but not least working for and advancing "the common good" of LOE. The system really promotes originality and independence resulting in the creation of new ideas and innovations within the perimeter of the subjects and beyond the LOE. This can be testified by the fact that a lot, if not all, of the young indigenous generated faculty have acquired starting and later consolidator prestigious competitive funding from national and international funding agencies (e.g. ERCs, VR). The panel appreciates the efforts of the LOE division for creating real innovative opportunities for the development of young researchers to rising stars and future leaders! *The panel suggests that these original hiring practices can be implemented at the LiU level as well!*

3) **Quality of the PhD training**, the expansion of the LOE division from 2010s until today was followed by equal increase of the population of the PhD students and post-Docs. The panel finds that these trainees are an active part of the research and innovation of the LOE ecosystem contributing in a major way to its intellectual and multicultural environment. It can be testified from the output that the research at LOE would not perform anywhere near the current level without the influx of ideas, enthusiasm and curiosity that the PhD students and post-docs bring to the table. In conclusion the panel finds that the training of the PhDs and Post-Docs is very original, and unique in its way of operating, meaning that these trainees are not just operational executers but real part of everyday life of the LOE division. *The panel suggests pursuing and intensifying the original way of training of PhDs and Post Docs.*

4) **Academic as well as non-academic networks and collaborations.**

The LOE has a vast network of collaborators within academia, nationally and abroad. In Sweden, collaboration with groups at KTH, Chalmers, Karolinska Institute, Umeå and Lund are

frequent, and internationally groups in France, UK, USA, Italy, Austria and China are prominently featured.

The establishment of such networks almost always are initiated at the independent group level and then driven by project needs. The maintenance of the networks also occurs at the independent group level.

Historically, Acreo/RISE has been the most important collaborator outside of academia and RISE remains the most important non-academic partner. LOE collaborates with companies through Vinnova-funded centers and in EU-funded projects, and generally also collaborates with the LOE spin-out companies. Recently the LOE has been active on Research-innovation networks/centers funded by Vinnova, EU and SSF. The panel finds that the LOE division is doing very well in academic and nonacademic networks alike. This success however is based on the individual and unit levels emanating from their original and excellent research and innovation performances. *Some help from the central administration of the LiU for writing/coordinating the networking efforts would be welcome!*

5) **Equal opportunities and gender equality**, the numbers show that there is a rough 50%:50% gender balance amongst the PhD students. On the faculty level, there is some unbalance in gender (25% women, 75% men). This unbalance is still better than the average at LiU level.

6) **Good research practice**, the research practice at LOE division as reported in all sections of the present document is unique, original and very efficient. *The panel suggests to continue this way and if possible, to help other divisions of the LiU in implementing the same practice!*

7) **Research in relation to teaching.**
The faculty participates in various bachelor and master educational programs of LiU listed at ITN-FEM division, although the financial compensation by LiU is symbolic! Also, the hiring of junior faculty in specific teaching competences is impeded and almost inexistent!
The LOE division has an excellent track record of teaching at the graduate level (PhDs) through research. However, it does not have a dedicated master's educational program on its main subject. Moreover, activities related to this type of education are mainly funded by the competitive fund-raising capacity of the LOE division. *The panel finds it of great urgency to have some corrective actions at the level of LiU, meaning to establish a master's program as requested many times by the LOE Division.*

Recommendations

For the recommendations see above in each section the highlighted text in italic.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) **Organization,** The LOE organization has adopted a bottom-up approach involving senior and junior academic members. This approach is more time-consuming, but the benefit of it is that the young faculty have more fun and more dedication to running the organization. Furthermore, they have biweekly general scientific/administrative meetings where all the members of all units can participate. Additionally, the LOE has established their own spin-out support functions that includes a spin-out group of senior researchers and experienced entrepreneurs that guide the LOE researchers from the early stages of evaluating innovations, patenting, developing business cases, finding mentors, finding investors, etc.
The LOE has a long-standing partnership with RISE (formerly Acreo) to take academic research in printed organic electronics into a technological readiness level (TRL) suitable for commercialization as well as maintaining a patent portfolio. These activities are supported financially initially by KAW and now continued to be supported by specific grants within WISE. An example in the area of organic bioelectronics is a company called OBOE IPR that has been created by researchers from LOE/LiU and the Karolinska Institute for the handling of patenting and maintenance ofa patent portfolio. It should be borne in mind that the LOE does not have funds for maintaining the patents, and does not have any ownership in the IPR generated within LOE or the spin-out companies. Furthermore, LOE does not receive any other financial benefit. The challenge is for the LOE division to secure patent rights but not immediately spin out a company, and still manage financing maintenance of patents. To overcome these difficulties the Home of Organic and Printed Electronics (HOPE), an accelerator for companies in the field of organic and printed electronics which is operated by NOSP has been established recently and is much appreciated. Examples of companies that benefitted from the HOME initiative are DP Patterning, Celfion, n-Ink, redox.me, Ligna Energy, and Model one. *The panel finds this initiative very important. The aim to bring research innovation to a TRL suitable for spinning out into a company is admirable. Overall, the panel finds that the organization of the LOE is very transparent, inclusive and constructive in such a way that all members have fun working and being creative/innovative. It suggested to pursue this way of operating.*

2)**Staffing,** The LOE has an excellent procedure for hiring early academic faculty and PhDs/Post docs. Details are reported already on the previous section page 7

2) Recruitment, Opportunities for early-career researchers to develop their originality and independence.
The panel finds that, even if the LOE appreciates the HR help from LiU, the LiU could be more helpful in diminishing the administrative burden of the LOE management.

3)**Funding,** The LOE division has an outstanding track record of substantial external competitive funding. The main funding sources for large grants are KAW, VR, SSF, Vinnova, EU (ERC, Horizon), and Formas.
The ratio of combined external funding (research grants) vs combined internal funding (teaching & research) is 3.3 in 2024 compared to a ratio of 0.5 for LiU as a whole. *The panel*

finds that this asymmetry in the funding resources puts the LOE division in a disadvantageous position for attracting the best faculty and even maintaining some excellent stars that they have produced so far. Corrective action from the LiU is urgent and desperately needed.

4)**Research infrastructure,** The LOE has established, organized and run open lab facilities available to all users with a minimal running fee. The economic model is viable because of the use of the "free" faculty funds received every year typically 60-70%. This way of operating is very helpful to young starting faculty and as well as to the older ones who desire to change subject and do not yet have the required funding for doing so. The drawback however is that the LOE does not have enough financial room to make strategic moves that require a large amount of funding. This drawback is offset by the successful winning of competitive funding and the goodwill of the researchers to share their wealth! The large clean room facility of LOE is partly funded by the WISE and LiU. Despite this effort of funding, there is no long-term sustainability of a clean room facility.
The panel finds that the open lab establishment, organization, and running is great and could be generalized at LiU as a whole, however the economic model has to be reinforced and must become sustainable to give financial room at least for the moment to the LOE division for important future strategic operations.
5)**Support functions** *The LOE is happy with the supporting administrative help, but the Panel finds that this support should be reinforced***.**

Recommendations

For the recommendations see above in each section the highlighted text in italic.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Many of the panel's recommendations above the LiU management can find inspiration from the way the LOE division operates with great success.

Panel F Report - F 1

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel F consisted of experts in computer engineering, quantum technologies, communication systems and networks, and microelectronics. The panel was composed of

- Erika Andersson (chair). Professor of Physics at Heriot-Watt University, Edinburgh, UK, with research background in quantum technology and quantum information science. Also serves as Associate Editor for Physical Review A.
- Ernesto Galvão. Leader of a group doing research in quantum computing, particularly using photonic systems, at the International Iberian Nanotechnology Laboratory (INL) in Braga, Portugal.
- Mikael Gidlund. Professor in Computer Engineering at Mid Sweden University, Sweden, with research background in wireless communication, security, and Internet-of-Things (IoT) for industrial applications.
- Jari Nurmi. Professor of Electrical Engineering at Tampere University, Finland, with research background in computer engineering, digital electronics, communication and positioning hardware.
- Susana Patón. Associate professor in the Electronics Technology Department at Universidad Carlos III de Madrid, Spain, with research background in analog and mixed-signal integrated circuits, data converters for communications and sensors, flexible microelectronics and integrated sensors for affective computing.

The panel was tasked with evaluating the research quality, research culture, and research conditions within each unit at Linköping University. The evaluation process included a thorough review of the submitted documentation, in-depth face-to-face meetings with researchers and PhD students, as well as a guided lab tour. The panel also considered strategic aspects such as collaboration, funding mechanisms, and institutional support structures.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. Structural and Organisational Conditions for Research Engagement

A recurring concern across academic units is the considerable teaching commitment, particularly for early- and mid-career scholars. In some instances, teaching duties occupy the vast majority of academic time, leaving limited scope for sustained research activity or the development of competitive funding proposals.

In parallel, several groups report a low number of active doctoral students. A limited doctoral presence can affect the continuity of research, restrict academic renewal, and reduce the vitality of the research environment. There is, therefore, an opportunity to adopt a more strategic and long-term approach to doctoral recruitment and supervision. Encouraging greater interaction among PhD students from related groups may further enrich the academic community and foster a more cohesive research culture.

It would also be beneficial to ensure that expectations regarding the doctoral education process are clearly communicated and regularly discussed. It became apparent that many PhD students are only vaguely aware of the formal learning outcomes associated with their programme. Moreover, these outcomes are seldom followed up or explicitly addressed in conversations with supervisors. Strengthening the connection between the intended learning outcomes and ongoing supervisory discussions could help clarify expectations, support student development, and contribute positively to the quality and coherence of doctoral education. Information could also be more easily accessible regarding available PhD courses across departments, as well as administrative procedures, for example, those related to thesis submission.

2. Internal Collaboration and Interdisciplinary Exchange

There appears to be considerable potential to strengthen collaboration both within and between research units. While examples of informal cooperation and joint applications exist, structured mechanisms to promote interdisciplinary work remain limited. Encouraging greater interaction, particularly among groups with overlapping or complementary interests, would enrich the research environment and may foster new and innovative directions.

The current scarcity of regular academic seminars, interdisciplinary forums, and internal events further limits opportunities for intellectual exchange and collaboration. Such activities are vital for sustaining a dynamic academic culture, supporting doctoral education, and building connections across research boundaries. In this context, the annual PhD student event

organised at Campus Norrköping stands out as a highly valuable initiative, and so is the bi-annual workshop organized by ISY, which the evaluation panel learnt about only after the evaluation visit had taken place. This provides a dedicated platform for community-building, visibility, and engagement across research groups and is strongly encouraged to go forward. Such gatherings, featuring presentations, posters, and informal exchanges, could bring together a critical mass across themes and disciplines. Similarly, encouraging regular attendance at departmental seminars and talks would promote ongoing interaction and professional development among staff and students.

The panel suggests that joint supervision of PhD students across different research units could serve as an effective way to further enhance collaboration and interdisciplinary exchange. Such arrangements not only support high-quality doctoral training but also help raise mutual awareness among researchers, foster knowledge sharing, and contribute to a more vibrant and interconnected research environment. Encouraging joint supervision, particularly between groups with complementary expertise, may act as a catalyst for cross-unit dialogue, innovation, and shared research initiatives.

Further use of infrastructures such as the Visualization Centre for public engagement and outreach would also be beneficial. Activities of this kind may support recruitment and enhance societal visibility and collaboration with external partners, including those in industry.

3. Equity, Diversity, and Inclusion

Matters of equity, diversity, and inclusion (EDI) were not widely addressed in the self-evaluations submitted by the units. Nevertheless, the panel noted encouraging individual efforts, such as the Women in Information Coding Theory workshop recently organized by Dr Onur Günlü. Initiatives of this kind are commendable and serve as valuable examples of how targeted activities can raise awareness and promote inclusivity within specific research areas.

That said, the issue of gender imbalance, particularly the underrepresentation of women in engineering and technology disciplines, is a well-documented and persistent challenge across the sector. This is more evident at senior levels. Despite this, there was little evidence from either the documentation or the interviews of a coordinated or strategic institutional response to this imbalance. It remains unclear how departments or the university as a whole are working systematically to address gender disparities in recruitment, and particularly with regards to retention and career progression.

This presents an important opportunity for the university to take a more structured and proactive approach. Such a strategy could include inclusive recruitment practices, mentorship programmes for women and other underrepresented groups, clear targets and monitoring for equality and diversity, and initiatives supporting academic career development at all levels. Importantly, these efforts should be integrated into broader institutional frameworks rather

than left to individual initiative. To avoid backlash, it is essential to involve everyone in these activities and to communicate clearly that the aim is not to provide unfair advantages, but to promote equity and inclusion.

Institutional recognition and sustained support, both in terms of policy and resourcing, would signal a serious commitment to equity and diversity. In this regard, existing programmes such as ELLIIT may provide valuable support for the development and implementation of gender equity initiatives, as well as broader EDI work across the research environment.

One form of fostering equity, while also increasing research potential, would also be to support currently not research-active staff to get back on the research track. This can include decreased teaching load, co-supervising PhD students, and dedicated time and support to prepare new research proposals.

4. Institutional Support and Infrastructure

Several institutional support structures, though well-intentioned, appear to present practical challenges. The university's intranet is frequently described as difficult to navigate, making it harder for researchers and students to access essential information and services. To give an example, it could be made easier for researchers to update information regarding their research groups.

Likewise, the communications function is seen as largely reactive. While high-impact research receives deserved attention, other valuable contributions, especially those with regional, interdisciplinary, or applied relevance, often remain less visible. A more strategic and inclusive approach to research communication would enhance institutional visibility and support greater engagement with external stakeholders and funding bodies.

5. Supporting Early-Career Researchers

The panel sees a clear opportunity to further support early-career scholars through the provision of structured start-up packages. These should ideally include protected research time, modest seed funding, and the possibility to recruit one or two doctoral students or a postdoctoral researcher.

Such packages would enable new faculty members to establish a coherent research agenda early in their appointment and to participate fully in the academic life of their department. Without this support, many are quickly drawn into intensive teaching responsibilities, which may constrain their ability to build sustainable research programmes or compete effectively for external funding.

6. Capacity for External and European Research Funding

There appears to be untapped potential for several units to engage more actively with applied and industry-oriented funding opportunities, such as those offered by Vinnova. While this was not consistently raised by researchers themselves, the panel recognizes it as a promising avenue for increasing external engagement and broadening the funding portfolio. Realizing this potential, however, will require more tailored and proactive institutional support.

At present, support from the university's grants office for applications to applied or industry-related funding agencies is limited. Some units could benefit from more structured and strategic assistance in this area. The panel recommends that the university consider implementing dedicated proposal writing support, which might include access to professional grant writers or "ghostwriters" who can assist researchers in articulating competitive applications. This would be especially valuable for those with heavy teaching loads or limited experience in applied funding contexts.

In addition, there is a timely opportunity to enhance institutional preparedness for participation in European research programmes. Departments may wish to initiate internal discussions on current challenges and opportunities, share successful practices, and explore the potential for joint or cross-disciplinary applications. These efforts would benefit from central coordination and workshops designed to build awareness, competence, and long-term strategic capacity about EU funding schemes.

7. Concluding Remarks

Based on the panel's review of documentation and interviews with representatives from the four academic units, it is evident that there are both strengths to build upon and areas where further development is possible. While the context and challenges may differ across units, several recurring themes emerged that merit broader attention.

Given the Swedish Government's growing emphasis on competitive research funding, it is both timely and important that academic units consider how best to position themselves for success in this evolving landscape. Although current participation in EU programmes remains limited in some areas, the university is well-placed to strengthen its engagement and build on its many existing strengths.

The themes identified in this review, ranging from doctoral education and internal collaboration to gender equity, institutional support, and funding preparedness, extend beyond the individual units examined. They are of relevance across the faculty and university

and addressing them coherently and strategically will support both academic excellence and long-term institutional sustainability.

Evaluated Unit's Name: ISY.DA Computer Engineering

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) The two professors in the division cater for complementary research topics within Computer Engineering. Prof. Gustafsson's research is largely based on more traditional algorithm mapping on hardware, but with timely applications such as Massive MIMO or Ising machines. He also works on approximate arithmetic and open-source design and visualization tool development, which are relevant and timely as well. Prof. Nunez-Yanez works on hardware architectures for machine learning, with applications in anomaly detection, high-speed image processing, and graph quantization. Another of his research areas is efficient quantum error correction using FPGAs. These are also very relevant and novel areas.

2) It is slightly difficult to make precise conclusions on the research quality based on the bibliometric analysis. The unit's research is published with quite typical distribution in journals (41%) and conferences (57%). While the share of level-2 journal publications is considerably higher than in LiU in general, the share of journal publications in WOS Q1 journals is considerably lower than the LiU average. By taking a closer look at the publication forums where recent papers have been published, the conclusion is that the output quality is good but not aiming at the top prestigious publications.

3) Regarding impact outside academia, in particular the open-source design tools have potential for a relatively high impact at smaller companies and among hobbyists and students. Relationships with companies are not on a very high level yet, although a large portion of publications include co-authors from industry.

4) Opportunities to extend the funding basis and application areas are explored, but not in a very systematic way.

Recommendations

- It would be good to establish an explicit research strategy and future directions for the division. This could be done within the new combined division.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) The publication strategies seem to be somewhat opportunistic, and open-source tools are mainly disseminated in seminars without published proceedings. Despite the less spoken-out strategy, the unit is capable of publishing with sufficient quality of the output.

2) Currently there is no middle layer (post-docs, assistant professors), so their opportunities to develop cannot be evaluated.

3) Regarding PhD training, the expectations and responsibilities of the supervisor and supervisee are not always very clear. However, regular meetings with the supervisor take place. The workload of teaching (20%) is ok for the students. Personal research plans are not systematically written at the beginning of the PhD work, which would be good practice. It is also not very clear what courses to include, and it is difficult to find enough relevant courses for the pretty large requirement of 90 credits. Internal collaboration between the PhD students seems to be quite limited. In general, a more systematic approach would improve the efficiency of PhD training. Mobility does not appear to be actively promoted or systematically discussed with PhD students. While a few have pursued short research stays abroad, primarily on their own initiative, a clearer strategy supporting international experience would be beneficial.

4) The academic networks of the division are at a sufficient level and being explored further. The industry contacts are scarce; however, Prof. Nunez-Yanez is making efforts to grow the company contact network as well.

5) Regarding equal opportunities and gender equality, no particular information was presented. At the time of the data provided, there were 11% female members in the division.

6) Good research practice is followed in general.

7) There are clear connections between the research at the unit and the courses taught.

Recommendations

- An explicit and communicated publication strategy should be crafted.

- Personal research and study plans should be systematically created for the PhD students, with their supervisor(s), when starting the PhD; the plan should be updated annually.
- The faculty should consider reducing the credit requirements to 60 instead of 90.
- The new division or the department should consider launching a regular research seminar for the students and staff to increase awareness, sharing and networking – and to give study credits.
- Equal opportunities and gender equality policy should be adopted if not accomplished yet.
- The PIs could work more strategically to identify and engage with relevant industrial partners, with support from innovation office or similar units to initiate and facilitate contacts, e.g., with companies like ABB, Hitachi Energy, and those in the defense-related hardware sector, ideally with cross-faculty coordination.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) There has been a recent change in the organization, merging this division with another one. The panel sees this to be beneficial for developing this research area.

2) The staffing of the unit is scarce; the top level is now good with the recruitment of another professor recently, but the postdoc or assistant/associate professor level could be reinforced for a more balanced personnel structure.

3) The division has been able to have funding from ELLIIT, SSF and WASP, for PhD students and also the new professor. Still, obtaining funding is not easy, as all funding sources are very competitive.

4) The research infrastructure is on an adequate level.

5) The unit could benefit from improving some support functions. In particular, the university level communications unit and legal services would be in higher demand than what is available now. Also, the centralized IT administration is not working as well as the local one did.

Recommendations

- The new, merged division should pay attention to integrating the former divisions, enabling common practices, sharing of contacts and information, peer support, and gradual improvements in staffing.
- The university should try to improve the availability of communications, IT and legal services for all units.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel sees the merger with another division to be beneficial for developing both research areas. The new organization management should pay attention to integrating the formerly separate divisions.

There is potential in finding synergies with academics and companies in need of efficient hardware implementations. In general, we would like to encourage seeking new collaborations inside and outside LiU. Consider appointing an adjunct professor from a strategically relevant industrial partner to strengthen industry-academia collaboration, increase visibility, and facilitate joint research opportunities.

Fostering an atmosphere of sharing and caring, both among the PhD students and between them and the supervisors, would probably lead to smoother progress for the whole unit.

Panel F Report - F2

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel F consisted of experts in computer engineering, quantum technologies, communication systems and networks, and microelectronics. The panel was composed of

- Erika Andersson (chair). Professor of Physics at Heriot-Watt University, Edinburgh, UK, with research background in quantum technology and quantum information science. Also serves as Associate Editor for Physical Review A.
- Ernesto Galvão. Leader of a group doing research in quantum computing, particularly using photonic systems, at the International Iberian Nanotechnology Laboratory (INL) in Braga, Portugal.
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General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. Structural and Organisational Conditions for Research Engagement

A recurring concern across academic units is the considerable teaching commitment, particularly for early- and mid-career scholars. In some instances, teaching duties occupy the vast majority of academic time, leaving limited scope for sustained research activity or the development of competitive funding proposals.

In parallel, several groups report a low number of active doctoral students. A limited doctoral presence can affect the continuity of research, restrict academic renewal, and reduce the vitality of the research environment. There is, therefore, an opportunity to adopt a more strategic and long-term approach to doctoral recruitment and supervision. Encouraging greater interaction among PhD students from related groups may further enrich the academic community and foster a more cohesive research culture.

It would also be beneficial to ensure that expectations regarding the doctoral education process are clearly communicated and regularly discussed. It became apparent that many PhD students are only vaguely aware of the formal learning outcomes associated with their programme. Moreover, these outcomes are seldom followed up or explicitly addressed in conversations with supervisors. Strengthening the connection between the intended learning outcomes and ongoing supervisory discussions could help clarify expectations, support student development, and contribute positively to the quality and coherence of doctoral education. Information could also be more easily accessible regarding available PhD courses across departments, as well as administrative procedures, for example, those related to thesis submission.

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There appears to be considerable potential to strengthen collaboration both within and between research units. While examples of informal cooperation and joint applications exist, structured mechanisms to promote interdisciplinary work remain limited. Encouraging greater interaction, particularly among groups with overlapping or complementary interests, would enrich the research environment and may foster new and innovative directions.

The current scarcity of regular academic seminars, interdisciplinary forums, and internal events further limits opportunities for intellectual exchange and collaboration. Such activities are vital for sustaining a dynamic academic culture, supporting doctoral education, and building connections across research boundaries. In this context, the annual PhD student event

organised at Campus Norrköping stands out as a highly valuable initiative, and so is the bi-annual workshop organized by ISY, which the evaluation panel learnt about only after the evaluation visit had taken place. This provides a dedicated platform for community-building, visibility, and engagement across research groups and is strongly encouraged to go forward. Such gatherings, featuring presentations, posters, and informal exchanges, could bring together a critical mass across themes and disciplines. Similarly, encouraging regular attendance at departmental seminars and talks would promote ongoing interaction and professional development among staff and students.

The panel suggests that joint supervision of PhD students across different research units could serve as an effective way to further enhance collaboration and interdisciplinary exchange. Such arrangements not only support high-quality doctoral training but also help raise mutual awareness among researchers, foster knowledge sharing, and contribute to a more vibrant and interconnected research environment. Encouraging joint supervision, particularly between groups with complementary expertise, may act as a catalyst for cross-unit dialogue, innovation, and shared research initiatives.

Further use of infrastructures such as the Visualization Centre for public engagement and outreach would also be beneficial. Activities of this kind may support recruitment and enhance societal visibility and collaboration with external partners, including those in industry.

3. Equity, Diversity, and Inclusion

Matters of equity, diversity, and inclusion (EDI) were not widely addressed in the self-evaluations submitted by the units. Nevertheless, the panel noted encouraging individual efforts, such as the Women in Information Coding Theory workshop recently organized by Dr Onur Günlü. Initiatives of this kind are commendable and serve as valuable examples of how targeted activities can raise awareness and promote inclusivity within specific research areas.

That said, the issue of gender imbalance, particularly the underrepresentation of women in engineering and technology disciplines, is a well-documented and persistent challenge across the sector. This is more evident at senior levels. Despite this, there was little evidence from either the documentation or the interviews of a coordinated or strategic institutional response to this imbalance. It remains unclear how departments or the university as a whole are working systematically to address gender disparities in recruitment, and particularly with regards to retention and career progression.

This presents an important opportunity for the university to take a more structured and proactive approach. Such a strategy could include inclusive recruitment practices, mentorship programmes for women and other underrepresented groups, clear targets and monitoring for equality and diversity, and initiatives supporting academic career development at all levels. Importantly, these efforts should be integrated into broader institutional frameworks rather

than left to individual initiative. To avoid backlash, it is essential to involve everyone in these activities and to communicate clearly that the aim is not to provide unfair advantages, but to promote equity and inclusion.

Institutional recognition and sustained support, both in terms of policy and resourcing, would signal a serious commitment to equity and diversity. In this regard, existing programmes such as ELLIIT may provide valuable support for the development and implementation of gender equity initiatives, as well as broader EDI work across the research environment.

One form of fostering equity, while also increasing research potential, would also be to support currently not research-active staff to get back on the research track. This can include decreased teaching load, co-supervising PhD students, and dedicated time and support to prepare new research proposals.

4. Institutional Support and Infrastructure

Several institutional support structures, though well-intentioned, appear to present practical challenges. The university's intranet is frequently described as difficult to navigate, making it harder for researchers and students to access essential information and services. To give an example, it could be made easier for researchers to update information regarding their research groups.

Likewise, the communications function is seen as largely reactive. While high-impact research receives deserved attention, other valuable contributions, especially those with regional, interdisciplinary, or applied relevance, often remain less visible. A more strategic and inclusive approach to research communication would enhance institutional visibility and support greater engagement with external stakeholders and funding bodies.

5. Supporting Early-Career Researchers

The panel sees a clear opportunity to further support early-career scholars through the provision of structured start-up packages. These should ideally include protected research time, modest seed funding, and the possibility to recruit one or two doctoral students or a postdoctoral researcher.

Such packages would enable new faculty members to establish a coherent research agenda early in their appointment and to participate fully in the academic life of their department. Without this support, many are quickly drawn into intensive teaching responsibilities, which may constrain their ability to build sustainable research programmes or compete effectively for external funding.

6. Capacity for External and European Research Funding

There appears to be untapped potential for several units to engage more actively with applied and industry-oriented funding opportunities, such as those offered by Vinnova. While this was not consistently raised by researchers themselves, the panel recognizes it as a promising avenue for increasing external engagement and broadening the funding portfolio. Realizing this potential, however, will require more tailored and proactive institutional support.

At present, support from the university's grants office for applications to applied or industry-related funding agencies is limited. Some units could benefit from more structured and strategic assistance in this area. The panel recommends that the university consider implementing dedicated proposal writing support, which might include access to professional grant writers or "ghostwriters" who can assist researchers in articulating competitive applications. This would be especially valuable for those with heavy teaching loads or limited experience in applied funding contexts.

In addition, there is a timely opportunity to enhance institutional preparedness for participation in European research programmes. Departments may wish to initiate internal discussions on current challenges and opportunities, share successful practices, and explore the potential for joint or cross-disciplinary applications. These efforts would benefit from central coordination and workshops designed to build awareness, competence, and long-term strategic capacity about EU funding schemes.

7. Concluding Remarks

Based on the panel's review of documentation and interviews with representatives from the four academic units, it is evident that there are both strengths to build upon and areas where further development is possible. While the context and challenges may differ across units, several recurring themes emerged that merit broader attention.

Given the Swedish Government's growing emphasis on competitive research funding, it is both timely and important that academic units consider how best to position themselves for success in this evolving landscape. Although current participation in EU programmes remains limited in some areas, the university is well-placed to strengthen its engagement and build on its many existing strengths.

The themes identified in this review, ranging from doctoral education and internal collaboration to gender equity, institutional support, and funding preparedness, extend beyond the individual units examined. They are of relevance across the faculty and university

and addressing them coherently and strategically will support both academic excellence and long-term institutional sustainability.

Evaluated Unit's Name: ISY.EKS Integrated Circuits and Systems

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Integrated Circuits and Systems (EKS) Unit has a very long and successful tradition at Linköping University. Research is focused on data converters and analog and mixed-signal circuits for a wide range of applications, such as low-power wideband radio transceivers or image sensors and, more recently, on implantable biomedical devices with wireless energy-harvesting capabilities. Some tested chips have been transferred to industry and are commercialized. Some other chips were published in high-impact solid-state circuit journals and reputed international conferences. Currently the unit is involved in several research projects funded by the Swedish Foundation for Strategic Research (SSF), the Excellence Center at Linköping – Lund in Information Technology (ELLIIT), and the Swedish Research Council (VR). Outside academia, the division is constantly involved in technology transfer actions with several companies such as SAAB, Ericsson, Intel or Cardiac.

The unit heavily depends on the guidance of Prof. Atila Alvandpour who is partially retired. Both the self-evaluation and the panel found this to be a potential risk regarding future research, even though planned future directions are promising, for example analog and mixed-signal neuromorphic circuits to accelerate AI computing.

The division recently merged with the Computer Engineering (DA) Unit. The panel observed that there is potential for more interaction between the units. The EKS division has internally collaborated with other divisions in the past within the ISY department. This includes the Information Coding (ICG) unit, as well as with other groups at other departments, such as the Department of Computer Science (IDA), and Biomedical Engineering (IMT), with joint PhD supervisions and joint grants. The panel observed an opportunity of defining future research directions in the new division around ultra-low power AI computing in-the-edge for different applications.

Recommendations

- Most importantly, develop a strategy to increase the autonomy of senior and junior researchers to increase their leadership and secure future research quality and unit knowledge.

- Proactively foster internal collaboration within and outside the division. Additionally, potential collaboration with related research groups located in Norrköping should be explored, such as the Communication Electronics Group in FEM unit.
- Develop a long-term strategy for recruiting and sustaining PhD students, diversifying the research directions.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The publication strategy within EKS is limited by two factors. On one hand, depending on who funds the research, there may be restrictions related to intellectual property. On the other hand, the long cycle of chip design and chip testing prevents a high number of high impact journal publications. This is balanced with contributions to relevant international conferences.

Recruited researchers (Dr. Alireza Saberkari, Associate Prof. 2020, and Dr. Saghi Forouhi, Assistant Prof. 2024) have a strong background and international experience in RF circuits and chip design, and they have high potential, although their opportunities for career development at Linköping University are limited by the teaching load and the lack of a starting package. This is of crucial importance in this unit due to the need to ensure future leadership of the research. Additionally, the limited number of researchers in the unit poses a challenge for PhD students, as they must develop a very high competence in chip design and testing quite early on their own. This contributes to an isolated research environment and reduced peer interactions. It would be beneficial with more structured and regular research seminars, interdisciplinary forums, mobility actions and outreach activities. These components are vital for PhD student development, as well as for stimulating cross-group collaboration and visibility.

Concerning PhD education, while there is a tradition of requiring 90 ECTS in doctoral-level coursework, students report some difficulty finding courses relevant to their research areas. Offerings appear irregular and ad hoc, and there is no centralized or transparent platform for viewing available courses and schedules. Furthermore, some PhD students express limited awareness of the broader learning outcomes expected of them, often focusing only on publication requirements. PhD Students also report some difficulties with teaching responsibilities as the number of students on their courses is increasing.

The academic and industrial network of the research leader, Prof. Alvandpour, is wide enough and international. The panel observed that the younger researchers are expanding their own network in Europe, with the target of getting European funds to the unit. No specific policy on promoting diverse, equal and inclusive recruitment and career development is reported. There are however some young female researchers in the unit, the team is quite international, and they are used to collaborating with each other.

The strong connection between the teaching courses on electronics and circuit design and the research activities strengthens the high-quality training of graduate and post-graduate students.

Recommendations

- Improve support for junior researchers by reducing teaching loads and offering structured mentoring and career development support.
- Implement competitive start-up packages for incoming junior researchers, including protected research time and initial funding to recruit PhD students.
- Review the publication strategy to enhance the academic curricula of PhD and junior researchers. A common practice in the field is to involve PhD students and junior researchers in both more research-oriented projects and technology transfer agreements for an adequate balance of industrial expertise and scientific publications.
- Develop a centralized, transparent platform for PhD course offerings, ideally with cross-faculty coordination.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The conditions for research within EKS are well organized given the limited number of human resources. The unit has benefited from postdoc positions.

Concerning funding, Prof. Atila Alvandpour reports good funding for the next couple of years. Historically, most of the funding has been provided by the non-academic sector. This strategy greatly improves the industry employment opportunities of PhD students. In the past, the research unit has also received important European funds. Nevertheless, strategic public funding is required to secure the recruitment of more researchers at different levels, to renew the research infrastructure and cover research expenses, such as chip fabrication in nm CMOS nodes. Prof. Atila Alvandpour is interested in the development of the European Chip Act in Sweden.

On the other hand, despite the need for continuous renewal, the unit has appropriate research infrastructure for chip design and chip testing, at least for low frequency applications.

Support functions could be improved in some respects, as suggested in general observations.

Recommendations

- Participate in Chips JU or equivalent international calls together with industrial partners, and foster the collaboration with internal and external related groups in semiconductor field to increase the visibility of Sweden in the European Chip Act.
- Improve institutional digital tools, particularly the intranet, to ensure they meet researchers' needs. This is also mentioned under *General Observations.*
- Encourage the communications office to take a more proactive and inclusive approach to promoting research, especially projects with societal or industrial relevance. This is also mentioned under *General Observations.*

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The research expertise of the group has been very well appreciated by local and international industry. With the right guidance and support they have the potential to increase the impact of their research and to contribute to the European microelectronics sovereignty by joint actions with surrounding industry and internal/external research groups. The panel emphasizes the need to increase the number of experienced researchers to gradually take over the leadership of the team, either by recruitment, or by supporting existing professors in the group. Additionally, there is potential to improve the funding strategy of the unit, in order to take full advantage of their capabilities, and to ensure the continuous flow of PhD students, postdocs and early-stage researchers.

Panel F Report – F3 ISY.ICG

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel F consisted of experts in computer engineering, quantum technologies, communication systems and networks, and microelectronics. The panel was composed of

- Erika Andersson (chair). Professor of Physics at Heriot-Watt University, Edinburgh, UK, with research background in quantum technology and quantum information science. Also serves as Associate Editor for Physical Review A.
- Ernesto Galvão. Leader of a group doing research in quantum computing, particularly using photonic systems, at the International Iberian Nanotechnology Laboratory (INL) in Braga, Portugal.
- Mikael Gidlund. Professor in Computer Engineering at Mid Sweden University, Sweden, with research background in wireless communication, security, and Internet-of-Things (IoT) for industrial applications.
- Jari Nurmi. Professor of Electrical Engineering at Tampere University, Finland, with research background in computer engineering, digital electronics, communication and positioning hardware.
- Susana Patón. Associate professor in the Electronics Technology Department at Universidad Carlos III de Madrid, Spain, with research background in analog and mixed-signal integrated circuits, data converters for communications and sensors, flexible microelectronics and integrated sensors for affective computing.

The panel was tasked with evaluating the research quality, research culture, and research conditions within each unit at Linköping University. The evaluation process included a thorough review of the submitted documentation, in-depth face-to-face meetings with researchers and PhD students, as well as a guided lab tour. The panel also considered strategic aspects such as collaboration, funding mechanisms, and institutional support structures.

The unit spans three main research areas: communication electronics, applied mathematics, and physical electronics/nanotechnology.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. Structural and Organisational Conditions for Research Engagement

A recurring concern across academic units is the considerable teaching commitment, particularly for early- and mid-career scholars. In some instances, teaching duties occupy the vast majority of academic time, leaving limited scope for sustained research activity or the development of competitive funding proposals.

In parallel, several groups report a low number of active doctoral students. A limited doctoral presence can affect the continuity of research, restrict academic renewal, and reduce the vitality of the research environment. There is, therefore, an opportunity to adopt a more strategic and long-term approach to doctoral recruitment and supervision. Encouraging greater interaction among PhD students from related groups may further enrich the academic community and foster a more cohesive research culture.

It would also be beneficial to ensure that expectations regarding the doctoral education process are clearly communicated and regularly discussed. It became apparent that many PhD students are only vaguely aware of the formal learning outcomes associated with their programme. Moreover, these outcomes are seldom followed up or explicitly addressed in conversations with supervisors. Strengthening the connection between the intended learning outcomes and ongoing supervisory discussions could help clarify expectations, support student development, and contribute positively to the quality and coherence of doctoral education. Information could also be more easily accessible regarding available PhD courses across departments, as well as administrative procedures, for example, those related to thesis submission.

2. Internal Collaboration and Interdisciplinary Exchange

There appears to be considerable potential to strengthen collaboration both within and between research units. While examples of informal cooperation and joint applications exist, structured mechanisms to promote interdisciplinary work remain limited. Encouraging greater interaction, particularly among groups with overlapping or complementary interests, would enrich the research environment and may foster new and innovative directions.

The current scarcity of regular academic seminars, interdisciplinary forums, and internal events further limits opportunities for intellectual exchange and collaboration. Such activities

are vital for sustaining a dynamic academic culture, supporting doctoral education, and building connections across research boundaries. In this context, the annual PhD student event organised at Campus Norrköping stands out as a highly valuable initiative, and so is the bi-annual workshop organized by ISY, which the evaluation panel learnt about only after the evaluation visit had taken place. This provides a dedicated platform for community-building, visibility, and engagement across research groups and is strongly encouraged to go forward. Such gatherings, featuring presentations, posters, and informal exchanges, could bring together a critical mass across themes and disciplines. Similarly, encouraging regular attendance at departmental seminars and talks would promote ongoing interaction and professional development among staff and students.

The panel suggests that joint supervision of PhD students across different research units could serve as an effective way to further enhance collaboration and interdisciplinary exchange. Such arrangements not only support high-quality doctoral training but also help raise mutual awareness among researchers, foster knowledge sharing, and contribute to a more vibrant and interconnected research environment. Encouraging joint supervision, particularly between groups with complementary expertise, may act as a catalyst for cross-unit dialogue, innovation, and shared research initiatives.

Further use of infrastructures such as the Visualization Centre for public engagement and outreach would also be beneficial. Activities of this kind may support recruitment and enhance societal visibility and collaboration with external partners, including those in industry.

3. Equity, Diversity, and Inclusion

Matters of equity, diversity, and inclusion (EDI) were not widely addressed in the self-evaluations submitted by the units. Nevertheless, the panel noted encouraging individual efforts, such as the Women in Information Coding Theory workshop recently organized by Dr Onur Günlü. Initiatives of this kind are commendable and serve as valuable examples of how targeted activities can raise awareness and promote inclusivity within specific research areas.

That said, the issue of gender imbalance, particularly the underrepresentation of women in engineering and technology disciplines, is a well-documented and persistent challenge across the sector. This is more evident at senior levels. Despite this, there was little evidence from either the documentation or the interviews of a coordinated or strategic institutional response to this imbalance. It remains unclear how departments or the university as a whole are working systematically to address gender disparities in recruitment, and particularly with regards to retention and career progression.

This presents an important opportunity for the university to take a more structured and proactive approach. Such a strategy could include inclusive recruitment practices, mentorship programmes for women and other underrepresented groups, clear targets and monitoring for

equality and diversity, and initiatives supporting academic career development at all levels. Importantly, these efforts should be integrated into broader institutional frameworks rather than left to individual initiative. To avoid backlash, it is essential to involve everyone in these activities and to communicate clearly that the aim is not to provide unfair advantages, but to promote equity and inclusion.

Institutional recognition and sustained support, both in terms of policy and resourcing, would signal a serious commitment to equity and diversity. In this regard, existing programmes such as ELLIIT may provide valuable support for the development and implementation of gender equity initiatives, as well as broader EDI work across the research environment.

One form of fostering equity, while also increasing research potential, would also be to support currently not research-active staff to get back on the research track. This can include decreased teaching load, co-supervising PhD students, and dedicated time and support to prepare new research proposals.

4. Institutional Support and Infrastructure

Several institutional support structures, though well-intentioned, appear to present practical challenges. The university's intranet is frequently described as difficult to navigate, making it harder for researchers and students to access essential information and services. To give an example, it could be made easier for researchers to update information regarding their research groups.

Likewise, the communications function is seen as largely reactive. While high-impact research receives deserved attention, other valuable contributions, especially those with regional, interdisciplinary, or applied relevance, often remain less visible. A more strategic and inclusive approach to research communication would enhance institutional visibility and support greater engagement with external stakeholders and funding bodies.

5. Supporting Early-Career Researchers

The panel sees a clear opportunity to further support early-career scholars through the provision of structured start-up packages. These should ideally include protected research time, modest seed funding, and the possibility to recruit one or two doctoral students or a postdoctoral researcher.

Such packages would enable new faculty members to establish a coherent research agenda early in their appointment and to participate fully in the academic life of their department. Without this support, many are quickly drawn into intensive teaching responsibilities, which may constrain their ability to build sustainable research programmes or compete effectively for external funding.

6. Capacity for External and European Research Funding

There appears to be untapped potential for several units to engage more actively with applied and industry-oriented funding opportunities, such as those offered by Vinnova. While this was not consistently raised by researchers themselves, the panel recognizes it as a promising avenue for increasing external engagement and broadening the funding portfolio. Realizing this potential, however, will require more tailored and proactive institutional support.

At present, support from the university's grants office for applications to applied or industry-related funding agencies is limited. Some units could benefit from more structured and strategic assistance in this area. The panel recommends that the university consider implementing dedicated proposal writing support, which might include access to professional grant writers or "ghostwriters" who can assist researchers in articulating competitive applications. This would be especially valuable for those with heavy teaching loads or limited experience in applied funding contexts.

In addition, there is a timely opportunity to enhance institutional preparedness for participation in European research programmes. Departments may wish to initiate internal discussions on current challenges and opportunities, share successful practices, and explore the potential for joint or cross-disciplinary applications. These efforts would benefit from central coordination and workshops designed to build awareness, competence, and long-term strategic capacity about EU funding schemes.

7. Concluding Remarks

Based on the panel's review of documentation and interviews with representatives from the four academic units, it is evident that there are both strengths to build upon and areas where further development is possible. While the context and challenges may differ across units, several recurring themes emerged that merit broader attention.

Given the Swedish Government's growing emphasis on competitive research funding, it is both timely and important that academic units consider how best to position themselves for success in this evolving landscape. Although current participation in EU programmes remains limited in some areas, the university is well-placed to strengthen its engagement and build on its many existing strengths.

The themes identified in this review, ranging from doctoral education and internal collaboration to gender equity, institutional support, and funding preparedness, extend beyond the individual units examined. They are of relevance across the faculty and university

and addressing them coherently and strategically will support both academic excellence and long-term institutional sustainability.

Evaluated Unit's Name: ISY.ICG Information Coding

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division of Information Coding (ICG) shows a strong and evolving research profile in the field of information processing. Over the past fifteen years, its focus has moved from audio and video encoding and computer graphics to quantum information. In the past seven years, this has expanded to include experimental work in photonic quantum technologies and optoelectronics (led by Associate Professor Guilherme Xavier), theoretical quantum computing (Professor Jan-Åke Larsson), and information theory (Associate Professor Onur Günlü). Since 2024, two new areas, digital forensics (Shizhen Chang) and cybersecurity (Arunava Naha), have been added. Research on organic and printed electronics, led by emeritus Professor Robert Forchheimer in collaboration with the ITN department in Norrköping, also continues. The division's work spans several disciplines, including engineering, mathematics, physics, computer science, and materials science.

The team consists of a good balance of senior and younger researchers working on current and important topics. Their research has received recognition through grants from major national research programs such as WACQT, ELLIITT, and WASP. The three newer research leaders, Günlü, Chang, and Naha, spend most of their time on research, which supports strong scientific development. Dr. Günlü's early promotion to Associate Professor reflects his strong contributions and the rapid progress of his research group.

The Quantum Technologies Laboratory, led by Associate Professor Xavier, has recently achieved important results in basic quantum research, such as testing uncertainty principles and quantum entanglement. The group also works on practical technologies, including random number generation, control of light properties, and optical storage. The creation of a quantum communication link with Stockholm, supported by the EuroQCI project, is a clear example of applied impact and national relevance.

The division's research output is solid, with regular publications in journals and conference proceedings, which is typical for the field. With the support of new staff, doctoral students, and postdoctoral researchers, the amount of scientific work is expected to grow.

The division also contributes beyond the academic sphere. Professor Larsson and Dr. Johansson have founded a company, Phase Space Computing AB, based on earlier university work, which now provides educational kits in quantum information. This also includes a submitted patent. The newer research groups in cybersecurity and forensics are expected to have impact in important areas of public interest.

The division maintains strong links both within the university and with external partners. These include Sectra AB (co-founded by Professor Forchheimer, with active involvement by Dr. Johansson), RISE AB (on printed electronics and photon storage), and Ericsson AB (through the NQCIS project). These partnerships strengthen the practical value of the division's research.

Looking ahead, the division has a clear plan to support and grow the new research groups led by Naha, Chang, and Günlü. The aim is to build stronger collaboration between them and further raise the quality and relevance of the research. Regular discussions on funding and partnerships show that the division is taking a thoughtful and forward-looking approach. Overall, the division presents a strong and active research environment, with promising developments in both academic and applied directions. It is well-placed for continued success.

Recommendations

- The panel encourages the unit to further strengthen internal collaborations, especially with a view of integrating the junior faculty. Opportunities have already been identified in the topics of control techniques (Naha), and the transversal topic of machine learning.

- It is desirable to realize the potential of applied research leading to patents or commercial exploration, for example novel random number generators, low-loss programmable phase shifters, and quantum cryptography for video encryption.

- The practical expertise acquired in the EuroQCI deployment could be leveraged for participation in the next round of development of this infrastructure. The panel did understand, however, that the national co-funding requirements may jeopardize LiU's future participation in this.

- An initial collaboration effort that may pay off in the future is in the development of FPGA-enabled fast control of experimental setups, an interest shared by this unit and that of Prof. Jose Nunez-Yanez from the Division of Electrical and Computer Engineering (ISY.DA). Such fast reconfigurability is essential for quantum error correction and photonic quantum computation. It could be helpful to establish contacts with companies interested in real-time decoders for quantum error

correction (Riverlane, Q-CTRL) and photonic quantum computation (Quandela, Orca Computing, Xanadu, PsiQuantum).

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The division maintains a well-targeted publication strategy, with outputs disseminated through appropriate channels. Performance indicators are strong, with an above-average citation rate within LiU and a high proportion of publications in Q1 journals.

Collaboration with other LiU units, including in Norrköping, is active. However, wider departmental engagement, such as regular seminar participation and cross-unit interaction, could be further developed to enhance scholarly exchange.

Although the self-evaluation does not explicitly address equality, diversity, and inclusion (EDI), relevant efforts are evident. A recent workshop on “Women in Information Coding Theory,” organised by Associate Professor Onur Günlü, received positive feedback. Günlü also leads other EDI-related initiatives supported by ELLIIT, and Daniel Spegel-Lexne contributes through WACQT. The division also engages in outreach, including LiU’s annual Open Day.

Interviews with junior faculty and PhD candidates indicate a collegial and supportive environment. Doctoral students report strong supervisory support, opportunities to present at conferences, and involvement in research planning. They are treated as peers, with meaningful responsibilities, such as equipment procurement, providing valuable professional experience.

Some concerns were raised regarding the 90-credit course requirement for PhD students, which is viewed as excessive given the limited availability of relevant courses. Alternative formats, such as study groups or seminar participation, could be considered to address this.

Overall, the division offers a supportive and inclusive research environment, with strong opportunities for early-career development and a clear commitment to good research practice.

Recommendations

- Institutionalize regular seminars, peer discussion groups, and interdisciplinary workshops.

- Encourage and appropriately resource activities related to public engagement, and for equality, diversity and inclusion. ELLIIT may also be a source for further funding in this regard, and public engagement activities might be delivered through the Visualization Centre.

- Investigate moving to 60 course credits instead of 90 for PhD students. Encourage the possibility of obtaining course credits for regularly attending departmental seminars and colloquia. Develop a centralized, transparent platform for PhD course offerings, ideally with cross-faculty coordination.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The division benefits from solid research infrastructure and a stable funding base. However, the low success rates in national (VR) and EU funding calls were noted as a source of discouragement. The research groups led by Chang, Naha, and Günlü have access to the supercomputing resources necessary for their work. The Quantum Technologies Laboratory has secured key equipment through the EuroQCI initiative; moving forward, additional technical staff would be valuable to support lab operations and allow PhD students to focus more fully on research.

Challenges in recruitment were reported, particularly in attracting high-quality postdoctoral researchers. Some difficulty in recruiting PhD students was also noted. One early-career faculty member highlighted the difficulty of attracting high-profile speakers to events hosted in Linköping.

The centralization of IT services has reportedly reduced the quality and responsiveness of support. Specific issues include limited autonomy in updating research group websites and difficulty navigating the intranet. By contrast, support from the communications office, particularly for press releases and research dissemination, was described as effective and appreciated.

Finally, visa-related delays have occasionally hindered timely hiring of international researchers.

Recommendations

- To complement current sources of funding, look at expanding funding for more applied research, for example Vinnova for technological outputs of the Quantum Technologies Laboratory.

- Improve access and permissions so that the group can directly update their information on the website. Improve searchability for the intranet. (This is also mentioned under *General Observations.*)

- Improving LiU's profile online, and dissemination of results, could help in increasing outside recognition and prospects for attracting talent.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

This unit has a healthy mix of senior and junior faculty, with one associate professor hired in 2022 and two in 2024. These three young groups are well funded, including funding for postdocs and PhD students. Together with the increased activities of the Quantum Technologies lab, this has brought in a commendable renewal in research lines, as well as collaborations within LiU and beyond, with the prospect of even higher productivity in the future.

The research infrastructure needs of the unit seem to be well covered at present, with new hires that could help with lab maintenance as one of the main points raised by the unit. Some general difficulty with attracting talent was reported, besides other minor issues with some university services.

The panel praises the research environment fostered by the group, where the students feel supported, and can develop their autonomy, and similarly for junior faculty. One challenge, and opportunity, is the identification and strengthening of research topics that are common to different groups in the unit. Another challenge is increasing funding for more applied research, including the possibility of new patents and possibly start-ups.

Panel F Report –F4

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel F consisted of experts in computer engineering, quantum technologies, communication systems and networks, and microelectronics. The panel was composed of

- Erika Andersson (chair). Professor of Physics at Heriot-Watt University, Edinburgh, UK, with research background in quantum technology and quantum information science. Also serves as Associate Editor for Physical Review A.
- Ernesto Galvão. Leader of a group doing research in quantum computing, particularly using photonic systems, at the International Iberian Nanotechnology Laboratory (INL) in Braga, Portugal.
- Mikael Gidlund. Professor in Computer Engineering at Mid Sweden University, Sweden, with research background in wireless communication, security, and Internet-of-Things (IoT) for industrial applications.
- Jari Nurmi. Professor of Electrical Engineering at Tampere University, Finland, with research background in computer engineering, digital electronics, communication and positioning hardware.
- Susana Patón. Associate professor in the Electronics Technology Department at Universidad Carlos III de Madrid, Spain, with research background in analog and mixed-signal integrated circuits, data converters for communications and sensors, flexible microelectronics and integrated sensors for affective computing.

The panel was tasked with evaluating the research quality, research culture, and research conditions within each unit at Linköping University. The evaluation process included a thorough review of the submitted documentation, in-depth face-to-face meetings with researchers and PhD students, as well as a guided lab tour. The panel also considered strategic aspects such as collaboration, funding mechanisms, and institutional support structures.

The unit spans three main research areas: communication electronics, applied mathematics, and physical electronics/nanotechnology.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. Structural and Organisational Conditions for Research Engagement

A recurring concern across academic units is the considerable teaching commitment, particularly for early- and mid-career scholars. In some instances, teaching duties occupy the vast majority of academic time, leaving limited scope for sustained research activity or the development of competitive funding proposals.

In parallel, several groups report a low number of active doctoral students. A limited doctoral presence can affect the continuity of research, restrict academic renewal, and reduce the vitality of the research environment. There is, therefore, an opportunity to adopt a more strategic and long-term approach to doctoral recruitment and supervision. Encouraging greater interaction among PhD students from related groups may further enrich the academic community and foster a more cohesive research culture.

It would also be beneficial to ensure that expectations regarding the doctoral education process are clearly communicated and regularly discussed. It became apparent that many PhD students are only vaguely aware of the formal learning outcomes associated with their programme. Moreover, these outcomes are seldom followed up or explicitly addressed in conversations with supervisors. Strengthening the connection between the intended learning outcomes and ongoing supervisory discussions could help clarify expectations, support student development, and contribute positively to the quality and coherence of doctoral education. Information could also be more easily accessible regarding available PhD courses across departments, as well as administrative procedures, for example, those related to thesis submission.

2. Internal Collaboration and Interdisciplinary Exchange

There appears to be considerable potential to strengthen collaboration both within and between research units. While examples of informal cooperation and joint applications exist, structured mechanisms to promote interdisciplinary work remain limited. Encouraging greater interaction, particularly among groups with overlapping or complementary interests, would enrich the research environment and may foster new and innovative directions.

The current scarcity of regular academic seminars, interdisciplinary forums, and internal events further limits opportunities for intellectual exchange and collaboration. Such activities are vital for sustaining a dynamic academic culture, supporting doctoral education, and

building connections across research boundaries. In this context, the annual PhD student event organised at Campus Norrköping stands out as a highly valuable initiative, and so is the bi-annual workshop organized by ISY, which the evaluation panel learnt about only after the evaluation visit had taken place. This provides a dedicated platform for community-building, visibility, and engagement across research groups and is strongly encouraged to go forward. Such gatherings, featuring presentations, posters, and informal exchanges, could bring together a critical mass across themes and disciplines. Similarly, encouraging regular attendance at departmental seminars and talks would promote ongoing interaction and professional development among staff and students.

The panel suggests that joint supervision of PhD students across different research units could serve as an effective way to further enhance collaboration and interdisciplinary exchange. Such arrangements not only support high-quality doctoral training but also help raise mutual awareness among researchers, foster knowledge sharing, and contribute to a more vibrant and interconnected research environment. Encouraging joint supervision, particularly between groups with complementary expertise, may act as a catalyst for cross-unit dialogue, innovation, and shared research initiatives.

Further use of infrastructures such as the Visualization Centre for public engagement and outreach would also be beneficial. Activities of this kind may support recruitment and enhance societal visibility and collaboration with external partners, including those in industry.

3. Equity, Diversity, and Inclusion

Matters of equity, diversity, and inclusion (EDI) were not widely addressed in the self-evaluations submitted by the units. Nevertheless, the panel noted encouraging individual efforts, such as the Women in Information Coding Theory workshop recently organized by Dr Onur Günlü. Initiatives of this kind are commendable and serve as valuable examples of how targeted activities can raise awareness and promote inclusivity within specific research areas.

That said, the issue of gender imbalance, particularly the underrepresentation of women in engineering and technology disciplines, is a well-documented and persistent challenge across the sector. This is more evident at senior levels. Despite this, there was little evidence from either the documentation or the interviews of a coordinated or strategic institutional response to this imbalance. It remains unclear how departments or the university as a whole are working systematically to address gender disparities in recruitment, and particularly with regards to retention and career progression.

This presents an important opportunity for the university to take a more structured and proactive approach. Such a strategy could include inclusive recruitment practices, mentorship programmes for women and other underrepresented groups, clear targets and monitoring for equality and diversity, and initiatives supporting academic career development at all levels.

Importantly, these efforts should be integrated into broader institutional frameworks rather than left to individual initiative. To avoid backlash, it is essential to involve everyone in these activities and to communicate clearly that the aim is not to provide unfair advantages, but to promote equity and inclusion.

Institutional recognition and sustained support, both in terms of policy and resourcing, would signal a serious commitment to equity and diversity. In this regard, existing programmes such as ELLIIT may provide valuable support for the development and implementation of gender equity initiatives, as well as broader EDI work across the research environment.

One form of fostering equity, while also increasing research potential, would also be to support currently not research-active staff to get back on the research track. This can include decreased teaching load, co-supervising PhD students, and dedicated time and support to prepare new research proposals.

4. Institutional Support and Infrastructure

Several institutional support structures, though well-intentioned, appear to present practical challenges. The university's intranet is frequently described as difficult to navigate, making it harder for researchers and students to access essential information and services. To give an example, it could be made easier for researchers to update information regarding their research groups.

Likewise, the communications function is seen as largely reactive. While high-impact research receives deserved attention, other valuable contributions, especially those with regional, interdisciplinary, or applied relevance, often remain less visible. A more strategic and inclusive approach to research communication would enhance institutional visibility and support greater engagement with external stakeholders and funding bodies.

5. Supporting Early-Career Researchers

The panel sees a clear opportunity to further support early-career scholars through the provision of structured start-up packages. These should ideally include protected research time, modest seed funding, and the possibility to recruit one or two doctoral students or a postdoctoral researcher.

Such packages would enable new faculty members to establish a coherent research agenda early in their appointment and to participate fully in the academic life of their department. Without this support, many are quickly drawn into intensive teaching responsibilities, which may constrain their ability to build sustainable research programmes or compete effectively for external funding.

6. Capacity for External and European Research Funding

There appears to be untapped potential for several units to engage more actively with applied and industry-oriented funding opportunities, such as those offered by Vinnova. While this was not consistently raised by researchers themselves, the panel recognizes it as a promising avenue for increasing external engagement and broadening the funding portfolio. Realizing this potential, however, will require more tailored and proactive institutional support.

At present, support from the university's grants office for applications to applied or industry-related funding agencies is limited. Some units could benefit from more structured and strategic assistance in this area. The panel recommends that the university consider implementing dedicated proposal writing support, which might include access to professional grant writers or "ghostwriters" who can assist researchers in articulating competitive applications. This would be especially valuable for those with heavy teaching loads or limited experience in applied funding contexts.

In addition, there is a timely opportunity to enhance institutional preparedness for participation in European research programmes. Departments may wish to initiate internal discussions on current challenges and opportunities, share successful practices, and explore the potential for joint or cross-disciplinary applications. These efforts would benefit from central coordination and workshops designed to build awareness, competence, and long-term strategic capacity about EU funding schemes.

7. Concluding Remarks

Based on the panel's review of documentation and interviews with representatives from the four academic units, it is evident that there are both strengths to build upon and areas where further development is possible. While the context and challenges may differ across units, several recurring themes emerged that merit broader attention.

Given the Swedish Government's growing emphasis on competitive research funding, it is both timely and important that academic units consider how best to position themselves for success in this evolving landscape. Although current participation in EU programmes remains limited in some areas, the university is well-placed to strengthen its engagement and build on its many existing strengths.

The themes identified in this review, ranging from doctoral education and internal collaboration to gender equity, institutional support, and funding preparedness, extend beyond the individual units examined. They are of relevance across the faculty and university and addressing them coherently and strategically will support both academic excellence and long-term institutional sustainability.

Evaluated Unit's Name: ITN.FEM Physics, Electronics and Mathematics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The FEM unit generally produces good-quality publications, with 14% of articles among the top 10% most cited, indicating strong performance in parts of the unit. However, the field-normalized citation rate remains relatively low (0.9), suggesting a need to improve overall visibility and impact. Publication practices vary widely across research areas, making aggregated data hard to interpret. The current decentralized approach would benefit from a more structured publication strategy to increase focus, target top-tier venues, and strengthen external visibility.

The communication electronics group is active in cutting-edge areas such as IoT, edge computing, and intelligent surfaces. Its involvement in EU-funded projects demonstrates both relevance and international competitiveness. The group builds research gradually through strong industry ties and student projects, progressing to collaborative grants. However, there is notable thematic overlap with a larger, internationally renowned group at the Linköping campus, particularly in antenna systems (Massive MIMO for instance). This has led to a sense of internal competition, which may require strategic action. Strengthening collaboration with the Linköping group, while also developing a clearer and more distinct research niche, would support complementarity, reduce redundancy, and potentially increase competitiveness for national research funding.

The applied mathematics group works on practical and societally relevant problems such as radar signal processing, medical imaging, and inverse problems. Despite its creativity, the group faces inconsistent funding and a heavy teaching load, limiting research output and scalability.

The nanotechnology group, once strong in attracting international PhD students and researching environmental nanotech, has declined due to funding challenges and new regulations affecting international admissions. While its research topics remain relevant, low activity and isolation threaten its long-term viability.

Finally, the Visualization Center, affiliated with the department, could be a valuable platform for outreach and science communication. Its potential to engage the public and external stakeholders, and to support research dissemination, was not clearly highlighted during the panel interviews but deserves further attention.

Recommendations

- Actively explore collaboration with similar groups at Linköping but also work towards establishing a clearly defined and distinguishable niche.
- The nanotechnology group, in particular, should seek collaboration with other research environments within the university to reduce isolation and regain momentum.
- The communication electronics group should seek more internal collaboration with other research groups in Communication Systems, Computer Engineering (especially hardware-related areas), and the Integrated Circuit (IC) Design group. Additionally, potential collaboration with related research groups located in Norrköping should be explored. There is significant potential for mutually beneficial collaboration in these areas.
- Provide earmarked research time for senior staff in the applied mathematics group to enhance research output and competitiveness in funding; reducing teaching load would enable greater focus on high-impact publications and strategic grant applications.
- Develop a long-term strategy for recruiting and sustaining PhD students across all groups.
- Increase visibility of ongoing and societally relevant research, particularly to engage regional industry and funding bodies.
- Provide seed funding for high-potential, currently underfunded projects to stimulate new research directions.
- Explore and formalize the use of the Visualization Center as a platform for outreach and science communication. If utilized strategically, it could become a key asset for engaging the public, external partners, and showcasing the unit's research outcomes.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research culture within the FEM unit presents promising foundations, particularly in its commitment to education and societal engagement. At the same time, there are clear opportunities to foster a stronger sense of community, enhance visibility, and reinforce support structures.

The relatively low number of PhD students across many groups contributes to isolated research environments and limits opportunities for collaboration and academic exchange.

The annual PhD student event at Campus Norrköping stands out as an excellent initiative and serves as a model worth extending to other areas within the unit.

Addressing gender imbalance is another important priority. Currently, only 9% of the staff identify as women, underscoring the need for active measures to promote equal opportunities in recruitment, mentoring, and career development for junior researchers. Such efforts would enhance diversity, enrich research perspectives, and contribute to an inclusive academic culture.

Although PhD education within the unit is generally of high quality, course offerings are perceived as irregular and access to information about these courses is limited. Establishing a centralized and transparent platform for PhD courses, with cross-faculty coordination, would greatly benefit doctoral education and planning.

Additionally, enhancing clarity around PhD learning outcomes and expectations would help ensure alignment between supervision, training, and research goals. Promoting regular internal seminars, cross-group activities, and interdisciplinary workshops would also strengthen academic exchange and foster a more cohesive research culture.

Several groups, especially the communication electronics group, have maintained strong ties with industry, which the panel views as a significant asset. However, broader collaboration with external partners remains uneven. Actively pursuing partnerships with regional and national companies, including RISE (Research Institutes of Sweden) and the printed electronics activities in Norrköping, could unlock valuable opportunities for joint research initiatives and funding.

The panel also sees the innovation office and related support structures as important enablers of such collaboration. Strengthening these support functions could ease administrative burdens and help researchers engage more effectively with external partners.

Recommendations

- Develop a centralized, transparent platform for PhD course offerings, ideally with cross-faculty coordination.
- Clarify and communicate PhD learning outcomes and expectations, ensuring these are integrated into supervision and planning.
- Institutionalize regular seminars, peer discussion groups, and interdisciplinary workshops.
- Improve support for junior researchers by reducing teaching loads and offering structured mentoring and career development support.

- Implement competitive start-up packages for incoming junior researchers, including protected research time and initial funding.
- Evaluate and actively pursue strategic collaboration with RISE and printed electronics division to tap into complementary research areas, enable joint grant applications, as well as to strengthen scientific output and industrial engagement.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Internal collaboration within FEM remains limited, but an even greater opportunity lies in strengthening cooperation with related research groups at the Linköping campus. These collaborations, especially with thematically aligned units, could help consolidate critical mass, boost research visibility, and support joint funding applications. This should be a strategic priority alongside improving intra-unit integration.

The current organizational structure of FEM brings together disparate groups that lack strategic integration. Internal collaboration is minimal, and shared infrastructure, such as the EMC lab, is underutilized. There is untapped potential in encouraging more strategic planning and use of resources. Additionally, the introduction of postdoctoral researchers could help strengthen the link between PhD students and senior staff, contributing to a more cohesive research environment. Postdocs could also play a valuable role in supporting research efforts and easing the teaching burden currently carried by many staff members.

Based on the information provided in the self-assessment, external funding across the unit remains limited and requires significant strengthening. The unit currently lacks funding from major national sources such as the Swedish Research Council (VR) and the Swedish Foundation for Strategic Research (SSF), and participation in EU funding programs is minimal. A more coordinated and strategic approach is needed to improve competitiveness and secure funding from these key agencies.

Support functions require focused improvement across several dimensions. The university intranet is widely perceived as inefficient, making essential information difficult to locate. Communication services are seen as focused on high-profile publications, missing opportunities to promote impactful research with regional and industrial relevance. Additionally, internal administrative units such as innovation offices and outreach services could play a more strategic role in facilitating external engagement, supporting fundraising efforts, and opening doors to collaborations with regional and national companies, thus relieving researchers of some of the administrative burden.

- Reevaluate and potentially restructure the FEM unit to enhance strategic alignment and integration.
- Develop a targeted strategy to increase external funding, with specific focus on national agencies like VR and SSF, as well as broader participation in EU programs.
- Activate shared infrastructure through collaborative project planning and open access models.
- Improve institutional digital tools, particularly the intranet, to ensure they meet researchers' needs. This is also mentioned under *General Observations.*
- Encourage the communications office to take a more proactive and inclusive approach to promoting research, especially projects with societal or industrial relevance. This is also mentioned under *General Observations.*

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The FEM unit demonstrates important strengths, particularly in areas such as communication electronics and applied mathematics, and contributes meaningfully to both education and industry engagement. Existing structures, including the Visualization Center and involvement in EU collaborations, offer valuable opportunities to further enhance outreach, visibility, and societal impact.

At the same time, the unit faces ongoing challenges, including fragmented internal collaboration, a low number of PhD students, high teaching loads, and uneven funding, factors that can limit research depth and long-term competitiveness. Addressing these challenges through targeted actions, improved support structures, and strategic collaboration will be key to ensuring sustainable growth.

The nanotechnology area, although currently facing difficulties, remains highly relevant. The panel encourages proactive efforts to revive this research direction through interdisciplinary collaboration and targeted investment.

With focused leadership and sustained institutional backing, the FEM unit is well-positioned to evolve into a more cohesive, competitive, and visible research environment, one that is well-equipped to meet both scientific and societal challenges.

To support this development, the panel recommends:

- Strengthening PhD recruitment and cohort-building to ensure research continuity and renewal.

- Deepening collaboration with Linköping-based groups to consolidate expertise and enhance visibility.
- Developing a structured publication and outreach strategy, leveraging platforms like the Visualization Center for effective dissemination.
- Supporting early-career researchers through start-up funding, structured mentoring, and balanced teaching commitments.
- Strategically reinvigorating the nanotechnology group through interdisciplinary partnerships and investment.
- Enhancing institutional support for grant writing, communications, and industry engagement.
- Increasing collaboration with RISE and other strategic partners to unlock new opportunities for joint research and funding.

By building on these recommendations, the FEM unit can further strengthen its role as a key contributor to the university's research mission, while enhancing its relevance and impact both nationally and internationally.

Panel G Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of prof. dr. Bart De Moor (KU Leuven, chair), prof. dr. Sabeth Verpoorte (University Groningen), prof. dr. Erik Ström (Chalmers), prof. dr. Bo Egardt (Chalmers), prof. dr. Thomas Parisini (Imperial College London), prof. dr. Ales Leonardis (University Birmingham).

We conducted our interviews with 5 research units:

- Tu 01/04/2025: G1 IMT.MT Division of Biomedical Engineering
- Tu 01/04/2025: G2 ISY CVL Computer Vision Laboratory
- We 02/04/2025: G3 ISY FS Vehicular Systems
- We 02/04/2025: G4 ISY KS Communication Systems
- Th 03/04/2025: G5 ISY RT Automatic Control

For each evaluation unit, we interviewed staff in three shifts, namely representatives of professors and senior researchers, junior researchers and postdocs, and finally PhD students.

Supplementary to all the material provided beforehand (university slide decks, self-assessments, etc…), we were also provided with the slides of the individual research units, highlighting their research topics and per unit a limited 'wish list' of potential improvements, about which we asked additional questions during the in-person interactions.

After each of the 5 sessions, the panel held a discussion of about 1 hour to converge towards first conclusions, that have been elaborated on in more detail in the individual assessment reports of the respective units.

In addition, we have compiled a collection of general observations and recommendations, that can serve as additional reflection material, both for the university decision makers, and the leadership of the assessed research units.

We would like to thank, wholeheartedly, Vera Pichler, who provided the panel with professional support and was a real pleasure to work with.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel converged to a set of common and general concerns, suggestions and observations. In principle, all the remarks below apply to all the units assessed, however not always in the same degree, but they are somehow relevant to all of them. In the panel's opinion, they could be used for internal reflection by both the university leadership and the specific research units.

- **Longer-term strategic plans and ambition**
  - We were presented in a general briefing session with the longer-term strategic research plan of the university, also developing the societal domains in which the university wants to excel. However, this grand university vision was not really diffused into the presentations of the individual research units that were assessed. Their research activities and ambitions were seldomly positioned in the bigger picture as established in the general presentation.
  - Therefore, there seems to exist some 'disconnect' between the top-down strategy and the bottom-up aspirations.
  - Even within their individual presentations and within their own research domains, a sufficient level of ambition often seemed lacking in the units evaluated. In some cases, the ambitions did not go much further than 'business as usual', based on some successes in the past, and kind of lacking international positioning and self-assessment to reach for higher ambitions. As an illustration, there were very few aspirations noticeable to apply for ERC funding (as there have been few in the past). The point is that this type of funding provides large opportunities to do 'out-of-the-box' 'high-risk high-gain' research and requires the submitting candidates to position themselves in a world-wide (and not only 'local or national') setting.
  - Sometimes, the intended scope-of-action is too broad or unachievable in relation to the number of researchers in a certain unit. In those cases, it is necessary to re-focus the research objectives based on a strategic SWOT analysis (that goes much deeper and broader) than the SWOT analyses provided in the self-assessment).
  - Often, this relative lack of ambition is also reflected in the lack of longer-term publication strategies and technology-transfer plans (see below) and in missing of 'science and technology' watch to detect potentially impactful research topics in the longer term.
  - As a matter of self-reflection, the question could be asked*: "Are we more followers than leaders ?"*, and *"If we want to be leading, in what exactly ?"*, and *"What is the (international) level playing field ?"*

- This level of 'excellence thinking', should be more pervasively injected in all layers of the university, and should also be monitored over the years.
- In many cases, there is good interaction with Swedish industry, although there is very little critical reflection on where the research is positioned with respect to the state of the art in industry itself. As an illustration, some of the 'academic' demos shown for sure could not compete with what in general is already commercialized by companies. So, the question could be asked on how some of the research activities do push the level playing field in which industry is already active. Of course, the agenda for companies is clear: they get into direct contact with PhDs and postdocs as potential future employees (this is good), but how do the research units benefit from interaction with industry that is basically run in 'service-mode'?

- **Funding for basic research**
  - More structural funding from the central level, as a kind of stabilization/leverage for attracting call-based funding. In many cases, the number of 'permanent' people was rather small. This implies that, despite the presence of many opportunities for research in the fields that were assessed, the growth of the research units is restricted.
  - More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more 'insecure' times?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.
  - Although there seems to be a system in place for start-up funding of young promising researchers, its budgets seem rather small.

- **Better support and procedures for:**
  - Detecting suitable calls in the myriads of possibilities on the national and international level. If not yet in place, this could be organized via a regular newsletter from the research coordination office.
  - Better support and guidance for further professionalization in writing competitive project and program applications.
  - Better and more accessible legal support in those dimensions of R&D where it is needed, e.g. on the track of valorization and technology transfer.
  - Creating more transparency and direct lines of command in the governance of the university (where now there seem to be a lot of intermediate decision levels, where even for division heads the decision trajectories are not always clear).

- **Human Resource Management and career planning**
    - Several concerns were raised by the research units, about the insufficient interaction between the research unit and the hiring committees for academics. The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'in-crowd'-hiring and conflicts-of-interests in the whole process.
    - For several reasons (that have to do with national security, visa screening, etc…), international recruitments have recently become increasingly challenging because of the complexity and long duration of the required procedures. The university management should be aware of this, and act accordingly internally as well as externally (e.g. pressure on policy makers and administrations).
    - There seems to be a need for more transparency toward younger researchers (postdoc and later) and professional career guidance for them.
    - Obviously, there is a serious gender issue in the engineering units, making clear that current policy measures are insufficient. Probably some more drastic actions are needed here.
    - The panel also got the impression that recruitment favors the "home-team" of postdoctoral fellows who have obtained their PhD in or around Linkoping. This might be caused by the lack of sufficient long-term strategic vision and ambition (cfr. Supra). A remark that was made in our panel was: *"Those that do not fit in, are not here !"*
    - There were mixed signals about the requirement for PhD students to take up 90 credits for their PhD education program, which, compared to international standards, is high. This might also be correlated to the average PhD duration of 5 years, which is also relatively high compared to international averages, which seems a price to be paid for sometimes high teaching loads and a heavy PhD education program.
    - In the self-evaluation reports and in the interviews, the panel learned about many commendable 'best practice' initiatives at the unit level. Examples include training and supervision of PhD students, preparation and reviewing of research proposals, teaching and mentoring, stimulating attractivity to MSc students, etc. Initiatives could be taken to spread, share and disseminate such best practices across unit/division/faculty borders, not in a top-down modus, but in one of bottom-up.

- **Valorization and tech transfer**
    - The Swedish system where IPR belongs to the researcher him/her-self at first sight seems advantageous for the individual. In practice however, often, it is not.
        - Acquiring a patent, and (financially) maintaining it, is costly and sometimes (e.g. in the case of potential infringement), requires a lot

of time and effort, and the assistance of and costs for legal specialists.
        - Negotiating a license based on IPR is time-consuming, not straightforward, and goes beyond the capacity/competence of an individual.
        - Creating a spin-off company, e.g. writing and deploying a professional business plan, composing a team, identifying market traction and approaching potential investors, supersedes the competence of one individual, who at the same time should not neglect his/her academic duties.
    - So, while advantageous for the individual 'inventor' at first sight, it is clear that the Swedish academic system as a whole, and Linkoping University in particular, misses a lot of opportunities (spin-off ideas, patents, licenses, that remain dormant). One could look for inspiration to potential role-models of Technology Transfer Offices (TTO) that are high in the rankings of most innovative universities in the world in general, but maybe more relevant, in Europe. Some ingredients for success are:
        - Sharing the IPR with the (TTO of) university, so that in return many of the aforementioned efforts and support can be provided by the TTO.
        - The TTO in turn could also professionalize in terms of capacity and quality based on the incomes from the valorization and tech transfer activities.
        - Researchers active in technology transfer could also be incentivized financially through the benefits from the patent, license, spin-off, etc. Because of the support of a TTO, they can concentrate on their real duties as a university professor: being excellent in teaching and research (and therefore creating even more opportunities for valorization and technology transfer).
        - In some (rare) European cases, the university creates its own seed money fund, with as shareholders the TTO or university itself, but also external third parties (e.g. banks that can be convinced to invest in high-tech companies, provided the TTO has a demanding funnel procedure to only select the most promising ventures). Because of the quality of selection, this can also be an argument for other investors and venture capital to step in.
    - This requires a sustained long-term vision and strategic decisions (and modifications of the current laws when needed), because obviously the (financial) returns of this (new) system, will only be visible after 10 years or so.

- **Internal communication**
    - There seems to be a need for better internal communication on all kinds of issues (HRM, funding opportunities, seminars/calls, social events, etc.). If not yet in place, a regular and recurrent university-broad newsletter could/should be launched.

- Most research units maintain their own websites, as this seems more flexible than the ‘official’ ones from the university. It might be advisable to reconsider the university policy here, as indeed websites should be maintained at the level where this is the most efficient.
- The research units raised some concerns about the branding of the university as a whole, so as to reinforce the attractivity of Linkoping as an exciting place to apply for a position.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

This evaluation unit numbered 48 members in total as of Dec. 2023, with 43 dedicated academic staff (including 15 PI's, 12 PhD students, 8 adjunct senior lecturers, 1 adjunct lecturer), 3 technical and administrative staff, and 2 guest professors. The division is active in four distinct areas of research, namely *Biomedical Image Science*, *Biomedical Modelling and Informatics*, *Biomedical Optics*, and *Neuroengineering*. Research is interdisciplinary, with work in projects related to imaging the microcirculation in skin and in the brain, diffusion MRI, functional MRI, automated body composition analysis, deep learning-based analysis of radiology and digital pathology images, deep brain stimulation, navigation and monitoring in brain surgery, digital twins and systems biology, and hybrid approaches combining machine learning with multi-scale mechanistic models. According to the evaluation unit, multidisciplinarity teams including engineers, clinical and preclinical researchers and industrial partners are key for success. (Inter)national networks and collaborations are also essential. The societal impact of group research is assured by selecting research questions that are relevant for large segments of society.

The evaluation unit was established in 1972 (before LiU was officially founded in 1975) and was the first biomedical engineering institute in Sweden. In this sense, the evaluation unit has a strong historical legacy.

Relevance and novelty

This division has 15 PI's as mentioned above, who are divided over 11 research teams. This statistic indicates that academic activities are fragmented, spread over a wide selection of research topics. The panel's perception of the situation is that maintaining a certain critical mass and continuity in all the different topic areas has been difficult. Some research projects are quite mature (e.g. the development of the scanner for probing microcirculation, done with Perimed, a company started over 40 years ago as a collaboration between MT researchers and private investors), others are newer (e.g. digital twins). While all the work is relevant from the perspective of patient care, research novelty was not always clear. The panel recommends consolidation of research efforts, both in terms of research topics and research groups. Merging research into fewer and larger research groups is a suggestion from

the evaluation unit itself (Section 1.1, self-evaluation report). The panel strongly supports this suggestion, as the unit needs a boost with respect to achieving international competitiveness (as the unit itself acknowledges).

Some positive observations include the above-mentioned microcirculation scanner, and new developments in the areas of digital twins and systems biology. Both the latter areas are trending in biomedical engineering, and so the panel would have liked to hear more about which niches the unit could carve out for themselves with an aim to become leaders on the global stage. Some thought should be given to this.

The panel observes that the needs and interests of the medical faculty strongly influence the research done within the evaluation unit. One can expect there to be significant collaboration between the unit and (pre)clinicians, and indeed this is the case. Many of the publications include authors from the local medical ecosystem. However, research lines in the unit may suffer in the long run if too much inspiration is drawn from medical questions originating mostly from medical professionals. The evaluation unit should ensure a healthy balance between a tendency to do service work for the medical faculty and establishing own research lines. The panel notes that research consolidation as mentioned above would help the unit also establish and maintain a strategy with respect strengthening own research lines to reposition collaboration with the medical faculty.

Quality of the research output

The field-normalized citation rate for journals is 1.0, which is under the LiU average of 1.1, and the Faculty of Science and Engineering average (1.4). The field-normalized citation rate for conference papers in 1.2, which again is below the LiU average of 1.8, and the faculty average of 1.9. The unit recognizes that there is room for improvement with respect to these statistics. One of their stated goals is to improve the impact of MT's publications by increasing the fraction appearing in Q1 journals, and publishing more per PI per year.

As stated above, there are research lines that are now subcritical with respect to publication, both in terms of numbers of papers published and the potential impact of the publication venues. Twelve PhD students have defended over the past 5 years, which is not many given that there are 15 PI's. The quality of the research output would thus benefit from an increased number of PhD thesis defenses per year, which in turn would benefit from increased funding for PhD students. It is crucial that the unit select which areas of research should remain active, and that efforts to fund these are increased.

Research impact outside academia

The division is benefiting from the advances made in instrumentation for monitoring microcirculation, which is now approaching the market. As this instrumentation enters the market, the division will fulfill the expectation that it, as a biomedical engineering division, should be pursuing research that yields new tools for the medical field. Other

instrumentation, namely for neuroengineering, are being developed directly with surgeons – a second success story with respect to societal impact.

Strategies, priorities and future research plans

Section 1.1 of the self-evaluation sets out a 9-point action plan for the evaluation unit. This plan recognizes that the current research performance needs to be improved and provides a number of good ideas to set out a new path to do so. The panel applauds this initiative.

The panel recognizes that the implementation of this 9-point plan within the unit will not be easy. First, consolidation of smaller groups to form larger ones is generally a very delicate process, as some researchers will be asked to share resources they consider their own with researchers who have fewer resources. It is also imperative that researchers do not lose their research identity when lines are merged. The panel recommends that the unit's management is actively supported in this consolidation process by the Dean of the faculty.

While proximity with the medical faculty is important, the panel observes that the unit is quite isolated from the rest of the faculty. It would be beneficial to have unit scientists be closer to colleagues at the *Department of Electrical Engineering* and *Department of Computer Information and Science*, with whom good collaborations exist and importantly, continue to be developed. There are also collaborative opportunities to be explored with scientists in the *Department of Physics, Chemistry and Biology*. The panel recommends that the unit be relocated to the main campus for the Faculty of Science and Engineering. Alternatively, the unit should be joined by other biomedical engineering researchers/divisions to form a biomedical engineering department having a size similar to other departments in the faculty.

Recommendations

The panel recommends consolidation of research efforts, both in terms of research topics and research groups. Merging research into fewer and larger research groups is a suggestion from the evaluation unit itself (Section 1.1, self-evaluation report). The panel strongly supports this suggestion, as the unit needs a boost with respect to achieving international competitiveness (as the unit itself acknowledges).

The quality of the research output would also benefit from an increased number of PhD thesis defenses per year, which in turn would benefit from increased funding for PhD students. It is crucial that the unit select which areas of research should remain active, and that efforts to fund these are increased.

The evaluation unit is working in areas which are trending in biomedical engineering (e.g. digital twins). The panel would have liked to hear more about which niches the unit could

carve out for themselves in new areas such as this, with an aim to become leaders on the global stage. Some thought should be given to this (as alluded to just above).

The evaluation unit should maintain a healthy balance between collaborations with the medical faculty and establishment of own research lines. The panel notes that research consolidation within IMT would help the unit to reposition its collaborations with the medical faculty.

The panel applauds the evaluation unit's proposed initiative to implement a nine-point plan to breathe some new energy into the unit. It will not be easy to merge small groups into larger ones, however, without having individual researchers feeling that their independence is being compromised. The panel recommends that this unit receive some support from upper management for this change.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategy: has been discussed above.

Recruitment

Most of the staff members appear to have trained in Linköping or elsewhere in Sweden. Clearly the education they have had is excellent, and several if not all members have benefited from international positions (e.g. postdoctoral fellowships). However, the evaluation unit could benefit from an increase in diversity through attraction of international staff. The panel encourages increased international recruitment.

Opportunities for early-career researchers to develop their originality and independence

There was no indication that the PhD students were limited in what they could undertake within their PhD programs. The students are quite autonomous, and have received the room to develop their research skills. Conference attendance is possible.

The four students with whom the panel spoke appeared to understand the career options they had. Two of the students envision going abroad for a postdoc, two see themselves in industry after their thesis defense.

Overall, the PhD students that the panel spoke with were not unhappy per se with the situation. They did note that they felt a lack of internal collaboration between PI's in the division, and found this unfortunate. The PhD students felt that more internal interaction

would benefit the group as a whole, and themselves as well. As it is, the students also note the aforementioned lack of productivity with respect to publications.

Quality of the PhD training

Nothing of note in this regard. The PhD students follow a program of courses, including transferable skills. Anders Eklund, senior staff member, is responsible for PhD training, and as such talks to each student each year to assess progress and potential issues. This system seems to work well. The panel, however, noted the small number of PhD students over the past 5 years (12 defended). Such a small number of students may adversely affect the consistency of the PhD training.

Academic as well as non-academic networks and collaborations

External collaborations with colleagues in other departments at Linköping exist and appear to work well. There are a significant number of shared publications. Many of the collaborations appear to be with the Faculty of Medical Sciences. As discussed above, the panel believes it would benefit the evaluation unit to establish a strategy which results in less dependence on the medical collaborators for shared research, and stronger research lines in their own right.

Equal opportunities and gender equality

The gender balance in this division is not too bad, relatively speaking, with 29 % of the staff and PhD students being female. The panel did not note any negativity with respect to female staff. This does not mean, however, that the evaluation unit should be complacent about gender balance, as there is certainly room for improvement.

Good research practice

PhD students are offered a mandatory scientific ethics course in their education program. Management is committed to acting appropriately when dealing with data and when discussing science generally.

Certainly this is a topic that becomes more relevant in a research environment where members of research teams actively interact with each other, and with others, on a daily basis. The panel experienced a somewhat placid research environment in this evaluation unit, with individuals operating often on their own. Consolidation of research groups and research lines would have a positive influence with respect to changing this.

Research in relation to teaching

Members of this division all teach in some way or another. However, the average amount of time spent on teaching is 12%, most of which is done within the technical faculty as smaller courses in mostly MSc programs. The panel feels that a stronger presence in teaching would help with visibility in the BME program and ultimately in recruitment of good PhD students. It would also provide a higher level of funding for the division.

Recommendations

The panel encourages increased international recruitment for this evaluation unit, particularly with respect to early stage researchers (PhD students, postdocs). Recruitment strategy should also focus on improvement of the gender balance, if at all possible.

An increased presence in biomedical teaching programs would be beneficial for the visibility of unit researchers among BSc and MSc students, and may ultimately improve diversity within the unit.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Organization

The evaluation unit is quite well organized with respect to management and working conditions are good, it seems. The issue with respect to generating high-quality research is more related to the fragmented research lines discussed above.

Staffing

There appears to be a good mix between senior and junior staff, with most junior staff recruited at the postdoctoral fellow stage if they obtain personal funding. Again, the panel experienced a pleasant and friendly atmosphere in their visit to this evaluation unit, and in the interviews with staff at all levels, but would have liked to see a bit more energy and ambition in discussions about research. The panel also recommends a larger degree of diversity in terms of internationality and gender.

The number of PhD students per supervisors is an issue, in that there are generally not enough PhD students per PI. This has been discussed above.

Funding

The evaluation unit does obtain external Swedish funding for projects, but not enough to be able to attract more PhD students to the various research lines. Funding is a fundamental issue for this group. The panel encourages the 15 PI's to free up more time for writing grant proposals, and looking further afield to the EU / ERC for funding.

Research infrastructure

This does not seem to be a big issue for the most part. However, there is a large dependence for MRI instrumentation at other facilities, for which access is limited by available funding and group size.

Support functions

The MT unit has several concerns with respect to the present support its members receive from LiU.

- MT is heavily dependent on external funding from both national and international sources. There is a LiU Grants and Programme office to support researchers in writing and preparation of EU grant proposals. However, such support for the preparation of proposals for national funding agencies would also be of great assistance in the very competitive Swedish funding landscape. Being able to rely on a funding officer or similar function for timely notification of calls for proposals in both national and EU programmes would also be extremely valuable for funding strategy.
- Economic assistance (financial control) is available centrally for MT, and is crucial for producing financial summaries for funding agencies of externally funded projects. However, the centralization of this service has meant less accessibility and personal interaction with economic support staff. MT researchers would much prefer a designated economist (e.g. business manager) within the MT unit, as was the case in the past.
- Biomedical engineering research often involves testing of new techniques and technologies in a clinical environment. These clinical studies now require medical device regulation (MDR) certification, which is tedious and time-consuming to organize. Rather than delegating this to the individual research groups involved, MT asks that this be administrated by a central office for MT and other groups.
- LiU has a central communication office for providing news items on the latest achievements of LiU researchers. However, they do not have the capacity or scientific expertise to do this on a more local level. MT has thus taken some local initiatives by e.g. setting up a LinkedIn account to disseminate news items However, this does take time, especially given the necessity of building up an own group of followers. MT researchers would appreciate being able to take better advantage of centralized communication possibilities and networks.

Recommendations

Focus on funding in the coming 5 years, whether it is national or international.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Nothing to add

Panel G Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of prof. dr. Bart De Moor (KU Leuven, chair), prof. dr. Sabeth Verpoorte (University Groningen), prof. dr. Erik Ström (Chalmers), prof. dr. Bo Egardt (Chalmers), prof. dr. Thomas Parisini (Imperial College London), prof. dr. Ales Leonardis (University Birmingham).

We conducted our interviews with 5 research units:

- Tu 01/04/2025: G1 IMT.MT Division of Biomedical Engineering
- Tu 01/04/2025: G2 ISY CVL Computer Vision Laboratory
- We 02/04/2025: G3 ISY FS Vehicular Systems
- We 02/04/2025: G4 ISY KS Communication Systems
- Th 03/04/2025: G5 ISY RT Automatic Control

For each evaluation unit, we interviewed staff in three shifts, namely representatives of professors and senior researchers, junior researchers and postdocs, and finally PhD students.

Supplementary to all the material provided beforehand (university slide decks, self-assessments, etc…), we were also provided with the slides of the individual research units, highlighting their research topics and per unit a limited 'wish list' of potential improvements, about which we asked additional questions during the in-person interactions.

After each of the 5 sessions, the panel held a discussion of about 1 hour to converge towards first conclusions, that have been elaborated on in more detail in the individual assessment reports of the respective units.

In addition, we have compiled a collection of general observations and recommendations, that can serve as additional reflection material, both for the university decision makers, and the leadership of the assessed research units.

We would like to thank, wholeheartedly, Vera Pichler, who provided the panel with professional support and was a real pleasure to work with.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel converged to a set of common and general concerns, suggestions and observations. In principle, all the remarks below apply to all the units assessed, however not always in the same degree, but they are somehow relevant to all of them. In the panel's opinion, they could be used for internal reflection by both the university leadership and the specific research units.

- **Longer-term strategic plans and ambition**
    - We were presented in a general briefing session with the longer-term strategic research plan of the university, also developing the societal domains in which the university wants to excel. However, this grand university vision was not really diffused into the presentations of the individual research units that were assessed. Their research activities and ambitions were seldomly positioned in the bigger picture as established in the general presentation.
    - Therefore, there seems to exist some 'disconnect' between the top-down strategy and the bottom-up aspirations.
    - Even within their individual presentations and within their own research domains, a sufficient level of ambition often seemed lacking in the units evaluated. In some cases, the ambitions did not go much further than 'business as usual', based on some successes in the past, and kind of lacking international positioning and self-assessment to reach for higher ambitions. As an illustration, there were very few aspirations noticeable to apply for ERC funding (as there have been few in the past). The point is that this type of funding provides large opportunities to do 'out-of-the-box' 'high-risk high-gain' research and requires the submitting candidates to position themselves in a world-wide (and not only 'local or national') setting.
    - Sometimes, the intended scope-of-action is too broad or unachievable in relation to the number of researchers in a certain unit. In those cases, it is necessary to re-focus the research objectives based on a strategic SWOT analysis (that goes much deeper and broader) than the SWOT analyses provided in the self-assessment).
    - Often, this relative lack of ambition is also reflected in the lack of longer-term publication strategies and technology-transfer plans (see below) and in missing of 'science and technology' watch to detect potentially impactful research topics in the longer term.

- As a matter of self-reflection, the question could be asked*: "Are we more followers than leaders ?"*, and *"If we want to be leading, in what exactly ?"*, and *"What is the (international) level playing field ?"*.
- This level of 'excellence thinking', should be more pervasively injected in all layers of the university, and should also be monitored over the years.
- In many cases, there is good interaction with Swedish industry, although there is very little critical reflection on where the research is positioned with respect to the state of the art in industry itself. As an illustration, some of the 'academic' demos shown for sure could not compete with what in general is already commercialized by companies. So, the question could be asked on how some of the research activities do push the level playing field in which industry is already active. Of course, the agenda for companies is clear: they get into direct contact with PhDs and postdocs as potential future employees (this is good), but how do the research units benefit from interaction with industry that is basically run in 'service-mode'?

- **Funding for basic research**
  - More structural funding from the central level, as a kind of stabilization/leverage for attracting call-based funding. In many cases, the number of 'permanent' people was rather small. This implies that, despite the presence of many opportunities for research in the fields that were assessed, the growth of the research units is restricted.
  - More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more 'insecure' times ?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.
  - Although there seems to be a system in place for start-up funding of young promising researchers, its budgets seem rather small.

- **Better support and procedures for:**
  - Detecting suitable calls in the myriads of possibilities on the national and international level. If not yet in place, this could be organized via a regular newsletter from the research coordination office.
  - Better support and guidance for further professionalization in writing competitive project and program applications.
  - Better and more accessible legal support in those dimensions of R&D where it is needed, e.g. on the track of valorization and technology transfer.
  - Creating more transparency and direct lines of command in the governance of the university (where now there seem to be a lot of intermediate decision levels, where even for division heads the decision trajectories are not always clear).

- **Human Resource Management and career planning**
    - Several concerns were raised by the research units, about the insufficient interaction between the research unit and the hiring committees for academics. The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'incrowd'-hiring and avoid conflicts-of-interests in the whole process.
    - For several reasons (that have to do with national security, visa screening, etc…), international recruitments have recently become increasingly challenging because of the complexity and long duration of the required procedures. The university management should be aware of this, and act accordingly internally as well as externally (e.g. pressure on policy makers and administrations).
    - There seems to be a need for more transparency toward younger researchers (postdoc and later) and professional career guidance for them.
    - Obviously, there is a serious gender issue in the engineering units, making clear that current policy measures are insufficient. Probably some more drastic actions are needed here.
    - The panel also got the impression that recruitment favors the "home-team" of postdoctoral fellows who have obtained their PhD in or around Linkoping. This might be caused by the lack of sufficient long-term strategic vision and ambition (cfr. Supra). A remark that was made in our panel was: *"Those that do not fit in, are not here !"*
    - There were mixed signals about the requirement for PhD students to take up 90 credits for their PhD education program, which, compared to international standards, is high. This might also be correlated to the average PhD duration of 5 years, which is also relatively high compared to international averages, which seems a price to be paid for sometimes high teaching loads and a heavy PhD education program.
    - In the self-evaluation reports and in the interviews, the panel learnt about many commendable 'best practice' initiatives at the unit level. Examples include training and supervision of PhD students, preparation and reviewing of research proposals, teaching and mentoring, stimulating attractivity to MSc students, etc. Initiatives could be taken to spread, share and disseminate such best practices across unit/division/faculty borders, not in a top-down modus, but in one of bottom-up.

- **Valorization and tech transfer**
    - The Swedish system where IPR belongs to the researcher him/her-self at first sight seems advantageous for the individual. In practice however, often, it is not.

        - Acquiring a patent, and (financially) maintaining it, is costly and sometimes (e.g. in the case of potential infringement), requires a lot of time and effort, and the assistance of and costs for legal specialists.
        - Negotiating a license based on IPR, is time-consuming, not straightforward, and goes beyond the capacity/competence of an individual.
        - Creating a spin-off company, e.g. writing and deploying a professional business plan, composing a team, identifying market traction and approaching potential investors, supersedes the competence of one individual, who at the same time should not neglect his/her academic duties.
    - So, while advantageous for the individual 'inventor' at first sight, it is clear that the Swedish academic system as a whole, and Linkoping university in particular, misses a lot of opportunities (spin-off ideas, patents, licenses, that remain dormant). One could look for inspiration to potential role-models of Technology Transfer Offices (TTO) that are high in the rankings of most innovative universities in the world in general, but maybe more relevant, in Europe. Some ingredients for success are:
        - Sharing the IPR with the (TTO of) university, so that in return many of the aforementioned efforts and support can be provided by the TTO.
        - The TTO in turn could also professionalize in terms of capacity and quality based on the incomes from the valorization and tech transfer activities.
        - Researchers active in technology transfer could also be incentivized financially through the benefits from the patent, license, spin-off, etc. Because of the support of a TTO, they can concentrate on their real duties as a university professor: being excellent in teaching and research (and therefore creating even more opportunities for valorization and technology transfer).
        - In some (rare) European cases, the university creates its own seed money fund, with as shareholders the TTO or university itself, but also external third parties (e.g. banks that can be convinced to invest in high-tech companies, provided the TTO has a demanding funnel procedure to only select the most promising ventures). Because of the quality of selection, this can also be an argument for other investors and venture capital to step in.
    - This requires a sustained long-term vision and strategic decisions (and modifications of the current laws when needed), because obviously the (financial) returns of this (new) system, will only be visible after 10 years or so.

- **Internal communication**
    - There seems to be a need for better internal communication on all kinds of issues (HRM, funding opportunities, seminars/calls, social events, etc.). If

not yet in place, a regular and recurrent university-broad newsletter could/should be launched.

- Most research units maintain their own websites, as this seems more flexible than the 'official' ones from the university. It might be advisable to reconsider the university policy here, as indeed websites should be maintained at the level where this is the most efficient.
- The research units raised some concerns about the branding of the university as a whole, so as to reinforce the attractivity of Linkoping as an exciting place to apply for a position.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Relevance and novelty of the research topics covered by the evaluation unit

The CVL evaluation unit covers the research area of computer vision, primarily within the framework of machine learning. The main research topics include 3D geometry, 3D motion, remote sensing, visual learning theory, and visual perception. This division of topics also reflects the organizational structure of the unit. These research topics are relevant and subject to intensive research worldwide, both in academia and industry. The CVL unit is at the forefront of computer vision research with its development of novel computer vision approaches within state-of-the-art machine learning frameworks, both in terms of theoretical and applied aspects. The relevance and novelty of the research are demonstrated in various ways. The CVL unit is part of the excellence centre ELLIIT, the research program WASP, the innovation hub Visual Sweden, and the LiU profile area VDF. CVL has also been recognized by Vinnova as the second strongest AI environment in Sweden. The members of the CVL evaluation unit have been awarded several best paper awards, the best Nordic Thesis prize, and have won several professional computer vision challenges. Also notable are keynotes given at various international conferences and workshops, professional organization activities, and memberships in professional societies. Three of the CVL members are also on the organizing committee of ECCV 2026, the main European computer vision conference.

Quality of the research output

The direct research outputs of the CVL evaluation unit include top-tier publications (including CVPR, ICCV, ECCV, IEEE TPAMI, IEEE TIP) and 12 PhD theses (2018-2023), which also reflect the high-quality performance, productivity, and standing of the unit. The quality and impact are also evidenced by the number of citations and invitations to give keynotes and be part of organizing committees of respective professional events.

Impact outside academia

CVL's high impact outside academia is evidenced by industrial and societal engagements. The CVL unit has several projects with external commercial entities, including IKEA, Daimler, Scania, SAAB (multiple industrial PhDs), Husqvarna, and SICK (MoU, adjunct professor affiliated with CVL in the 3D geometry team). CVL unit members are also involved in various consultancies. CVL is also engaged in work with startups such as Smart Agritech Solutions and Deep Forestry.

In terms of societal impact, the CVL evaluation unit has a long list of societal outreach activities, including work with the Swedish police, law enforcement through "Digital Forensics Sweden," and public engagement events such as "Pint of Science."

Strategies, priorities and future research plans

Future research plans are appropriate and ambitious, targeting important research questions such as how to combine mechanistic modelling and data-driven approaches to achieve more interpretable, less data-hungry, and more energy-efficient processing. The research direction to tackle important interdisciplinary questions related to biology and material science is also commendable.

Recommendations

The CVL evaluation unit is productive in terms of research outputs and well-connected with national and international partners, industry, and the public sector. It may be further beneficial for CVL to get more involved in EU projects (with some additional institutional support) and especially ERC projects.

While the strategic future plans of the CVL align well with some of the University's strategic priorities (e.g., research related to material science), both the CVL unit and the University could benefit from more structured bottom-up and top-down alignment mechanisms in terms of strategic research directions.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategy

The CVL evaluation unit has a well-established publication strategy, which follows the global trend in computer vision (CV) and machine learning (ML) of aiming to publish in top-tier conferences and journals. For CVL specifically, this includes top-tier conferences such as CVPR, ICCV, ECCV (74%) and top journals (22%). This strategy ensures the fast dissemination of results. Some extended versions are then published in top journals such as IEEE TPAMI and IEEE TIP for archival purposes. This strategy has resulted in significant impact, as evidenced by citations. Also commendable is the decision to increase the proportion of open-access publications.

Recruitment, Opportunities for early-career researchers to develop their originality and independence - with Recommendations

Recruitment of the CVL staff (teachers) is largely constrained and steered at the faculty and university levels. The current structure (in terms of different professorship levels) of the CVL unit is adequate; however, considering the worldwide growth in the research areas covered by the CVL evaluation unit, additional hires for early-career researcher positions would further strengthen the existing group.

The internal structure of the CVL unit into sub-groups (3D geometry, 3D motion, remote sensing, visual learning theory, and visual perception) reflects the intention to enable early-career researchers (through guidance and mentoring) to develop their own original research and independence. One important aspect is that the assistant professors should be able to obtain docent qualifications as soon as possible, which would then enable them to be primary (leading) supervisors of their PhD students, rather than having the role of co-supervisors in cases where they are de facto the leading supervisors. Further recommendations include a start-up package for newly hired assistant/associate professors and a more formalized pathway towards their promotion.

The recruitment of PhD students follows established procedures; however, especially with international students, the CVL unit would need additional support as the processes, first with visas and later with individual financial arrangements, often take too long, jeopardizing the loss of talent and reputation.

Quality of the PhD training – with Recommendations

In the evaluation period, 12 PhD students completed their studies at the CVL unit. Their quality is also evidenced by the jobs they secured after graduation (five at Apple, two at Maxar, and five at startups and small Swedish companies).

The PhD students are generally well mentored; however, in our conversations with them and their supervisors, a few areas of potential improvement have been identified. The current number of mandatory courses (90 credits) might be excessive, and a potential reduction to 60 credits may enable students to focus more on their research. These courses could also come from a larger pool of options, and a list of all potential PhD courses should be known at the start of their studies. While the students have expressed satisfaction with the mentoring provided, the process could further benefit from a more structured approach and clear requirements leading to the completion of their studies.

Academic as well as non-academic networks and collaborations

The CVL unit has an excellent number of academic and non-academic networks and collaborations (e.g., other divisions, other departments at the University of Linköping, other universities in Sweden, universities outside Sweden, research institutions, public bodies, etc.).

Equal opportunities and gender equality - with Recommendations

The CVL unit is well aware that the gender balance is not at the desirable level, and efforts are underway to organize events where underrepresented groups could be better exposed to the exciting research in the areas of computer vision and machine learning. This would hopefully result in a larger number of applicants and graduates at the undergraduate and graduate levels, thereby also enhancing the potential for a better gender balance at the professorial levels.

Good research practice

The CVL unit follows good research practices, including seminar series, reading groups, tutorials on professional skills, and cross-unit internal reviewing of paper and project proposal submissions.

Research in relation to teaching

The CVL unit teaches 14 undergraduate courses, half of them being fundamental and the other half more advanced. Especially the advanced courses are constantly updated with the most recent developments in the research field. Also commendable is the broader impact that the CVL teachers have in several engineering programs by being responsible for some educational profiles related to the CVL domain of expertise.

Recommendations

Please see above; sections *Recruitment, Opportunities for early-career researchers to develop their originality and independence; Quality of the PhD training; Equal opportunities and gender equality.*

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The *Organization; Staffing – with Recommendations*

The CVL evaluation unit comprises 37 people (+2 joining in summer). Among these, there are two professors, two associate professors, three assistant professors, two postdocs, two research engineers, 18 PhD students, and several adjuncts. The division into subgroups is sensible and consistent with the overall objectives. A clear strategic growth pipeline for bringing in more junior professors (with a good gender balance) would further strengthen the group. More staff members would also enable possible alternations, thereby facilitating sabbaticals.

Funding - with Recommendations

The funding of the CVL evaluation unit shows a healthy, stable portfolio of various funding sources, including the Wallenberg Foundation, the Swedish Research Council, the Swedish Agency for Innovation Systems, EU projects, etc.

From the point of view of better, stable, and more predictable planning of research activities based on financial situation predictions, the CVL unit strives for more permanent funding (currently less than one senior salary) and a more transparent system of the LiU internal redistribution of funding for education and research.

Research infrastructure - with Recommendation

The research infrastructure is adequate for the research activities performed; however, the CVL evaluation unit would benefit from the recruitment and funding of research engineers with the special competencies needed to run and maintain all CVL resources.

Support functions - with Recommendations

The administrative support at the division council is generally commendable; however, the administrative support at higher levels of the university could be improved. In particular, the CVL unit would benefit from better legal support, scaled-up technical support staff at the unit to support both research and education, more efficient and flexible support by IT to facilitate CVL dissemination activities, and support for international researchers and PhD students coming to Sweden (e.g., to prevent delayed salary payments, erroneous information about insurance status, etc.).

Recommendations

Please see above; sections *Organization; Staffing; Funding; Research infrastructure; Support functions.*

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Nothing to add

Panel G Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

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    - Even within their individual presentations and within their own research domains, a sufficient level of ambition often seemed lacking in the units evaluated. In some cases, the ambitions did not go much further than 'business as usual', based on some successes in the past, and kind of lacking international positioning and self-assessment to reach for higher ambitions. As an illustration, there were very few aspirations noticeable to apply for ERC funding (as there have been few in the past). The point is that this type of funding provides large opportunities to do 'out-of-the-box' 'high-risk high-gain' research and requires the submitting candidates to position themselves in a world-wide (and not only 'local or national') setting.
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    - Often, this relative lack of ambition is also reflected in the lack of longer-term publication strategies and technology-transfer plans (see below) and in missing of 'science and technology' watch to detect potentially impactful research topics in the longer term.

- As a matter of self-reflection, the question could be asked*: "Are we more followers than leaders ?"*, and *"If we want to be leading, in what exactly ?"*, and *"What is the (international) level playing field ?"*.
- This level of 'excellence thinking', should be more pervasively injected in all layers of the university, and should also be monitored over the years.
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- **Funding for basic research**
  - More structural funding from the central level, as a kind of stabilization/leverage for attracting call-based funding. In many cases, the number of 'permanent' people was rather small. This implies that, despite the presence of many opportunities for research in the fields that were assessed, the growth of the research units is restricted.
  - More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more 'insecure' times ?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.
  - Although there seems to be a system in place for start-up funding of young promising researchers, its budgets seem rather small.

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  - Creating more transparency and direct lines of command in the governance of the university (where now there seem to be a lot of intermediate decision levels, where even for division heads the decision trajectories are not always clear).

- **Human Resource Management and career planning**
    - Several concerns were raised by the research units, about the insufficient interaction between the research unit and the hiring committees for academics. The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'incrowd'-hiring and avoid conflicts-of-interests in the whole process.
    - For several reasons (that have to do with national security, visa screening, etc…), international recruitments have recently become increasingly challenging because of the complexity and long duration of the required procedures. The university management should be aware of this, and act accordingly internally as well as externally (e.g. pressure on policy makers and administrations).
    - There seems to be a need for more transparency toward younger researchers (postdoc and later) and professional career guidance for them.
    - Obviously, there is a serious gender issue in the engineering units, making clear that current policy measures are insufficient. Probably some more drastic actions are needed here.
    - The panel also got the impression that recruitment favors the "home-team" of postdoctoral fellows who have obtained their PhD in or around Linkoping. This might be caused by the lack of sufficient long-term strategic vision and ambition (cfr. Supra). A remark that was made in our panel was: *"Those that do not fit in, are not here !"*
    - There were mixed signals about the requirement for PhD students to take up 90 credits for their PhD education program, which, compared to international standards, is high. This might also be correlated to the average PhD duration of 5 years, which is also relatively high compared to international averages, which seems a price to be paid for sometimes high teaching loads and a heavy PhD education program.
    - In the self-evaluation reports and in the interviews, the panel learnt about many commendable 'best practice' initiatives at the unit level. Examples include training and supervision of PhD students, preparation and reviewing of research proposals, teaching and mentoring, stimulating attractivity to MSc students, etc. Initiatives could be taken to spread, share and disseminate such best practices across unit/division/faculty borders, not in a top-down modus, but in one of bottom-up.

- **Valorization and tech transfer**
    - The Swedish system where IPR belongs to the researcher him/her-self at first sight seems advantageous for the individual. In practice however, often, it is not.

        - Acquiring a patent, and (financially) maintaining it, is costly and sometimes (e.g. in the case of potential infringement), requires a lot of time and effort, and the assistance of and costs for legal specialists.
        - Negotiating a license based on IPR, is time-consuming, not straightforward, and goes beyond the capacity/competence of an individual.
        - Creating a spin-off company, e.g. writing and deploying a professional business plan, composing a team, identifying market traction and approaching potential investors, supersedes the competence of one individual, who at the same time should not neglect his/her academic duties.
    - So, while advantageous for the individual 'inventor' at first sight, it is clear that the Swedish academic system as a whole, and Linkoping university in particular, misses a lot of opportunities (spin-off ideas, patents, licenses, that remain dormant). One could look for inspiration to potential role-models of Technology Transfer Offices (TTO) that are high in the rankings of most innovative universities in the world in general, but maybe more relevant, in Europe. Some ingredients for success are:
        - Sharing the IPR with the (TTO of) university, so that in return many of the aforementioned efforts and support can be provided by the TTO.
        - The TTO in turn could also professionalize in terms of capacity and quality based on the incomes from the valorization and tech transfer activities.
        - Researchers active in technology transfer could also be incentivized financially through the benefits from the patent, license, spin-off, etc. Because of the support of a TTO, they can concentrate on their real duties as a university professor: being excellent in teaching and research (and therefore creating even more opportunities for valorization and technology transfer).
        - In some (rare) European cases, the university creates its own seed money fund, with as shareholders the TTO or university itself, but also external third parties (e.g. banks that can be convinced to invest in high-tech companies, provided the TTO has a demanding funnel procedure to only select the most promising ventures). Because of the quality of selection, this can also be an argument for other investors and venture capital to step in.
    - This requires a sustained long-term vision and strategic decisions (and modifications of the current laws when needed), because obviously the (financial) returns of this (new) system, will only be visible after 10 years or so.

- **Internal communication**
    - There seems to be a need for better internal communication on all kinds of issues (HRM, funding opportunities, seminars/calls, social events, etc.). If

not yet in place, a regular and recurrent university-broad newsletter could/should be launched.

- Most research units maintain their own websites, as this seems more flexible than the 'official' ones from the university. It might be advisable to reconsider the university policy here, as indeed websites should be maintained at the level where this is the most efficient.
- The research units raised some concerns about the branding of the university as a whole, so as to reinforce the attractivity of Linkoping as an exciting place to apply for a position.

Evaluated Unit's Name: ISY.FS Vehicular Systems

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The main research area of the Vehicular Systems unit concerns theory and methods for control systems related to vehicles. The activities range from fundamental systems science aspects to applications in collaboration with industrial partners.

Despite the relatively small size of the group, it has been visible internationally over many years, and its scientific contributions have been clearly recognized. Traditional dissemination via journal and conference papers have been complemented by books and book chapters, and by organizing scientific competitions at conferences. Active involvement by key faculty in international organizations such as IFAC and IEEE has also contributed to visibility. However, it remains to be a challenge having an impact in both more theoretically inclined forums and forums closer to the industrial applications. This has implications on the share of papers in top-ranked journals and on impact/citation rates, which are below the average for the Faculty of S&E.

Relevance of the research has been maintained by close interaction with industry, but also by adapting research topics over the years: vehicle propulsion and fault diagnostics have gradually been complemented by emerging areas such as vehicle control, autonomy, and electrification. The impact the group has had on industry is well described in the report in terms of research projects that have resulted in product implementations and employments of graduated PhDs.

The directions for future research are explained in the report and basically stress presence in existing profile areas such as electrification (energy storage, grid, routing and planning), high-capacity vehicles in transportation, and fault diagnostics and prognostics. The report lacks a more in-depth discussion of novel research topics that could contribute to the group's future impact.

Recommendations

We recommend that the group further develops the research strategy, pointing out a few scientifically challenging research problems that could lead to high-impact contributions. The idea would be to help prioritize when preparing future research proposals and recruitments. An example of the latter is the plan to recruit an assistant professor in the power electronics area, which we strongly support.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The profile of the group, emphasizing a strong tie to applications in industry, presents a challenge regarding *publication strategy*. There is a need for presence and visibility in forums with industry, and this may have a negative influence on scientific impact and citations.

Given the age and gender balance of the group – faculty members are purely male and LiU offsprings – *recruitment* appears to be of strategic importance for the group. The assistant professorship in the pipeline is crucial in this regard and should be given opportunities to develop independence and originality. It is not clear to what extent external postdocs are regularly recruited to the group (we did not meet the postdocs).

Many of the cultural aspects that contribute to high-quality research are reflected in the *PhD training*. The unit seems to have an excellent work environment in general, and for the PhD students in particular. Training in basic research is promoted and organized, and relevant courses are provided, often in collaboration with the Automatic Control division. Difficulties in PhD recruiting is identified as a threat. The share of industrial PhD students is high, and it was remarked that it is not desirable to increase it further.

To actively promote a *scientific network* has implications on research quality, visibility, and impact, and on quality of PhD training, recruitment etc. Nationally, there are several networks for collaboration, and the competence center SEDDIT involves research groups at both LiU and Uppsala University, along with industrial partners. Few details about international networking are given, but we have noticed that international co-authorship is lower than Faculty of S&E average.

The division has a significant *teaching portfolio* with a strong tie to the active research areas. This has recently been enhanced further by taking onboard several courses in the electric power area, putting some strain on the group.

Recommendations

We recommend that the future recruitment of PhD students (including industrial PhD students) be subject to a strategic discussion, and that a plan to mitigate the threats is formed.

We recommend that the publication strategy be discussed and revised in the group. The PhD students are trained in scientific writing and encouraged to publish in important journals and conferences, but there is a need to enforce this further.

We think that additional efforts should be spent in recruiting young researchers (postdocs and assistant professors) to contribute creating a dynamic and vibrant research environment. In these recruitments, it is important to reach out externally.

We recommend that the group puts more priority on strengthening the international network. One ingredient of this could be to encourage young faculty and PhD students to make short visits to research groups abroad to initiate writing joint papers, which could lead to further collaboration.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The *organization* of the group as a division in the EE Department is natural, even though there are many connections with other areas, e.g. in mechanical engineering. The group seems to benefit particularly from the close ties with the Automatic Control division, both in research collaboration and in PhD training.

The group is relatively small, roughly 20 academic staff members, half of which are PhD students. The group of purely male senior faculty has formed and developed the group since many years back. Gender balance is better among PhD students, with some 20% female students.

The group has undergone a significant growth in *funding* and *personnel* during the five-year period studied, mainly due to an increase in teaching volume. As already pointed out, there is a need to recruit on the junior faculty level, which seems to be acknowledged by the division management.

The increase in teaching volume and funding has been accompanied by a similar growth (in absolute terms) of *research funding*, and the group seems content with the situation. The lion's share of research funding is from external grants, and it is pointed out that part of the direct government grant (coming from ELLIIT) is indeed subject to competition.

The group enjoys the availability of a research *infrastructure* of their own, the *Vehicle Lab*. It has developed over the years, and it seems to meet the current needs of the group. There is a desire to extend the lab with e.g. electric power and battery facilities to meet future needs, but there seems to be no concrete action in this direction.

The *support functions* available at departmental and university level appear to work well, with communication services being an exception. The division management argues for a need for support by an economic controller.

Recommendations

We recommend that the group performs a thorough and forward-looking investigation of needs concerning infrastructure, including both research and teaching. This investigation would also include a critical assessment of the existing facility and its relevance for future research directions.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The Vehicular Systems division is a healthy and well-functioning unit with a good visibility and track record, and an excellent work environment. There are challenges, however. One is related to the notable expansion of teaching during recent years, causing significant strain on the group. Another is the ongoing renewal of the research portfolio and the related need for inflow of new, junior researchers with expertise in complementing areas.

The overall recommendation to the group is to spend some efforts into further pursuing the SWOT analysis included in the self-evaluation report. There are embryos which could be developed into clear strategies and concrete action plans for the future development of the group.

Panel G Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of prof. dr. Bart De Moor (KU Leuven, chair), prof. dr. Sabeth Verpoorte (University Groningen), prof. dr. Erik Ström (Chalmers), prof. dr. Bo Egardt (Chalmers), prof. dr. Thomas Parisini (Imperial College London), prof. dr. Ales Leonardis (University Birmingham).

We conducted our interviews with 5 research units:

- Tu 01/04/2025: G1 IMT.MT Division of Biomedical Engineering
- Tu 01/04/2025: G2 ISY CVL Computer Vision Laboratory
- We 02/04/2025: G3 ISY FS Vehicular Systems
- We 02/04/2025: G4 ISY KS Communication Systems
- Th 03/04/2025: G5 ISY RT Automatic Control

For each evaluation unit, we interviewed staff in three shifts, namely representatives of professors and senior researchers, junior researchers and postdocs, and finally PhD students.

Supplementary to all the material provided beforehand (university slide decks, self-assessments, etc…), we were also provided with the slides of the individual research units, highlighting their research topics and per unit a limited 'wish list' of potential improvements, about which we asked additional questions during the in-person interactions.

After each of the 5 sessions, the panel held a discussion of about 1 hour to converge towards first conclusions, that have been elaborated on in more detail in the individual assessment reports of the respective units.

In addition, we have compiled a collection of general observations and recommendations, that can serve as additional reflection material, both for the university decision makers, and the leadership of the assessed research units.

We would like to thank, wholeheartedly, Vera Pichler, who provided the panel with professional support and was a real pleasure to work with.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel converged to a set of common and general concerns, suggestions and observations. In principle, all the remarks below apply to all the units assessed, however not always in the same degree, but they are somehow relevant to all of them. In the panel's opinion, they could be used for internal reflection by both the university leadership and the specific research units.

- **Longer-term strategic plans and ambition**
  - We were presented in a general briefing session with the longer-term strategic research plan of the university, also developing the societal domains in which the university wants to excel. However, this grand university vision was not really diffused into the presentations of the individual research units that were assessed. Their research activities and ambitions were seldomly positioned in the bigger picture as established in the general presentation.
  - Therefore, there seems to exist some 'disconnect' between the top-down strategy and the bottom-up aspirations.
  - Even within their individual presentations and within their own research domains, a sufficient level of ambition often seemed lacking in the units evaluated. In some cases, the ambitions did not go much further than 'business as usual', based on some successes in the past, and kind of lacking international positioning and self-assessment to reach for higher ambitions. As an illustration, there were very few aspirations noticeable to apply for ERC funding (as there have been few in the past). The point is that this type of funding provides large opportunities to do 'out-of-the-box' 'high-risk high-gain' research and requires the submitting candidates to position themselves in a world-wide (and not only 'local or national') setting.
  - Sometimes, the intended scope-of-action is too broad or unachievable in relation to the number of researchers in a certain unit. In those cases, it is necessary to re-focus the research objectives based on a strategic SWOT analysis (that goes much deeper and broader) than the SWOT analyses provided in the self-assessment).
  - Often, this relative lack of ambition is also reflected in the lack of longer-term publication strategies and technology-transfer plans (see below) and in missing of 'science and technology' watch to detect potentially impactful research topics in the longer term.
  - As a matter of self-reflection, the question could be asked*: "Are we more followers than leaders ?"*, and *"If we want to be leading, in what exactly ?"*, and *"What is the (international) level playing field ?"*.

- This level of ‘excellence thinking’, should be more pervasively injected in all layers of the university, and should also be monitored over the years.
- In many cases, there is good interaction with Swedish industry, although there is very little critical reflection on where the research is positioned with respect to the state of the art in industry itself. As an illustration, some of the ‘academic’ demos shown for sure could not compete with what in general is already commercialized by companies. So, the question could be asked on how some of the research activities do push the level playing field in which industry is already active. Of course, the agenda for companies is clear: they get into direct contact with PhDs and postdocs as potential future employees (this is good), but how do the research units benefit from interaction with industry that is basically run in ‘service-mode’?

- **Funding for basic research**
  - More structural funding from the central level, as a kind of stabilization/leverage for attracting call-based funding. In many cases, the number of ‘permanent’ people was rather small. This implies that, despite the presence of many opportunities for research in the fields that were assessed, the growth of the research units is restricted.
  - More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more ‘insecure’ times ?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.
  - Although there seems to be a system in place for start-up funding of young promising researchers, its budgets seem rather small.

- **Better support and procedures for:**
  - Detecting suitable calls in the myriads of possibilities on the national and international level. If not yet in place, this could be organized via a regular newsletter from the research coordination office.
  - Better support and guidance for further professionalization in writing competitive project and program applications.
  - Better and more accessible legal support in those dimensions of R&D where it is needed, e.g. on the track of valorization and technology transfer.
  - Creating more transparency and direct lines of command in the governance of the university (where now there seem to be a lot of intermediate decision levels, where even for division heads the decision trajectories are not always clear).

- **Human Resource Management and career planning**
    - Several concerns were raised by the research units, about the insufficient interaction between the research unit and the hiring committees for academics. The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'incrowd'-hiring and avoid conflicts-of-interests in the whole process.
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    - In the self-evaluation reports and in the interviews, the panel learnt about many commendable 'best practice' initiatives at the unit level. Examples include training and supervision of PhD students, preparation and reviewing of research proposals, teaching and mentoring, stimulating attractivity to MSc students, etc. Initiatives could be taken to spread, share and disseminate such best practices across unit/division/faculty borders, not in a top-down modus, but in one of bottom-up.

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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Relevance and novelty

Relevance of the research topics is quite high and is line with the general trends in wireless (cellular) systems. Novelty is good, but not outstanding, in terms of the topics chosen. The material and interviews did not give sufficient material to judge the novelty of the future research questions and methods. The track record of the division is, however, outstanding, and there is no reason to believe that this would not continue to be the case.

Quality of research output

The division is a world-leading environment in the development of massive MIMO. The citation data is simply outstanding. Especially impressive is the field-normalized citation rates.

Impact outside academia

The impact on industry is very good. Close collaboration with commissioned research with Ericsson and, to some degree, Huawei have led to quick utilization of the division's research results. Vinnova projects and participation in EU projects have also led to industrial impact, although it is harder to judge this from the submitted material. A spin-off company was co-funded by a professor in the division and was later acquired by Teledyne.

The division has a very nice presence on YouTube and through blogs.

Strategies, priorities and future research plans

Recommendations

As already mentioned, the directions for future research are quite reasonable and follows the general trends in the area. What is, perhaps, lacking are ideas of the next-big-thing in wireless research. What could be a game-changer in 7G and beyond (just as massive MIMO turned out to be)? This is no easy question to answer, but the division has the ability (skill, people, networks, and other conditions) to lead the way. Some crazy ideas could be pursued in parallel with the (more safe) research directions described in the submitted material.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategies

The unit publishes in the best journals and conferences in the division's field and parallel publishing on arXiv. The balance between journal and conference publications is tricky, but the division seems to have a good approach. Outreach in terms of podcasts and blogs is commendable.

Recruitment and career planning

The division recruits mainly outside LiU, which is good practice for faculty. However, there are concerns about the difficulties in recruiting PhD students from LiU, Sweden, or the EU. As with all academic groups in wireless, the division suffers from the effects of geopolitical tensions, immigration difficulties, and export control rules. If not mitigated with better recruitment of students from the EU, this threatens the quality of research, teaching, and graduates.

Career planning and mentoring of young faculty seems to be quite good.

Quality of PhD training

PhD training seems to be quite good, with regular internal seminars, robust supervision, and control mechanisms. The submitted material includes many interesting ideas for improvement for the PhD training and research culture.

Networks and collaboration

It is interesting to learn that both Ericsson and Huawei have been collaboration partners. Academic collaboration with national and international researchers is quite good.

Equal opportunity and gender equality

Gender equality is very good for the younger faculty (associate and assistant professors) with a 50-50 distribution. Senior faculty and postdocs/PhD students are predominantly men. This challenge is shared with most groups in the area but is nevertheless a concern.

Research in relation with teaching

The division teach courses in the areas of research.

Recommendations

Publication strategies

- Consider to publish also code and data for reproducibility of research.

Career planning for young faculty

- We suggest to make existing support more easily found (by improving the intranet and other communication channels)

Quality of PhD training

- The submitted material contains a nice list of potential improvements. Further analysis should be made to prioritize actions deemed to provide the most cost-effective gains in quality of PhD training.
- As a general comment, it seems to be hard for the PhD students to find relevant courses, and courses are offered too infrequently or at unpredictable starting dates. The university is recommended to address these issues to make it easier for PhD students to plan their course work.

Industrial collaboration

- It is tricky to navigate to have commissioned research from competitors (e.g, Ericsson and Huawei). Hence, it is recommended to carefully consider the pros and cons with future arrangements to avoid or mitigate drawbacks, e.g., a split in group (lack of scientific discussion, dissemination of results, etc.)

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Organization

The PhD topics are well separated and coordinated, which is good practice as it avoids double work and unnecessary internal competition. Proposals are peer-reviewed in the group, which is commendable, especially as this is very helpful for young faculty. Regular group meetings and seminars are good for internal communication.

Staffing

The unit has little influence on the recruitment process for faculty and that external reviewers are very influential in the selection process. This can be both good and bad.

Funding

The unit has excellent diversity in funding from the most relevant national (VR, KAW, SSF, WASP, Vinnova) and international sources (EU). Direct funding from companies is important for quickly utilizing the research results.

Research infrastructure

Seems to be adequate in terms of computational resources and access to data from industrial partners.

Support functions

The division seems content with internal support from the grants office (FOSA) and legal. However, the unit (and other units) are unhappy with LiU's external web.

Recommendations

The interviews did not reveal any signs of an unhealthy environment. However, promoting "appropriate peer pressure among students" is good, but it might create unhealthy stress for PhD students. Hence, the unit leadership is recommended to keep an eye out for warning signs (PhD student drop out, health issues, burn outs, etc.)

It may make sense to critically examine the hiring process of faculty. For instance, it may be reasonable to reduce the influence of the external reviewers and involve the division leadership in the hiring decisions. This to ensure that "soft" values are given the appropriate weight in the hiring decisions.

It is recommended to form a strategy to handle the deteriorating geopolitical situation. In particular, how to handle tension between competitors and how to engage or not engage in security and military research. (Increase need for protection of data, results, and researchers. Restrictions on openness and academic collaborations. Restrictions on hiring. Possible need for security clearances.)

The LiU external web receives complaints from most units. How can this be improved?

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The unit is overall very strong. It has very good international visibility. Very impressive field-normalized citation rates and excellent choice of publication venues.

As with all research groups with a sizeable activity in wireless communication, renewal in traditional research topics is needed. The underlying theoretical base (signal processing, communication, and information theory) is broadly applicable to other research fields. Finding the best path forward is of great importance.

The unit is recommended to form strategies based on the SWOT analysis, i.e., how to leverage strengths, remove weaknesses, exploit opportunities, and mitigate threats.

In particular,

- What is done to increase visibility in undergraduate programs
    - Bachelor thesis
    - Student workers
    - Acquiring courses
- What is done to mitigate the dependencies on external grants?
    - Take on internal tasks (leadership roles) funded with FoFu grants?

    - Take on more teaching?
- What is done to improve PhD student recruitment?
    - Increase visibility
    - Joint advertisements for open positions with the rest of the department

Panel G Report

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After each of the 5 sessions, the panel held a discussion of about 1 hour to converge towards first conclusions, that have been elaborated on in more detail in the individual assessment reports of the respective units.

In addition, we have compiled a collection of general observations and recommendations, that can serve as additional reflection material, both for the university decision makers, and the leadership of the assessed research units.

We would like to thank, wholeheartedly, Vera Pichler, who provided the panel with professional support and was a real pleasure to work with.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel converged to a set of common and general concerns, suggestions and observations. In principle, all the remarks below apply to all the units assessed, however not always in the same degree, but they are somehow relevant to all of them. In the panel's opinion, they could be used for internal reflection by both the university leadership and the specific research units.

- **Longer-term strategic plans and ambition**
    - We were presented in a general briefing session with the longer-term strategic research plan of the university, also developing the societal domains in which the university wants to excel. However, this grand university vision was not really diffused into the presentations of the individual research units that were assessed. Their research activities and ambitions were seldomly positioned in the bigger picture as established in the general presentation.
    - Therefore, there seems to exist some 'disconnect' between the top-down strategy and the bottom-up aspirations.
    - Even within their individual presentations and within their own research domains, a sufficient level of ambition often seemed lacking in the units evaluated. In some cases, the ambitions did not go much further than 'business as usual', based on some successes in the past, and kind of lacking international positioning and self-assessment to reach for higher ambitions. As an illustration, there were very few aspirations noticeable to apply for ERC funding (as there have been few in the past). The point is that this type of funding provides large opportunities to do 'out-of-the-box' 'high-risk high-gain' research and requires the submitting candidates to position themselves in a world-wide (and not only 'local or national') setting.
    - Sometimes, the intended scope-of-action is too broad or unachievable in relation to the number of researchers in a certain unit. In those cases, it is necessary to re-focus the research objectives based on a strategic SWOT analysis (that goes much deeper and broader) than the SWOT analyses provided in the self-assessment).

- Often, this relative lack of ambition is also reflected in the lack of longer-term publication strategies and technology-transfer plans (see below) and in missing of 'science and technology' watch to detect potentially impactful research topics in the longer term.
- As a matter of self-reflection, the question could be asked*: "Are we more followers than leaders ?"*, and *"If we want to be leading, in what exactly ?"*, and *"What is the (international) level playing field ?"*.
- This level of 'excellence thinking', should be more pervasively injected in all layers of the university, and should also be monitored over the years.
- In many cases, there is good interaction with Swedish industry, although there is very little critical reflection on where the research is positioned with respect to the state of the art in industry itself. As an illustration, some of the 'academic' demos shown for sure could not compete with what in general is already commercialized by companies. So, the question could be asked on how some of the research activities do push the level playing field in which industry is already active. Of course, the agenda for companies is clear: they get into direct contact with PhDs and postdocs as potential future employees (this is good), but how do the research units benefit from interaction with industry that is basically run in 'service-mode'?

- **Funding for basic research**
  - More structural funding from the central level, as a kind of stabilization/leverage for attracting call-based funding. In many cases, the number of 'permanent' people was rather small. This implies that, despite the presence of many opportunities for research in the fields that were assessed, the growth of the research units is restricted.
  - More transparency in the allocation system for internal funding is needed. Most units are now piling up money, for reasons that are a bit unclear (savings for more 'insecure' times ?). Also, the system seems rather volatile, based on the teaching load of people of the research units. Maybe those savings could be given a destination as suggested in some of the paragraphs of this assessment.
  - Although there seems to be a system in place for start-up funding of young promising researchers, its budgets seem rather small.

- **Better support and procedures for:**
  - Detecting suitable calls in the myriads of possibilities on the national and international level. If not yet in place, this could be organized via a regular newsletter from the research coordination office.
  - Better support and guidance for further professionalization in writing competitive project and program applications.
  - Better and more accessible legal support in those dimensions of R&D where it is needed, e.g. on the track of valorization and technology transfer.
  - Creating more transparency and direct lines of command in the governance of the university (where now there seem to be a lot of

intermediate decision levels, where even for division heads the decision trajectories are not always clear).

- **Human Resource Management and career planning**
    - Several concerns were raised by the research units, about the insufficient interaction between the research unit and the hiring committees for academics. The panel finds that the university leadership may want to reconsider the procedures here, in finding a better equilibrium between the strategic research plans of the units (often not explicit enough, see above), their participation in the head hunting and recruitment process, opening up vacancies as to avoid 'incrowd'-hiring and avoid conflicts-of-interests in the whole process.
    - For several reasons (that have to do with national security, visa screening, etc…), international recruitments have recently become increasingly challenging because of the complexity and long duration of the required procedures. The university management should be aware of this, and act accordingly internally as well as externally (e.g. pressure on policy makers and administrations).
    - There seems to be a need for more transparency toward younger researchers (postdoc and later) and professional career guidance for them.
    - Obviously, there is a serious gender issue in the engineering units, making clear that current policy measures are insufficient. Probably some more drastic actions are needed here.
    - The panel also got the impression that recruitment favors the "home-team" of postdoctoral fellows who have obtained their PhD in or around Linkoping. This might be caused by the lack of sufficient long-term strategic vision and ambition (cfr. Supra). A remark that was made in our panel was: *"Those that do not fit in, are not here !"*
    - There were mixed signals about the requirement for PhD students to take up 90 credits for their PhD education program, which, compared to international standards, is high. This might also be correlated to the average PhD duration of 5 years, which is also relatively high compared to international averages, which seems a price to be paid for sometimes high teaching loads and a heavy PhD education program.
    - In the self-evaluation reports and in the interviews, the panel learnt about many commendable 'best practice' initiatives at the unit level. Examples include training and supervision of PhD students, preparation and reviewing of research proposals, teaching and mentoring, stimulating attractivity to MSc students, etc. Initiatives could be taken to spread, share and disseminate such best practices across unit/division/faculty borders, not in a top-down modus, but in one of bottom-up.

- **Valorization and tech transfer**
    - The Swedish system where IPR belongs to the researcher him/her-self at first sight seems advantageous for the individual. In practice however, often, it is not.
        - Acquiring a patent, and (financially) maintaining it, is costly and sometimes (e.g. in the case of potential infringement), requires a lot of time and effort, and the assistance of and costs for legal specialists.
        - Negotiating a license based on IPR, is time-consuming, not straightforward, and goes beyond the capacity/competence of an individual.
        - Creating a spin-off company, e.g. writing and deploying a professional business plan, composing a team, identifying market traction and approaching potential investors, supersedes the competence of one individual, who at the same time should not neglect his/her academic duties.
    - So, while advantageous for the individual 'inventor' at first sight, it is clear that the Swedish academic system as a whole, and Linkoping university in particular, misses a lot of opportunities (spin-off ideas, patents, licenses, that remain dormant). One could look for inspiration to potential role-models of Technology Transfer Offices (TTO) that are high in the rankings of most innovative universities in the world in general, but maybe more relevant, in Europe. Some ingredients for success are:
        - Sharing the IPR with the (TTO of) university, so that in return many of the aforementioned efforts and support can be provided by the TTO.
        - The TTO in turn could also professionalize in terms of capacity and quality based on the incomes from the valorization and tech transfer activities.
        - Researchers active in technology transfer could also be incentivized financially through the benefits from the patent, license, spin-off, etc. Because of the support of a TTO, they can concentrate on their real duties as a university professor: being excellent in teaching and research (and therefore creating even more opportunities for valorization and technology transfer).
        - In some (rare) European cases, the university creates its own seed money fund, with as shareholders the TTO or university itself, but also external third parties (e.g. banks that can be convinced to invest in high-tech companies, provided the TTO has a demanding funnel procedure to only select the most promising ventures). Because of the quality of selection, this can also be an argument for other investors and venture capital to step in.
    - This requires a sustained long-term vision and strategic decisions (and modifications of the current laws when needed), because obviously the (financial) returns of this (new) system, will only be visible after 10 years or so.

- **Internal communication**
    - There seems to be a need for better internal communication on all kinds of issues (HRM, funding opportunities, seminars/calls, social events, etc.). If not yet in place, a regular and recurrent university-broad newsletter could/should be launched.
    - Most research units maintain their own websites, as this seems more flexible than the 'official' ones from the university. It might be advisable to reconsider the university policy here, as indeed websites should be maintained at the level where this is the most efficient.
    - The research units raised some concerns about the branding of the university as a whole, so as to reinforce the attractivity of Linkoping as an exciting place to apply for a position.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research carried out by the Division focuses on five main areas: i) complex networks and multiagent systems, ii) optimization for control, iii) Robotics and autonomous systems, iv) sensor fusion, and v) systems identification. This is quite a wide spectrum, even if well-established in the automatic control international community. The "centers of gravity" are primarily methodological and driven by established senior academic staff. The quality of the Division's research output is excellent, and it is strategically focused on publishing as much as possible in journals of the highest quality (*IEEE Transactions* and the like). In this respect, statistics confirm the excellence of the research output both quantitative-wise (122 journal papers during 2018-2022) and quality-wise (67% of the articles are published in Q1 journals, with a field-normalized citation rate of 1.4). The Division is also very active in regularly disseminating the research results at the leading international conferences of the field, such as IEEE CDC, IFAC WC, ECC, etc. It is also commendable that a good fraction of journal articles has international co-authors. Likewise, approximately 25% of the publications have co-authors affiliated with non-academic collaborators affiliated with industrial partners within the significant network established by the Division over the years. The remarkable impact on industry mainly connected with WASP, ELLIIT, SEDDIT, and Security Link is worth noting in this connection. Indeed, Project Ngulia is worth mentioning because of its significant societal impact.

On the other hand, strategies for the growth and consolidation of the research portfolio seem vague. One member of senior academic staff in robotics will be replaced according to the self-evaluation document. However, according to the interview with the senior staff, robotics (in a broad sense covering both industrial robots and moving robots) is an area that does not seem strategic anymore because of the reduced interest by the leading industrial partner (ABB), and it is not clear in which area the Division wants to invest. Also, the Division has access to the "Arena," which potentially could be a great area in which to experiment with drones and ground robots. Still, a clear research direction does not seem that evident. Besides, while keeping the scientific leadership in the consolidated research fields in which the Division has an excellent track record, future research plans are related to significant societal challenges such as climate change and developing AI and machine learning methodologies with substantial mathematical grounds. The plans for the latter topics are

rather vaguely described, though. This might be related to the uncertainty in the future recruitment of junior academic staff, which presents some challenges, as illustrated in other sections of the present report.

Recommendations

It is strongly advisable to devise a medium-term strategic plan to enable the sustainability and possibly the growth of the Division's portfolio of research topics. The plan should aim to open up new directions that go beyond the "comfort zone" of the well-established current topics that are, *de facto,* inspired and led by past and current senior academic staff. To enable this plan, it is suggested that a recruitment strategy for young academics be laid down, keeping open the possibility of attracting an established world leading academic in a strategically important area in the nearby future. The implementation of the plan could benefit from the technology inspirations from the vast industry network within the Competence Centers and by stronger multi-disciplinary collaboration efforts with other Divisions in the Department.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The publication strategies and habits are fully adequate in that they focus on publishing as much as possible in journals of the highest quality and regularly disseminating the research results at the leading international conferences in the field. There are several success stories of PhD students receiving international prestigious awards for their research outputs. Also, the drop-out rate is minimal and the value proposition of PhD studies in the Division is significant in that after graduation career success does not seem an exception but the rule (some 20% of PhD students have been recruited by the companies within the Division's network of partners, which is a remarkable result). PhD students are encouraged to present their papers at conferences, and mentorship is provided. Licentiate and final theses are fruitful ways of generating new research ideas and strengthening the independence of the PhD student with respect to the supervisors during the last two years of the doctoral program, hence developing their autonomy and independence. In this respect, more encouragement to proceed with the (non-compulsory) Licentiate Thesis would be welcome. Senior supervisors are the primary source of inspiration and mentorship. It is rather unfortunate, though, that the number of junior researchers and Assistant Professors is very small, thus missing an "intermediate layer" of mentorship, which is generally extremely useful.

The recruitment strategy of PhD students is effective owing to the consolidated early engagement already at the level of the MSc thesis (and sometimes even earlier). Instead, recruitment of junior and senior academic staff to sustain and even improve the research excellence at the Division is challenging, as made clear in the self-evaluation and further explained during the interviews. This is an important strategic point since the current structure of the research group is very unbalanced toward senior academics, and there is an urgent need for a "re-balance" via the recruitment of a significant number of junior Assistant Professors, also to open new research directions in areas with an important future potential societal impact. First, there is a lack of effective institutional communication on the openings at all levels of seniority: the national and international visibility of the University is not effectively communicated. Second, the department is only involved in drafting the job description, but there is no further executive involvement; not even the Head of the Department has a say since the faculty has a totally independent process managed by a Recruitment Board. As also evidenced in the interviews, cohesion and coordination within the Division and the research groups are constantly sought. The quality of PhD training is excellent, with the provision of compulsory and elective modules that make up 90 ECTS. Nevertheless, PhD students appreciate the quality and the tutorial value of these modules. However, significant room for improvement relates to the actual organization and scheduling of the modules in that the scheduling of PhD activities turns out to be quite erratic and lacks efficiency, thus making the time organization during the first two years rather challenging and somewhat stressful for the students.

The established senior academics at the Division have an extensive national and international network of collaborations, as evidenced by the diverse authorship of the publication outputs. However, there is room for improvement in how junior academic staff, PostDocs, and Ph.D. students are supported and mentored in building their own networks of potential collaborators nationally and internationally.

Gender equality is not satisfactory at all levels, especially the senior one, as clearly shown by the data provided in the personnel tables. In the self-evaluation, lack of diversity is listed as a weakness, but no strategic plan seems to be in place to mitigate the gender inequality issue.

Recommendations

The strategy for the recruitment of academic staff needs urgent improvements to sustain the research and teaching excellence of the Division. It is recommended that a medium/long-term strategic and implementation plan be laid down to enable the re-balancement of the group in favor of hiring junior assistant professors. At the institutional level, it is recommended that the University's communication strategy be enhanced to improve the attractiveness of academic openings nationally and internationally. More executive involvement of the

department in the hiring process would be critically important and is strongly suggested, necessitating also the presence of a well-established strategic plan.

It is recommended to significantly improve the logistic organization of the PhD teaching program in favor of better scheduling of the taught modules to improve the time organization of PhD activities during the first two years: a better organization would be very beneficial for an even more productive research activity of PhD students.

It is also suggested that a more structured mentorship and support program be implemented to help junior academic staff, PostDocs, and Ph.D. students build their own networks of potential collaborators nationally and internationally.

It is also recommended that institutional support be improved to facilitate the practical and financial aspects of cross-division collaborations.

A strategic plan with specific action items to mitigate gender inequality is urgently needed at the Division level and in coordination with the other Divisions. Strong supporting actions devised at the institutional level are advised.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The organization of the Division is effective and well-structured. The organization would take advantage of more junior Assistant Professors and PostDocs. Enabling this re-balancing is strongly depending on the funding landscape and ecosystem. The funding situation during 2018-2023 is excellent, with a healthy attraction of external research funding and a good number of direct government grants within the strategic research area ELLIIT. Regarding the sustainability of funding, which is critical to enable the previously mentioned recommendation for a hiring plan at the junior level, the main issue relates to the relatively short duration of external funding schemes (typically 5 years) and the modest base level of non-competitive faculty funding. More specifically, direct governmental educational grants remained nearly constant without matching the increasing costs for personnel and teaching-related expenses. The lack of growth in number of students exacerbates this issue. Indeed, the competitive EU funding level is not satisfactory. The main reason for the latter is the lack of internal co-funding.

Research activities are mostly methodological and do not require major infrastructure. Nevertheless, when specific infrastructure is needed, procedures are *ad hoc* without clear support at the institutional level.

Recommendations

The lack of EU funding could potentially harm the international visibility and prestige of the Division. At the institutional level, it is recommended that an effective financial strategy and implementation plan be put in place to make co-funding available to enable active participation in EU funding initiatives such as the Horizon targeted calls, ERC, and Marie Curie Fellowships. Again, at the institutional level, it is recommended to change the way internal funding is provided, making it more directly and transparently related to the quantity and quality of the research output and its scientific relevance. Activating this "virtuous circle" would help this Division to sustain its academic excellence. It is also suggested that the specific day-to-day administrative support for PhD students, which sometimes looks lacking, be substantially improved.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Nothing to add

Panel H Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel H consists of the members presented in Table 1. The panel had a couple of pre-meetings before the visit to Linköping briefly discussing the reports from and on the units, asking for additional material in the form of publication list from each unit and dividing the work amongst the members. Topics to be discussed during the visit have also been elaborated. The panel also emphasize the plan to visit labs and that also numerical results are presented.

Table 1. Panel H members and evaluation units.

NAME	FUNCTION	ORGANIZATION	COUNTRY	EVALUATION UNIT
Staffan Lundström	Chair	Luleå University of Technology	Sweden	H4.IEI.MVS: Applied Thermodynamics and Fluid Mechanics
Ewa Wäckelgård	Member	Dalarna University	Sweden	H1.IEI.ENSYS : Energy systems
Ramin Karim	Member	Luleå University of Technology	Sweden	H2.IEI.FLUMES: Fluid and Mechatronic Systems
Ulrich Krupp	Member	RWTH Aachen University	Germany	H3.IEI.KMAT: Engineering materials
Tracy Bhamra	Member	Royal Holloway, University of London	UK	H5.IEI.PROD: Product realisation
Niels Aage	Member	Technical University Denmark (DTU)	Denmark	H6.IEI.SOLMEK: Division of Solid Mechanics
Karin Fredriksson	Senior Coordinator	Linköping University	Sweden	

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Positive issues

PhD students are very satisfied with their supervision, the departmental seed money is very good and drives new research collaborations, there is confidence in the department management and the local administration support is valued. The department labs are seen as a strength, it is very good that one node of the national computer cluster is at LiU and the strong collaboration with industry is a strength across all divisions.

Areas that can be improved

The two main things that can be improved are the amount of EU funding and gender balance across all the divisions.

Recommendations for the Department and University

Regarding EU funding

- Cover the overhead not given by EU.
- Help with the structure and general text for the applications.
- Central support with the administrative issues during applications, the initial part of the project and when running the project.

Regarding gender diversity

- Initiate dedicated programs for female students at the beginning of their master studies, to increase awareness of research careers and PhD studies.
- An effort on several levels guiding women into the research subjects. This should include work on strengthening the pipeline of girls into engineering subjects from high school.
- Promote role models at all levels (PhD students, Junior and Senior Researchers) at the university to all students, high school students and the public.

In addition, we recommend a fund for refurbishments and upscaling of lab equipment with costs up to a few MSEK (3-4 MSEK, for instance).

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) Relevance and novelty of the research topics covered by the evaluation unit: The societal relevance is high, and manifested in extensive collaboration with industry, utilities, real estate companies and others as mentioned in the self-evaluation. The research is to 2/3 funded with external funding that is done in collaboration with industry (using it as a wide concept for the different stakeholders mentioned above). Research questions are formed with the external partners in a co-creative process. The novelty is found in new projects combining the toolbox of methods used in the division. The toolbox of methods is not to be developed as commented by seniors in the interviews, it suits well the research done and to be done. This touch upon point 4 below.

2) Quality of the research output: External projects result in both deliveries to non-academic partners and scientific publications. Transdisciplinary is the leading research approach. The senior group interviewed mentioned the challenge to find journals that accept such broad perspective, but they have learned how to find journals for their purposes. See more under publication strategies about quality in publications.

3) Impact outside academia: Self-evaluation mentions policy development for energy end-use and related CO_2-emissions. External partners in research projects gain knowledge through the projects to improve decision making which also count as such impact. There is sufficient of impact outside academia.

4) Strategies, priorities and future research plans: Quoted from self-evaluation: "The division plans to further continue to work in a transdisciplinary setting and to aim for future international collaborations" The self-evaluation did not present an explicit strategy for publications, internationalization or future research plans. It was mentioned by the junior researchers that a research strategy and clear goals would be a good guidance for them when choosing their research areas.

Recommendations

- Formulate a more direct strategy and from that action plans for international collaboration and research paths forward. This can be set-up as a division-wide work during a period that includes all personnel.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic

1) Publication strategies: Quoted from self-evaluation: ”The division’s strategy is to continue publishing its research findings in high ranked scientific journals.” Share of journal articles with international co-authorship from the bibliometric data is 21% (67 % for faculty). This points again on needs to increase international collaboration. The majority of publications is on the Norwegian list level 1, and in Energies far more than in other journals. A way forward could be to show quality in out-put by increased publishing on level 2.

2) Recruitment: Quoted from self-evaluation:” There is no explicit recruitment strategy, though the division has historically been recruiting junior researchers from their own PhD-base,” This was confirmed from the senior group interview where all were internals from PhD studies. To have at least a few externally recruited junior/senior researchers can contribute to build-up a wider international network. It was mentioned in the self-evaluation that there are very few applications to doctoral positions. We did not sort out if that was because advertisement was only Swedish.

Opportunities for early-career researchers to develop their originality and independence: The self-evaluation states that no specific support is given except the mandatory annual meeting with the head of division (medarbetarsamtal). The juniors interviewed wished to have more clear guidance in this matter.

3) Quality of the PhD training: there is a joint doctoral program together with the environmental technology group with a common general study plan and seminars. The interviewed doctoral students (2) seemed to be satisfied with supervision. The complained about that courses sometimes were difficult to match in time with the need of them. Not possible to find out in good time when a course is given.

4) Academic as well as non-academic networks and collaborations: See points 1) and 4) in Quality. In addition to that national academic collaboration is mainly inhouse. A main national university partner is University of Gävle. The inhouse and national collaboration measured in journal articles are both around 40 % of the total. The transdisciplinary character is a factor behind high inhouse publication and, also a need to get good quality.

5) Equal opportunities and gender equality: the division has 40 % – 60 % (women to men) and this is rather stable over time. This varies within the categories but is never less than 30 % of females. No specific actions are taken to reach such good balance. The interviewed explain it is due to the transdisciplinary research with high societal relevance.

6) Good research practice: The self-evaluation points at structured meetings for different needs and it was confirmed by the interviewed that they have steadily improved these structures to be more collaborative in planning for calls, and what content and who that will participate in applications. They utilize their specific competences to set-up the project groups.

7) Research in relation to teaching: The teaching part is rather small in this division compared to other units the panel evaluates. It is distributed among the teachers, in a range between 30 – 60 % but for the assistant professors (not interviewed) it could be higher.

Recommendations

- Publication strategy to go for higher ranked journals and international co-authorship.
- Announcement of positions internationally to get applicants from a larger research community.
- Introduce a career planning guide for junior researcher showing the requirements for the next level in promotion, matters to balance work and life and a map of all collaborations present and recently.
- Better advert of doctoral courses at LiU showing when it is offered and course responsible to contact.
- Continue with structured open meetings for different purposes so all can be included.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization: This comes hand in hand with good research practice and culture as described above. In addition, the head of division has an advisory group of the three other seniors so the team of four lead in the softer management and the head has delegation from head of department on personnel and economy. It is a very good model to have group-leadership that is robust to changes and makes transitions on the head position smoother.

2) Staffing: The Division consists of 24 people: 9 doctoral students (incl. Industrial), 3 juniors (postdoc and deputy assistant professor), 3 assistant professors, 6 seniors (3 professors), 2 prof. emeritus. This is sufficient staffing for conducting teaching, research and supervision of doctoral students. However, it is an age-gap between the juniors being < 40 and ass. profs. and seniors being > 50. This must be considered some years ahead in the recruitment/competence planning and dealt with.

3) Funding: The division relies heavily on external research funding with 2/3. It is expressed in the self-evaluation that it is vulnerable. The main part comes from The Swedish Energy Agency (Energimyndigheten) from projects in specific calls. The interviewed seniors mentioned that there is a plan to rely less on Energimyndigheten and go for EU-funding. Internal funding fluctuates, mainly because part of it is rewards for doctoral degrees the previous year. The panel did not get a clear explanation on the underlying principles for the distribution of internal funding to the divisions. 4) Research infrastructure: Quoted from self-evaluation: “The unit has access to the national supercomputer centre (NSC). Apart from that, the unit has no explicit demand for RI.” A wish from the juniors interviewed was hardware for running AI models.

5) Support functions: It seems to be consensus from all interviewed that the local support in the form of HR, communication, IT and finance is functioning very well and should be preserved in the present form. It was complaints that the legal support did not function well for the needs of NDA and other contracting issues.

Recommendations

- Continue with a team leading the division.
- Mind upcoming retirements and plan replacements, which might not be in exactly the same competence area.
- Make the plans real to divert the sources for external funding and include EU-funding as one source.
- Try to establish relation with the legal office, the panel heard from other interviewed divisions that this support work very well.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

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Karin Fredriksson	Senior Coordinator	Linköping University	Sweden	

The evaluation units, also presented in Table 1, are all part of the Department of Management and Engineering (IEI) and all but the Energy Systems Division may be seen as a group of Divisions under the umbrella of Mechanical Engineering.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Positive issues

PhD students are very satisfied with their supervision, the departmental seed money is very good and drives new research collaborations, there is confidence in the department management and the local administration support is valued. The department labs are seen as a strength, it is very good that one node of the national computer cluster is at LiU and the strong collaboration with industry is a strength across all divisions.

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Regarding EU funding

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- Help with the structure and general text for the applications.
- Central support with the administrative issues during applications, the initial part of the project and when running the project.

Regarding gender diversity

- Initiate dedicated programs for female students at the beginning of their master studies, to increase awareness of research careers and PhD studies.
- An effort on several levels guiding women into the research subjects. This should include work on strengthening the pipeline of girls into engineering subjects from high school.
- Promote role models at all levels (PhD students, Junior and Senior Researchers) at the university to all students, high school students and the public.

In addition, we recommend a fund for refurbishments and upscaling of lab equipment with costs up to a few MSEK (3-4 MSEK, for instance).

Evaluated Unit's Name: IEI.FLUMES Fluid and Mechatronic Systems

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The IEI.FLUMES Fluid and Mechatronic Systems Division at Linköping University (LiU) demonstrates a strong foundation in engineering systems design, with a particular focus on

fluid power and aircraft systems. The Division's research is oriented towards practical applications, especially in the domains of mobile machinery and aircraft, which aligns well with industry needs and societal impacts. As the Division explores emerging research areas such as systems-of-systems (SoS), artificial intelligence (AI), and condition monitoring, it presents significant opportunities for interdisciplinary collaboration and expansion.

Both junior researchers and PhD students are fostered in an environment that emphasizes practical experience, proposal writing, and publication. However, there is a clear need for more structured supervision and training methodologies to ensure consistent quality. While the Individual Study Plan (ISP) process initially appeared to be a mere formality, it has proven beneficial for planning purposes, although it is not considered a means for providing feedback on supervision. There is also a need for clearer guidelines regarding mandatory courses and training requirements to reduce stress and ensure their relevance to specific disciplines. New international PhD students face challenges, such as signing contracts and receiving payments, indicating a need for additional support at the start of their programs.

The Division's supervision process experience varies, with some students benefiting from an effective system of main and co-supervisors, while others experience a more informal and evolved process. The frequency of seminars and webinars has declined in recent years, suggesting a need for their reintroduction and formalization to foster a collaborative and engaging research environment. Regular meetings within the Division and external networking opportunities are crucial for discussing work progress and gaining support. The Division currently lacks a formal publication strategy, relying instead on connections to conferences and expectations ahead of doctoral theses. In summary, the IEI.FLUMES Division's dedication to innovation and applied research positions it well for substantial future advancements and contributions to the engineering field.

Recommendations

Enhance Structured Supervision and Training: Improve the structured supervision and training programs for junior researchers and PhD students to ensure consistent quality and support across various projects. **Formalized Dissemination Strategy**: Develop a more formalized dissemination strategy to enhance the sharing of research findings within the academic community and with industry partners. **Interdisciplinary Collaborations**: Expand interdisciplinary collaborations, particularly with the computer and electronics departments, to strengthen modelling and simulation efforts. **Application of AI and Machine Learning**: Increase focus on the application of AI and machine learning in research projects to remain at the forefront of technological advancements. **Infrastructure and Resources**: Improve infrastructure and resources to support the expansion into new research areas such as condition monitoring and systems of systems. **Support for International PhD Students**: Offer additional support to new international PhD students, facilitating a smoother transition and integration into the university environment. **Clarification of Mandatory Courses and Training Requirements**: Clarify the mandatory courses and training requirements for PhD students to

reduce stress and ensure relevance to their specific disciplines. **Reintroduction of Seminar Series and Webinars**: Reintroduce and formalize regular seminar series and webinars to foster a collaborative and engaging research environment.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

In conclusion, the observations and analyses highlight a critical need for improved support structures and clearer guidelines for PhD students. By enhancing collaboration, refining publication strategies, and ensuring equitable opportunities, the university can foster a more robust and vibrant research culture. Addressing the challenges faced by international students and junior researchers will further solidify the institution's commitment to excellence in both academic and non-academic spheres.

Some critical aspects of research culture:

Collaboration with Supervisors: The relationships between PhD students and their supervisors are robust and supportive, characterized by well-defined roles and open-door policies. **PhD Student Integration**: The social environment is conducive, with regular social gatherings. **Publication Strategy**: The strategy is driven by conference contributions, with the objective of publishing two journal papers before the PhD defense. **Junior Researchers**: Junior researchers include one assistant professor and one associate professor. They specialize in fluid power and systems simulation, not limited to aero, and are involved in the supervision of PhDs as co-supervisors. **Junior Researchers**: Assistant and associate professors are actively involved in the supervision of PhD students. **Proposal Writing**: PhD students receive support in proposal writing but do not lead the process. The central office provides support, although the writing process is often perceived as being too applied. **Paper Writing**: The process is predominantly led by PhD students, with supervisors providing feedback.

Recommendations

Enhancing Collaboration and Seminar Culture: Foster a more robust seminar culture within the group, returning to the previous frequency and quality of seminars. Encourage open dialogue and collaboration among supervisors, clearly defining roles and maintaining an open-door culture. **Improving Support for PhD Students:** Clarify the Individual Study Plans (ISP) regarding the balance between courses and research activities, ensuring transparency. Address payment issues for international PhD students outside the EU, ensuring timely and adequate financial support upon arrival. Review and refine mandatory courses to better align with the PhD students' research needs and goals. **Optimizing Proposal and Paper Writing Processes:** Provide comprehensive support for proposal writing, particularly for funding and

research council applications, while ensuring the content is sufficiently academic and not overly applied. Continue encouraging PhD students to lead the paper writing process, with supervisors offering constructive feedback and guidance. **Publications Strategy:** Develop a strategic plan for publications, emphasizing the importance of presenting at conferences and aiming for at least two journal papers before the PhD defense. **Promoting Gender Diversity and Social Environment:** Increase efforts to improve gender balance by engaging external professionals and utilizing insights to create a more inclusive environment. Implement structural changes to the team's work methods while maintaining beneficial informal practices, to foster a positive and inclusive social environment. **Infrastructure and Computing Facilities:** Invest in specialized equipment, to enhance the current infrastructure. Ensure continued access to advanced computing facilities, including supercomputers, to support high-level research activities. **Recruitment and Diversity:** Address the recruitment issues by diversifying the PhD candidate pool, reducing reliance on internal master's program graduates. Increase proactive university-level support to promote engineering to high school students, thereby fostering greater diversity in the future.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The current infrastructure meets basic needs but lacks some specialized equipment, particularly for battery-related research. Computing facilities, including super-computer access, are adequate. The work environment is positive, though gender diversity remains a challenge. Recruitment of PhDs from master's programs limits diversity as it creates a closed system where postdocs are recruited from within the same pool. This makes it difficult to attract new talent and increase diversity. More proactive university-level support is needed to promote engineering to high school students, thereby fostering greater diversity in the future. Additionally, the social environment in the team is satisfactory, with team members generally happy to come to work. Efforts to improve gender balance by engaging professionals and leveraging insights could be beneficial. Structural changes to the team's working methods might also help, though maintaining some informal practices is also acceptable. **Infrastructure**: The current infrastructure meets basic needs but requires specialized equipment, particularly for battery-related research. There is a need for additional external facilities, such as trial machines with realistic loads. **Computing Facilities**: The computing facilities are adequate, including access to supercomputers. **Work Environment**: The work environment is generally positive. However, improving gender diversity remains challenging due to the existing educational pipeline. **Recruitment Issues**: The recruitment of PhDs from master's programs limits diversity, creating a closed system where postdocs are recruited from within the same pool. This makes it difficult to attract new talent and increase diversity. There is a need for more proactive university-level support to promote engineering

to high school students, fostering greater diversity in the future. **Social Environment**: The social environment within the team is satisfactory, with members generally happy to come to work. Efforts to improve gender balance by engaging professionals and utilizing insights could be beneficial. Structural changes to the team's working methods might also help, although maintaining some informal practices is also acceptable.

Recommendations

Infrastructure: It is recommended to acquire specialized equipment. **Computing Facilities**: While the current computing facilities, including access to supercomputers, are adequate, it is imperative to ensure continuous updates and maintenance to keep them performing optimally. **Work Environment**: To address the challenges related to gender diversity, it is crucial to implement targeted initiatives. Collaborate with educational institutions to create programs that encourage female and underrepresented minorities to pursue careers in engineering. **Recruitment**: To diversify the recruitment pipeline, it is recommended to reach out to a broader array of universities and international programs. Establish partnerships with institutions that have diverse student bodies to attract a wider range of candidates. **University Support**: Enhance the university-level efforts to promote engineering among high school students. Develop outreach programs and workshops that highlight the opportunities within the field, aiming to inspire a diverse future workforce. **Social Environment**: Maintain the positive team dynamic while actively seeking to improve the gender balance. Engage professional consultants to provide insights and strategies for fostering an inclusive atmosphere. Encourage both structured and informal methods for team collaboration. **Research Conditions**: Clarify the requirements and expectations for courses in relation to research activities. Address logistical challenges for international researchers, such as payment issues for non-EU members, to ease their integration and participation.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Enhance Supervision and Training: Implement structured supervision and professional development programs for junior researchers and PhD students to ensure consistent quality and support.

Formalize Dissemination Strategy: Develop a formal publication and dissemination strategy to effectively share research findings and increase academic impact.

Expand Interdisciplinary Collaborations: Strengthen interdisciplinary partnerships, especially in artificial intelligence and condition monitoring, to drive innovation and broaden research horizons.

Improve Infrastructure: Invest in specialized equipment and advanced computing facilities to support cutting-edge research and maintain a competitive edge.

Financial Support: Develop a comprehensive financing plan to support ongoing research activities, infrastructure improvements, and recruitment initiatives.

Promote Diversity: Enhance recruitment efforts to diversify the PhD candidate pool and create inclusive environments through proactive initiatives and university-level support.

Panel H Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel H consists of the members presented in Table 1. The panel had a couple of pre-meetings before the visit to Linköping briefly discussing the reports from and on the divisions, asking for additional material in the form of publication lists from each unit and dividing the work amongst the members. Topics to be discussed during the visit have also been elaborated. The panel also emphasized the plan to visit labs and that also numerical results are presented.

Table 1. Panel H members and evaluation units.

NAME	FUNCTION	ORGANIZATION	COUNTRY	EVALUATION UNIT
Staffan Lundström	Chair	Luleå University of Technology	Sweden	H4.IEI.MVS: Applied Thermodynamics and Fluid Mechanics
Ewa Wäckelgård	Member	Dalarna University	Sweden	H1.IEI.ENSYS : Energy systems
Ramin Karim	Member	Luleå University of Technology	Sweden	H2.IEI.FLUMES: Fluid and Mechatronic Systems
Ulrich Krupp	Member	RWTH Aachen University	Germany	H3.IEI.KMAT: Engineering materials
Tracy Bhamra	Member	Royal Holloway, University of London	UK	H5.IEI.PROD: Product realisation
Niels Aage	Member	Technical University Denmark (DTU)	Denmark	H6.IEI.SOLMEK: Division of Solid Mechanics
Karin Fredriksson	Senior Coordinator	Linköping University	Sweden	

The evaluation units, also presented in Table 1, are all part of the Department of Management and Engineering (IEI) and all but the Energy systems division may be seen as a group of Divisions under the umbrella of Mechanical Engineering.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Positive issues

PhD students are very satisfied with their supervision, the departmental seed money is very good and drives new research collaborations, there is confidence in the department management and the local administration support is valued. The department labs are seen as a strength, it is very good that one node of the national computer cluster is at LiU and the strong collaboration with industry is a strength across all divisions.

Areas that can be improved

The two main things that can be improved are the amount of EU funding and gender balance across all the divisions.

Recommendations for the Department and University

Regarding EU funding

- Cover the overhead not given by EU.
- Help with the structure and general text for the applications.
- Central support with the administrative issues during applications, the initial part of the project and when running the project.

Regarding gender diversity

- Initiate dedicated programs for female students at the beginning of their master studies, to increase awareness of research careers and PhD studies.
- An effort on several levels guiding women into the research subjects. This should include work on strengthening the pipeline of girls into engineering subjects from high school.
- Promote role models at all levels (PhD students, Junior and Senior Researchers) at the university to all students, high school students and the public.

In addition, we recommend a fund for refurbishments and upscaling of lab equipment with costs up to a few MSEK (3-4 MSEK, for instance).

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Relevance and novelty: The division is represented by three research groups, additive manufacturing (AM), composites, and surface engineering. Materials testing and microstructure characterization are core facilities that are extensively used within and beyond the division. Common overarching topics are aerospace technologies and the role of defects in AM and fatigue behaviour of materials. The division considers light-weight design by high-strength alloys and composites, as well as the use of natural fibres as their contribution to LiU's profile area Sustainable Materials. The division explores H_2 technologies, e.g., high-pressure H_2 storage in CFRP cylinders. As this can be complemented by low-H-permeable coatings and/or Al/steel liners, H_2 technologies will benefit from the complementary expertise of the groups.

Quality of the research output: The established research ranges from very good to excellent. The interdisciplinary research on microstructure-fatigue interactions has been a long-term success story at LiU. The division established the topics surface engineering and additive manufacturing in a well interacting manner. The grant application success rate is very high.

Impact outside academy: The division has been strongly connected with local industry (e.g., SAAB, Siemens) and is reaching out to strengthen the industrial network (GKN, Chalmers AM centre). The division research focus to the needs of the end-user side and wants to be "the place industry goes for answers".

Strategies, priorities and future research plans: The division has been strengthened by the establishment of two new laboratories, for additive manufacturing and composites, respectively. The two labs have been acting as nuclei for new applied and fundamental research, e.g., on 3D-printing of refractories or using graphene-coated natural fibres for marine applications. While the division has been very successful in evolving disciplinary research, the new areas should inspire more inter- and multidisciplinary research. The division has been reaching out to participate (successfully) in Horizon Europe projects and initiated a bilateral program with Tunisia that may act as a pioneer to intensify collaboration with African countries in general. The sound experiences in setting up international collaborations can be considered as best practice and support other less experienced divisions. The activities to re-strengthen the existing close collaboration with solid mechanics, e.g., on joint projects in biomechanics of orthopaedic implants, are considered of high relevance and priority.

Recommendations

KMAT: *It is recommended to pro-actively align research topics to LiU's profile area "sustainable materials" (by strengthening the joint research topics between the groups, e.g., impact of AM defects on fatigue life, coatings on fibers, corrosion/hydrogen protection) and seeking for multidisciplinary collaborations, e.g., with a socio-economic perspective on circular economy problems. Furthermore, it is recommended to clearly identify application fields to link physics-based materials modeling with AI models, e.g., deep neural networks can be used to automatically extract microstructure descriptors to explore process microstructure property linkages. In this context, the existing collaboration with the division solid mechanics should be strengthened, i.e., by implementing topology optimization in AM or by applying numerical damage modeling to complement the number of experiments.*

University/ Department: *The division greatly benefits from the department funding for the new laboratories for AM and composites, respectively. It is recommended to ensure the quality and maintain/extend the capability of the laboratories, e.g., additional 3D printers and/or powder production for AM, by promoting them as shared facilities and setting up an infrastructure and maintenance fund that can be fed by budget allocated within external funding of the active divisions. It is recommended to motivate interdisciplinary research by increasing seed money funding.*

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategy: The division's publication strategy has been focused on publishing highly-cited articles in international journals with a high open-access rate.

Recruitment: The division receives a high number of applications (>100) and handles the selection process in a very efficient manner. To approach gender balance, the division has been trying to recruit female candidates if the topical competence is considered equal to the male applicants. This turned out to be successful.

Quality of the PhD training: The PhD students receive strong support during the start phase of their projects by their supervisors; excellent technical support, training (by the research engineers) and access to the experimental infrastructure is highly appreciated.

Networks and collaborations: The division is engaged in several networks, e.g., the CAM2 competence center for AM or the Swedish fatigue network UTMIS. Relevant networks of the seniors are shared with PhD students, junior researchers and post-docs. Although the PhD students get support from the seniors in dealing with the PhD course program, the general organization of the mandatory courses seems to be somewhat non-transparent.

Equal opportunities and gender equality: Most recently, the division employed three female PhD students. With 5 female out of 14.6 full-time equivalents in the academic staff, the division is in a good position.

Good research practice: In addition to journal publications and conference contributions, the division has been steadily making sure that the research results are of high application impact on an industrial level by spin-offs, filing patents etc.

Research in relation to teaching: Although the teaching load seems not to be distributed equally, the division can allocate enough time to develop research plans and strategies.

Recommendations

KMAT: *It is recommended to intensify the training of PhD students and post-docs in grant-application writing and in time management. The division should pro-actively follow up the success in attracting female researchers for materials engineering, e.g., by a social media campaign.*

University/ Department: *It is recommended to strengthen the division's successful path to reach gender balance and advertise this as best-practice role model. It is recommended to improve the organization of the mandatory PhD course program and to ensure timely access to the courses.*

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Organization and staffing: The division has a good balance between seniors / young researchers (6 employees) and post-docs / PhD students (8 employees), all of them experiencing excellent support by technical staff (3 research engineers). Strategically, the growth of the division and future recruitment will be aligned to external funding. The division has a very active and structured meeting culture with weekly Fika and monthly seminars, where PhD work, grants (including open calls) and publications are presented. In addition, they held a bi-weekly PhD/post-doc seminars, where all PhD students present their work once per semester. Due to the strong focus on experimental work, the office presence is very high.

Funding: From governmental side, funding for education has been decreasing, but for research has been increasing, reflecting a strong support of the department. The division has been very active in grant-proposal writing and hence, being successful in substantially increasing external funding since 2023. In particular the experience and deep insight into the European funding schemes of one of the seniors is of great support for the division to diversify external funding sources.

Research infrastructure: The division relies to a large extent on experimental infrastructure that has been successfully grown since the 80s. Maintaining the high quality of the infrastructure and extending it to the new research areas, i.e., composites, hydrogen and additive manufacturing, are the main concerns of the division. Neither the division nor the department have a clear research data management plan. Data storage is mainly done individually.

Support functions: The division is satisfied with the service of HR in employment. Recruitment is solely the responsibility of the division. Grant support office is not frequently used by the division, since the preselection and quality of the information is not sufficient.

Recommendations

KMAT: *It is recommended to implement a research data plan to ensure open since principles (F.A.I.R. principles). This might be an added value when it comes to coordinated, interdisciplinary grant applications.*

University/ Department: *It is recommended that the department promotes shared facilities. Allocate funding to interdisciplinary used equipment might motivate joint grant applications of various divisions of the mechanical engineering unit. It is further recommended that LiU offers an individualized grant-application support. Such an effort can be financed by co-applying for staff funding for the grant office.*

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division is curious whether LiRE25 may lead to substantial changes.

Panel H Report

Introduction

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In addition, we recommend a fund for refurbishments and upscaling of lab equipment with costs up to a few MSEK (3-4 MSEK, for instance).

Evaluated Unit's Name: IEI.MVS Applied Thermodynamics and Fluid Mechanics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division currently has no PhD students employed and only a limited number of researchers.

Relevance and novelty: Lecturing currently dominates in this division, but efforts are underway to strengthen research activities. Six research areas have been identified: oil-hydraulic cavitation, biogas, thermal management, hemodynamics, automotive aerodynamics, and indoor climate. These areas share common expertise in numerical tools, which represents a key strength within the division, alongside collaboration with industry and the use of Magnetic Resonance Imaging (MRI) in partnership with the University Hospital. Additionally, the division actively contributes to the development of numerical methods, particularly through applications of machine learning and physics-informed neural networks (PINNs). Another important and shared focus is multiphase flow research.

Quality of the research output: The quality ranges from good to excellent. However, the current publication rate is low, though published articles appear in relevant journals with high academic impact in the field of thermodynamics.

Impact outside academy: The deep knowledge and development of numerical tools for different applications with the coupling between numerical simulations and MRI as one example.

Strategies, priorities and future research plans: The division faces barriers to growth primarily due to limited funding and the cycle of balancing available time and growth efforts. The Division has minimal plans for adjunct professors but recognizes the role of collaboration and internal and external funding in building strong CVs. Here the existing internal seed money plays a role. Also dialogues and collaborations have been initiated with strong research groups alongside the already mentioned recruitment of established researchers.

Recommendations

MVS: *It is recommended to focus on fewer areas of research by grouping or reformulating areas, find the science in the numerics (for instance is multi-scale modelling mentioned) and capitalize on the knowledge build-up on MRI measurement of flows. As an inspiration the areas could be: Advanced Fluid Dynamics and Computational Modeling, Multi-phase flows, Thermal Management and Sustainability and Biomedical and Cardiovascular Modeling, possibly incorporating the final area in the other three. Furthermore, national and international collaboration should increase, and enrolling Adjunct Professors can be one alternative to promote this. Another way is to, in a more structural way and together, approach similar research units.*

University/ Department: *Enable young researchers to develop the new research fields proposed by the Division. The build-up of a generic MRI lab possibly as a department lab. A well-functioning MRI lab will certainly make the Divion more attractive on a national and international level. Continue with seed money.*

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategy: Main publication strategy is to increase the number of publications a year. With this in-mind there is a trend to publish in both research subject related journals as well as journals connected to the application area. This is relevant.

Recruitment: Recruitment currently prioritizes hiring established researchers who can attract external funding and contribute effectively to expanding research activities, given that existing staff are heavily engaged in teaching. While managerial skills are beneficial, strong project leadership and research experience are essential. New recruits should also support ongoing teaching responsibilities. Recruitment follows LiU's standard procedures. However, recruitment processes tend to be lengthy, and personal qualifications might receive insufficient attention during selection. Young early career researchers are doing lectures to a large extent but are recommended to apply for research funding and to increase their network for collaboration.

Quality of the PhD training: The quality of the PhD training cannot be assessed in depth since there are currently no PhD-students employed. A positive indicator is still that several previous PhD-students have positions in industry and at the University hospital in Linköping.

Networks and collaborations: The division network for collaboration is relatively small and includes collaborations with institutions like KTH, SLU, a German university, and SAAB, especially in thermal dynamics and aerodynamics. Strengthening CVs and collaboration with strong researchers are seen as essential for future development.

Equal opportunities and gender equality: The division has no women employed, and hence, the gender balance needs special attention.

Good research practice: Additional to journal publications active participation in conferences is essential for showcasing activities, attracting new collaborations, and building competencies. Furthermore, contributing as peer reviewers for respected scientific journals will ensure we stay updated with current developments in the field.

Research in relation to teaching: Connection to education is very strong, being an important component once the volume of research in increased.

Recommendations

MVS: *Increase efforts in grant applications by, for instance, discussing this topic more frequently than currently done and extending the national and international network. Actively implement measures to attract female researchers and PhD students. Given the existing gender imbalance at the Master level, it is crucial to engage existing female Master students in research activities early on. Additionally, carefully considering a gender perspective when formulating job advertisements may be important to get a better gender balance amongst the applicants.*

University/ Department: *Direct the help for grants to Divisions with too little research as a strategic effort. Take initiative for a shared database on successful applications. Facilitate collaboration on Department or Mechanical Engineering level on joint applications. Increase the Department meeting culture on all levels (Seniors, juniors, PhD-students).*

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Organization and staffing: The Division has a flat organization with 9 employees and working conditions are judged to be good. The division currently holds regular meetings discussing various topics, but they recognize a need for more frequent and structured meetings, such as short pulse meetings, to improve idea-sharing and project planning. Increasing the number of researchers, PhD students and improving gender balance is also necessary. Office presence fluctuates around 50%, which is challenging given the small size of the division; setting specific office days might help, although maintaining flexibility due to the extensive lecturing is preferred.

Funding: Undergraduate education provides the primary funding for the unit and increasing external funding is essential to support growing research activities. This is challenging due to intense competition. Although funding for smaller projects has been obtained, larger applications (e.g., VR) have been unsuccessful, highlighting the need for an internal review process before submission and having access to a shared database of successful proposals. Also, better inter-division collaboration, encouraged by the department, would be beneficial despite internal competition.

Research infrastructure: Numerical infrastructure primarily relies on the national cluster, which is partly located at LiU. However, it would be beneficial to have a smaller, readily accessible computer cluster within the Division or Department that does not require a written application and subsequent review for use. Experimental infrastructure is available at the University Hospital, within industry settings, and at other universities. Investment in a focused lab is interesting and if realized may increase Academic impact a lot.

Support functions: HR and communicational support are considered excellent, though support for application writing (possibly via FOSA/Grants Office) has been underutilized based on the fact that one researcher recently had valuable help from FOSA. It is suggested that the legal unit provides more help than just templates.

Recommendations

MVS: Increase frequency and focus of discussions around grant applications, potentially through dedicated meetings or workshops, and consider creating an internal repository of successful grant applications to improve application quality

Advocate internally for the acquisition of a small, readily accessible computer cluster at the Division to streamline research productivity without the current application and review requirements. And evaluate and propose strategic investment in a specialized research lab (MRI) to significantly enhance the academic impact of the Division and its research visibility.

Consider implementing at least two fixed office days per week to foster interaction, balancing this requirement with flexibility to accommodate teaching obligations.

University/ Department: Support the establishment and funding of a small-scale, accessible computational cluster at the departmental level to reduce administrative barriers and improve research efficiency. Additionally, as previously emphasized, prioritize resource allocation toward developing specialized experimental infrastructure or laboratories, such as MRI facilities, to significantly enhance academic output and promote interdisciplinary collaboration

Promote and incentivize inter-divisional and interdisciplinary research collaborations across departments to optimize research output and resource utilization.

Maintain and continue investing in strong HR and communication support, as these are currently highly valued and effective. The role of FOSA should be better communicated to the researchers and the legal office templates better explained.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division sees this report as valuable for future improvements.

Panel H Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Panel H consists of the members presented in Table 1. The panel had a couple of pre-meetings before the visit to Linköping briefly discussing the reports from and on the divisions, asking for additional material in the form of publication lists from each unit and dividing the work amongst the members. Topics to be discussed during the visit have also been elaborated. The panel also emphasized the plan to visit labs and that also numerical results are presented.

Table 1. Panel H members and evaluation units.

NAME	FUNCTION	ORGANIZATION	COUNTRY	EVALUATION UNIT
Staffan Lundström	Chair	Luleå University of Technology	Sweden	H4.IEI.MVS: Applied Thermodynamics and Fluid Mechanics
Ewa Wäckelgård	Member	Dalarna University	Sweden	H1.IEI.ENSYS : Energy systems
Ramin Karim	Member	Luleå University of Technology	Sweden	H2.IEI.FLUMES: Fluid and Mechatronic Systems
Ulrich Krupp	Member	RWTH Aachen University	Germany	H3.IEI.KMAT: Engineering materials
Tracy Bhamra	Member	Royal Holloway, University of London	UK	H5.IEI.PROD: Product realisation
Niels Aage	Member	Technical University Denmark (DTU)	Denmark	H6.IEI.SOLMEK: Division of Solid Mechanics
Karin Fredriksson	Senior Coordinator	Linköping University	Sweden	

The evaluation units, also presented in Table 1, are all part of the Department of Management and Engineering (IEI) and all but the Energy systems division may be seen as a group of Divisions under the umbrella of Mechanical Engineering.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Positive issues

PhD students are very satisfied with their supervision, the departmental seed money is very good and drives new research collaborations, there is confidence in the department management and the local administration support is valued. The department labs are seen as a strength, it is very good that one node of the national computer cluster is at LiU and the strong collaboration with industry is a strength across all divisions.

Areas that can be improved

The two main things that can be improved are the amount of EU funding and gender balance across all the divisions.

Recommendations for the Department and University

Regarding EU funding

- Cover the overhead not given by EU.
- Help with the structure and general text for the applications.
- Central support with the administrative issues during applications, the initial part of the project and when running the project.

Regarding gender diversity

- Initiate dedicated programs for female students at the beginning of their master studies, to increase awareness of research careers and PhD studies.
- An effort on several levels guiding women into the research subjects. This should include work on strengthening the pipeline of girls into engineering subjects from high school.
- Promote role models at all levels (PhD students, Junior and Senior Researchers) at the university to all students, high school students and the public.

In addition, we recommend a fund for refurbishments and upscaling of lab equipment with costs up to a few MSEK (3-4 MSEK, for instance).

Evaluated Unit's Name: IEI.PROD Product Realisation

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) Relevance and novelty of the research topics covered by the evaluation unit,

The Division of Product Realisation is highly interdisciplinary, and its research covers a wide variety of topics mainly focussed on design, product development methodology, design automation and industrial cyber-physical systems. It is also well aligned with LiUs target area of sustainable societal transition although this was not very clear in the self-evaluation document. There is also evidence of significant collaboration across the University both outside of the division and the department related to areas such as Additive Manufacturing and Design. The topics covered between the two units in the division are highly relevant to society and industry and they address important topics related to design, sustainability and production. There is some novelty, but the group is very much aligned to industry and largely focussed on innovation funding (VINNOVA) so scientific novelty may be more limited than in some other divisions.

2) Quality of the research outputs,

Outputs appear to be of high quality with a large percentage published in Q1 journals with high citations. They publish in a range of different types of journals across different disciplines and these reflect the interdisciplinary nature of division's research.

3) Impact outside academia,

The division works extensively with industry across all research areas and produces publications with industrial partners as co-authors. This provides some evidence that there may be impact beyond academia but overall, it was difficult to identify what this impact was beyond collaboration in research.

4) Strategies, priorities and future research plans

The group appears to be in transition and looking for ways to work more closely together. As it is currently configured it is difficult to see what brings them together as a division. The priorities are clearly larger funded projects to enable the employment of more PhD Students and Post-Docs.

Recommendations

- The Division is well networked both across different divisions within the Department and more widely at LiU, this should be fully supported and encouraged as it demonstrates the interdisciplinary nature of their research.
- Spending time articulating their impact outside of academia (i.e. what difference they have made) would enable them to demonstrate their importance to industry funders and may lead to more industrial PhDs and industry funding.

- The Division should prioritise larger funding proposals that enable the growth in the number of junior researchers, Post-Docs and PhD students.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication strategies,

The division clearly has a strong publication strategy based on high quality outputs in journals and key conferences. All members of the division (including PhD students) are contributing well to this and demonstrating good academic impact. A high percentage of the outputs are open access.

2) Recruitment, Opportunities for early-career researchers to develop their originality and independence.

This division has very few early-career researchers currently and due to the high teaching load across all staff it seems to be difficult for early career researchers to have enough time to demonstrate their independence fully although they are writing some national funding proposals.

3) Quality of the PhD training

The PhD training, support and supervision within the division is excellent. All PhD students commended their supervision and the support they get to help build their careers. There were however some concerns about the wider departmental training, particularly the accessibility and timing of mandatory courses. The Departmental PhD Days were seen as a very positive development.

4) Academic as well as non-academic networks and collaborations

The Division is well networked within their distinct disciplines, but most national collaborators are from industry rather than other universities. They are also starting to build their international university collaborative network in order to access international research funds but this also could be extended further across all members of the division.

5) Equal opportunities and gender equality

All graduated PhDs in recent years have been male and whilst there have been a few female PhD students recruited recently the group is overwhelming male with only one female senior researcher and no female junior researchers. The division has been advertising positions more widely to try to attract a more diverse applicant pool. This gender balance is unusual for a division that includes design, and the division, department and university need to consider how to address this problem more effectively.

6) Good research practice

The division clearly demonstrates excellent research practice. The research methods employed, and the areas of focus are in line with what is expected and what would be seen at other leading research universities across the world. The division provides opportunities for research discussions both across the whole division and within the different units and demonstrates a culture of sharing and collaboration but overall they indicated that they thought this could be strengthened. There is clearly a balance to be found between large whole division seminars and smaller more focussed discussions on key topics.

7) Research in relation to teaching

This division has very high teaching loads, which clearly demonstrates the importance of the subjects they cover but does also enable them to bring their cutting-edge research into their teaching regularly. However, the group has to balance this high teaching load between all the researchers meaning that overall, they have less time for research than some other divisions.

Recommendations

- The Division demonstrates best-practice in its support for PhD students so this should be maintained.
- The Departmental PhD Days should be continued.
- The Division should look for opportunities to employ more junior researchers to help balance the teaching requirements and enable more time for research funding applications.
- The Division should grow both its national and international university collaboration network to help with gaining research funding.
- Improving the Gender balance needs to be the focus of work across the whole University.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organisation

The division is large (over 40 people in total) and divided into four groups within two distinct units. In the self-evaluation the division appeared not to be working closely together. However, in the interviews they made it clear that they were working hard to address siloed working and initiating more cross-unit activities. This may take some time to achieve as it is not immediately obvious how some of the groups fit together within one division.

2) Staffing

This has largely been addressed above but overall the group is unbalanced with fewer junior researchers, post-docs and PhDs than would be expected from the number of senior researchers.

3) Funding

The division would benefit from more, larger research projects to enable the employment of post-docs and junior researchers. The focus currently is innovation funding and industry projects but overall external research funding has declined over recent years. The funding from industry is also relatively low and appears to be largely in-kind. They may want to focus on being part of larger

collaborative national and EU research projects to build their research reputation before leading large projects in the future**.**

4) Research infrastructure

Members of the division use departmental facilities such as the Composites Lab and Additive Manufacturing Lab. They have some of their own research facilities such as the Robotics Lab but these appear to lack funding and are not delivering what they need for their research. They also use other facilities for prototyping that are essential for this type of research but these are mainly teaching labs so access can be challenging due to a lack of clear administration and lab support.

5) Support functions

The Departmental support functions appear to work well with the Division but there was some concern around the support for EU funding from the Grants Office. More support for smaller EU grants would enable the Division to build up its track record with the EU before being part of larger Horizon bids.

Recommendations

- The Division would benefit from reviewing its strategy to identify clear methods, research areas or approaches that bring them together to further improve collaboration within the division.
- The University support function around large grants, particular EU could be better focussed on the requirements from divisions, in particular providing templates and more timely information on Open Calls.
- There is an opportunity for the Department to support a wider range of labs for research that help ensure the research infrastructure for the division is fit for purpose. This approach would also facilitate more cross-division working.
- There needs to be funding available for research infrastructure to ensure the division has access to the appropriate facilities

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Whilst the senior researchers tried to stress that they are working collaboratively across the division it still appears that the group is very much split and operates largely as two distinct units. That was also evident from the conversations with the junior researchers. It may be that the two areas could operate either as separate divisions or each be merged with another areas where there is more cohesion.

The Cross-University Design Group was seen as a positive development for some within the division and enables LiU to showcase its strengths in this area. This could be something that could be built on for funding and wider industry collaboration.

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Regarding gender diversity

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- An effort on several levels guiding women into the research subjects. This should include work on strengthening the pipeline of girls into engineering subjects from high school.
- Promote role models at all levels (PhD students, Junior and Senior Researchers) at the university to all students, high school students and the public.

Evaluated Unit's Name: IEI.SOLMEK Solid Mechanics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

1) Relevance and novelty of the research topics covered by the evaluation unit,

The research conducted at this division covers topics which are both of importance to industry and to academia within the field of solid mechanics, as well as the other division within mechanical engineering at LiU. These can be grouped as 1: High Temperature Fatigue and fracture, 2: Biomechanics, 3: Structural Optimization and 4: Structural Integrity. There is a clear overarching theme, i.e. strong capabilities in computational mechanics. Although above research topics are not new in themselves, emerging technologies such as additive manufacturing means that novel research is necessary to support technological advances.

2) Quality of the research outputs,

The research quality is evident from the divisions bibliometric data, which demonstrates the ability to publish in top tier technical journals.

3) Impact outside academia,

The division's close ties to industry and large number of industrial PhD students clearly shows that the division makes significant impact outside of academia.

4) Strategies, priorities and future research plans

The division has a clear strategy for how to align their research with emerging technologies and societal needs. This includes computational methods for additive manufacturing and design optimization, AI/ML for material mechanics, biomechanics/hip-implants as well as a renewed focus on classical disciplines such as bolted connections with focus on composite/metal interaction challenges.

Recommendations

- Maintain scope of competences and the focus on computational mechanics.
- We suggest the division develop a joint strategy for writing applications, sharing of best practices, research idea generation, etc. This could e.g. be facilitated through the regular senior staff meeting. The goal should be to continuous external research funding plan as a recurring and always present discussion point.
- Similarly, we recommend that effort is put into the identification of appropriate calls. The aim should be to look outside the commonly used instruments.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication strategies,

The current publication strategy is to focus on technical subject-specific scientific journals. This choice is motivated based on tradition and to ensure novelties are read by appropriate researchers within the research fields. Open access is prioritized, covering most publications.

2) Recruitment,

Recruitment of PhD candidates is mainly done from within LiU. This has been / is possible due to a large pool of qualified internal candidates and emphasis is given to Swedish speaking candidates, or internationals with good English skills.

3) Quality of the PhD training

PhD candidates experience direct and easy access to supervisors and are satisfied with the level of supervision. Especially, the administrative tasks are very well assisted in collaboration with senior researchers, e.g. assistance on ISP planning and updating. The course work required as part of the PhD is significant. Sometimes access to faculty courses such as “paper writing” and “university didactics” can be hard to enroll in at appropriate times.

4) Academic as well as non-academic networks and collaborations

The division has a strong collaboration within mechanical engineering and with the university hospital. These collaborations are necessary as they allow for mechanical testing and subsequent verification and tuning of numerical methods. The same holds for company partners and select Swedish universities. However, collaborations with international academic institutions are not pronounced.

5) Equal opportunities and gender equality

The division has no women employed, and hence, the gender balance needs special attention. There is, however, an increasing interest in solid mechanics from students, and from information provided during the panel interviews, we have been informed that there are between 10-25% women on master courses. In summary, in-house candidates are present, although in reduced numbers.

6) Good research practice

The division facilitates a high-quality research culture based on a strong sense of belonging, supportive for both juniors and seniors in their endeavor to drive forward new research areas within the scope of the division's core research areas. In-office work is emphasized. An indicator of the success of the current research practices is demonstrated through the large number of docents.

7) Research in relation to teaching

The division is heavily involved in teaching and aims at ensuring current research is included in master classes. This is both a good way to ensure in-house recruitment but also has the benefit of

MSc thesis being coupled to research projects. However, since the division is tasked with a very high teaching load, this means that time for research is low.

Recommendations

- Maintain a strong interdivision collaboration with KMAT, PROD & the university hospital.
- Suggestion for increased visibility of division: Potential for more publications in non-specialized ("popular science") journals. Emerging fields such as AM and BioMech are obvious candidates for subjects that fit here.
- Focused work on division level to increase the level of international collaborations with other academic institutions. This provides, amongst others, a good entry point for attracting EU funding. Could e.g. be initiated through PhD candidate research exchanges to relevant groups.
- Improved gender balance: See comments and suggestions under general observations.
- The division is heavily involved in teaching. Steps are recommended to ensure better division between research and teaching time. External funding is the recommended tool to achieve this, c.f. previous recommendation on a joined strategy for applications.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

1) Organization and staffing

The division is relatively small in size and is therefore organized using a flat hierarchy. This is an appropriate and natural choice. Each sub-area typically includes two senior researchers, with the exception of structural optimization with only one dedicated senior staff. There is a large degree of interdisciplinary collaboration and support across sub-fields, particularly enabled by the computational mechanics' theme.

3) Funding

The division's financial foundation relies heavily on internal funding through teaching activities. In the period of evaluation, there has been a steady decline in external research funding, which may pose challenges for long-term research sustainability and development.

4) Research infrastructure

Regarding research infrastructure, the staff expressed general satisfaction with current resources. Access to computational facilities, including national high-performance computing platforms, is reported to be sufficient for ongoing research needs. Laboratory and experimental testing capabilities were also described positively. However, the evaluation panel noted that the financial model for laboratory operations and maintenance is not fully transparent.

5) Support functions

Support functions are highly appreciated within the division. Especially, the local IT services are described as highly effective and responsive. In addition, centralized legal support functions is considered to be working efficiently.

Recommendations

- The current accessibility of computing resources should the maintained. This applies to both national resources and local resources.
- We highly recommend that the local IT support is kept local to the department. Centralization of such support functions should be avoided.
- We recommend increased focus on acquiring external funding. We acknowledge the increased competition and suggest this is mitigated through additional effort in this field. Success can also be achieved by joint consortiums e.g. with the university hospital and partners outside of LiU.
- The optimization group within the division has reached low critical mass. Due to relevance and a strong history of this field within the division, special departmental focus should be given to support this area by additional junior/senior staff.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division is unclear on how the result of LiRE25 will be used and whether the outcome may lead to significant changes.

Panel I Report: General observations and recommendations

Introduction

Introducing the panel members (in alphabetical order):

Christian Larsen is Professor at Department of Economics and Business Economics, Aarhus University, Denmark. His research interests include operations research, inventory control, production planning, and stochastic decision models.

Ina Drejer is Professor with special responsibilities in impact studies and innovation at Aalborg University Business School, Denmark. Her research interests include innovation and industrial dynamics, innovation policy, university-industry interaction, inter-firm relations, and regional economics.

Marianne Jahre is professor and the Dean of Research at KLU, Germany, and Adjunct Professor at BI Norwegian Business School. She also has a professorship at Lund University. Her main research focus is design of supply networks and logistics systems and supply chain risk management within different contexts.

Marielle Christiansen is the Dean of the Faculty of Economics and Management at the Norwegian University of Science and Technology (NTNU). Prior to this role, she served as Head of the Department of Industrial Economics and Technology Management at NTNU. Her primary research interests are maritime transport and logistics optimization.

Peter Björk is professor in marketing at HANKEN School of Economics, Finland. His research focus is on the field of service marketing, consumer behavior, tourism marketing and destination development. He has a special interest in service innovation and design, destination branding, tourist experiences and attraction marketing.

Rune Dahl Fitjar is professor of innovation studies and head of the Centre for Innovation Research at UiS School of Business, University of Stavanger, Norway. Previously, he was Pro-Rector for Innovation and Society at University of Stavanger. His research focus is innovation and regional development.

The panel's observations and recommendations are based on the evaluation units' self-evaluation reports and supplementary materials on funding, staff composition and bibliometrics, as well as dialogues with researchers at all levels from the evaluation unit. The

dialogue meetings were organized by LiU according to seniority, with separate meetings with senior researchers/PIs, junior researchers, and PhD students.

While two members of the panel were assigned main and secondary responsibility for a specific evaluation unit, the observations and recommendations are the result of a joint process involving all members of the evaluation panel.

The panel's commitment includes the following evaluation units (divisions): KTS (Communications and Transport Systems), INDEK (Industrial Management), LOGQ (Logistics and Quality Management), PEK (Production Economics), and PIE (Project management, Innovation and Entrepreneurship).

The evaluation panel has been assisted by Johanna Nählinder, who acted as panel coordinator on behalf of Linköping University.

General Observations that go beyond the specific evaluation units

The general observations presented in the following are based on observations across the five evaluation units (divisions) covered by the panel. The issues raised were stressed to varying degrees by the different divisions.

The evaluation panel is grateful for the opportunity to participate in the LiRE25 process. It has provided valuable insights into some of the very interesting and highly relevant research being conducted at Linköping University. We met engaged and impactful researchers at all levels and saw examples of the impressive achievements that LiU have made during its first 50 years. We hope that the observations and recommendations at the general level as well as for the specific divisions covered by the panel can contribute to the further development of LiU as a strong research institution.

Structural Challenges in the Swedish Research Funding System

Before moving to the observations that are specific to Linköping University, the panel finds it important to stress that the Swedish system with a heavy reliance on external funding for research is unique. Because there is a very low level of internal funding for research, positions are driven by teaching, while research time is so closely tied to external funding that it in many cases becomes equal to working on externally funded projects. As a result, academic staff without external research funding are left to focus primarily, or exclusively, on teaching. This creates substantial pressure on the academic staff and is seen as a stress-generating factor. While the challenges vary across divisions, the theme of stress and pressure to secure funding has been a recurring theme in the dialogues.

Although there is little that LiU can do in the short term to change the national system, ***the panel recommends that LiU focuses on how it, within the limits of the existing framework,***

can support the development of a working environment that is more conductive to independent research, and not only reduces the pressure that many, not least younger researchers, feel, but also allows for realizing the ambitions that LiU has concerning Excellence, Innovativeness, and Interdisciplinarity. This involves aligning ambitions and expectations with resources. In the long term, LiU should join forces within the university sector in Sweden to evaluate the implications of the current research funding system for the competitiveness of Swedish research.

Varying Understandings of Research and the Need for Clearer Incentives

Partially related to the above, the panel observed considerable variation in how "research" is understood across and within divisions. For some units and individuals, research is synonymous with externally funded projects; for others, it involves industry interactions; and some perceive research as scientific publishing, with differing emphases on quantity, quality, or impact. ***The panel recommends that LiU become clearer on defining what is considered "good research" and use this definition to guide the development and implementation of a clearer and more transparent incentive system for developing good (or excellent, with reference to one of the three key terms in LiU's vision) research.*** Clearer and more transparent incentives (including promotion criteria) — not only in relation to research, but across all prioritized areas — will, in the opinion of the evaluation panel, signal that the organization (leaders at different levels) is serious about the prioritized goals and is willing to reward the employees' contributions to achieving these goals.

Transparency and Strategic Communication

The issue of transparency is also relevant in relation to the four identified profile areas at LiU (Life Science Technologies; Materials Science for Sustainable Technologies; Societal Transformations; and Visual Digital Futures). The level of knowledge about the profile areas — what they are; how they have been identified; what they entail; and how they relate to/can be relevant to the different evaluation units and individual researchers, including what benefits are associated with working with the profile areas — varies, but in general, the panel perceives LiU researchers' knowledge about the profile areas as vague.

During the meetings with researchers, the panel encountered additional indications of insufficient information flow and lack of transparency throughout the organization. One example is the apparently limited knowledge about or understanding of the internal budgeting and resource allocation model. The panel was left with the impression of a generally weak understanding of how this model works and how it might be used for strategic planning and prioritization. This links to broader impressions of a lack of strategic thinking, understanding, and leadership at the division level. Much activity seems to be based on tacit knowledge, short-term opportunities, or reactive responses to immediate needs. Accordingly, ***the panel recommends that LiU strengthen its internal information system and ensure greater transparency, including on the rationale and expectations behind strategic***

***initiatives. Furthermore, it is recommended to enhance the focus on strategic leadership in LiU's management training programs*.**

Societal Impact: Definitions and Measurement

The societal impact of the research carried out by the divisions is one of the issues that the evaluation panel has been asked to assess. While all divisions agree that societal impact is important and something they aim to achieve, the definitions and understandings of what constitutes societal impact — and how it should be measured — differ considerably. The understandings span from seeing teaching as the main impact-generating factor to describing interactions with industry and/or externally funded projects as equivalent to societal impact. Being very open to how societal impact can be defined is valid, but ***if LiU intends to be able to communicate its societal impact and develop an incentive structure for prioritizing (and more systematically reporting) the societal relevance of research, the evaluation panel recommends that LiU develop and share clearer guidelines on how societal impact is defined and measured at LiU***.

Onboarding and Orientation of New Staff

A recurring issue in the dialogues with the divisions was the onboarding of new staff (from PhD students and above). Many reported a feeling of largely being left to themselves in the early stages of their employment, particularly when trying to understand how the "system" works and what is expected of them. Therefore, ***the evaluation panel recommends that LiU initiate a process to develop a structured onboarding program, adaptable to various staff categories.***

Recruitment Challenges and Support for Early Career Researchers

Opportunities for early career researchers to develop originality and independence were among the areas the evaluation panel was asked to address. A recurring theme, both in the self-evaluation report and dialogues with senior staff, was the issue of recruitment.

There is a widely shared perception among senior researchers/PIs that LiU is highly reliant on internal recruitment. Recruitment of faculty is in most divisions described as driven by teaching needs (while still being dependent on external funding) and own PhDs are by several perceived as a crucial — and in some cases the only — recruitment channel for acquiring junior scholars. Many also rely mainly on recruiting LiU master students as PhD candidates and struggle to attract candidates from outside. At the same time, most divisions report that their master students generally do not view pursuing a PhD as being an attractive career path. Overall, there is a widespread perception of severe recruitment challenges and difficulties hiring externally, including internationally. Becoming more international in the recruitment is by some divisions, which mainly teach courses in Swedish, perceived as almost impossible because of the teaching-driven recruitment. Despite this, there appears to be little interest in increasing the number of courses offered in English, due in part to perceptions that teaching,

interaction with industry, and local networking require Swedish language skills. As a result, some divisions and groups of researchers appear inward-looking.

That said, there are also examples of divisions that have successfully begun teaching more courses in English to accommodate to more international staff. The panel also met researchers who engaged intensively with industry (some of these researchers were industry-funded) despite not yet mastering the Swedish language. ***These positive examples could serve as models and inspiration for a more outward-looking and internationally oriented recruitment strategy***. There are some observations of external recruitment having increased during the last decade, which is in accordance with the diversity in the group of PhD students and junior scholars that the panel met, representing different nationalities and professional backgrounds.

The panel sees a large potential in the PhDs and junior faculty but is also left with the impression of significant room for improvement in creating supportive conditions for motivated and capable early-career researchers. There are e.g. several examples of junior scholars that have demonstrated the capability to publish in highly ranked journals but nonetheless are employed on conditions that leave them with very little research time. In addition to having high teaching loads (e.g. 75% teaching), some also teach multiple courses across different teaching programs, and it is the panel's impression that junior scholars with limited teaching experience are not provided with additional preparation time or coordination support compared to their senior colleagues. In addition, many junior researchers feel that their careers are in their own hands, and that there is no particular support system for juniors in terms of career development ("junior faculty is just faculty"). Based on these observations, ***the panel recommends that LiU establish systems and structures for early-career development, including mentoring programs, to support junior scholars in building sustainable academic careers.***

Teaching Load and Research Time

Although teaching is not a topic that is directly included in the evaluation, the above reflects that teaching was a consistent topic at every dialogue meeting the panel had. Because the conditions for carrying out research are closely tied to teaching obligations, the panel has one recommendation that is directly related to teaching and the way that this is organized.

The dialogues have revealed a clear need for more concentrated research time, especially for the younger scholars who are in the qualifying phase of their academic careers, whether this career will be at LiU or elsewhere. ***The panel recommends that teaching activities on an individual level are planned in a way that allows for consecutive periods of time to focus on research activities.*** One way of achieving this could be to explore opportunities for more joint courses across teaching programs and reduce the number of small courses with very few students. In addition to this, the panel recommends avoiding excessive dispersion of teaching obligations, particularly for junior researchers and PhD students.

Importantly, any reductions in teaching loads achieved through organizing teaching in different ways should not result in decreased financial resources allocated to teaching at the division level.

PhD Training

The conditions for PhD students appear to vary considerably not only across divisions, but also within divisions. The general impression is that much depend on the individual supervisor. This leaves the PhD students in a very vulnerable position, not only in terms of their relationships with supervisors, but also if the supervisor leaves the university before the PhD is completed.

Some PhD students are affiliated with externally funded centers or projects, which can offer shared guidelines and courses for PhD students and foster a sense of community. However, it is the evaluation panel's understanding that there are no university level standards concerning issues such as PhD onboarding, credit requirements (which can vary between 60 and 90), licentiate expectations, engagement with external research communities, or which types of teaching activities and teaching load can be expected from a PhD student.

Several divisions suggest the establishment of a graduate school to provide more structure and build a critical mass for developing and building a community for the PhD students, who are otherwise left very much on their own. Many divisions have very small PhD cohorts and struggle to develop a critical mass internally, while the division structure creates silos that reduces interaction between PhD students across divisions. The panel does not have sufficient insight to assess whether creating a graduate school is the most appropriate solution, but we do ***recommend that LiU initiate a targeted evaluation of the current organization of PhD training, including the feasibility of developing more attractive consistent conditions for both internal and external, including international, PhD candidates*.**

Gender Equality and Diversity

Most of the divisions evaluated by the panel face challenges related to gender imbalance. While some researchers recalled an earlier initiative promoting gender equality (unclear whether this was at department, faculty or university level), nobody were aware of any current initiatives for promoting a more equal gender balance. Only after the panel's dialogues with researchers did we learn of the existence of a Gender Equality Plan for Linköping University (dated November 2024). That none of the divisions mentioned this plan and how it can be used for promoting gender equality, indicates a lack of awareness and implementation. ***The panel therefore recommends that LiU intensify efforts to disseminate and integrate the Gender Equality Plan into the university's daily operations and culture*.**

Historical Structures and the Potential for Organizational Renewal

When asked about division-level organization or policy variation — such as differences in credit requirements for PhD students — responses often referred to history. The LiRE25

process provides an ideal opportunity to challenge and reassess some of the historically determined paths and structures at division and overall level.

One example could be to reassess the current configuration of divisions. In general, the researchers from the different divisions struggled with explaining what defines their unit or even whether they are *one* unit. Some divisions also appear vulnerable in terms of being heavily reliant on one or two key individuals. At the same time, there appears to be unexplored potential in closer relations to other divisions, or parts of other divisions. Therefore, ***the evaluation panel recommends that LiU include an assessment of the current structure of divisions in the next stages of the LiRE25 process. However, any such assessment must be conducted carefully to avoid generating additional stress in the organization*.**

Research Infrastructure, Support Functions, and Ethical Culture

The issues and recommendations presented above are the ones that the evaluation panel find most relevant for further development of the research culture and quality at LiU. The evaluation guidelines also covered areas such as research integrity and ethical culture, research infrastructure, and support functions.

The two latter areas (i.e. research infrastructure and support functions) were only sporadically addressed in the self-evaluation reports and dialogues with researchers. Some researchers expressed the need for more support in areas such as recruitment and the acquisition of external (e.g. EU) funding. The panel was also presented with a request for improved communication from the central university services regarding upcoming funding opportunities. Several researchers indicated that they currently receive more information about funding opportunities through their external networks than through internal channels at LiU.

Specifically concerning Horizon Europe, the evaluation panel noted that LiU do not appear to share draft versions of the work programs with researchers. Sharing draft work programs from Horizon Europe internally at universities is commonly accepted, typically accompanied by instructions not to disseminate the drafts further. Not sharing these drafts may put LiU researchers at a disadvantage as they miss the opportunity to prepare for upcoming calls in advance.

Research integrity and ethics were only mentioned in the context of avoiding predatory journals. ***The panel recommends that LiU place central responsibility for promoting ethical research conduct and integrity at the university level, rather that delegating it to divisions.***

Panel I Report: IEI.INDEK

Introduction

This report summarizes the panel's evaluation of the Industrial Management (INDEK) division at IEI. The evaluation draws on the division's self-assessment report, bibliometric analysis, and interviews with junior and senior faculty and PhD students.

Please refer to the separate document with general observations and recommendations for a presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Evaluated Unit's Name: IEI.INDEK Industrial Management

Research and the Research Quality

Relevance and novelty of the research topics covered by the evaluation unit

The relevance of the research carried out at the Industrial Management division (INDEK) is deemed high. Business to Business research (B2B) has a long history and can today be considered a mature discipline with own journals, conferences, and research communities. The B2B context is in the flux of change challenging our understanding of business models, value creation, sustainability, market strategies, servitization, value chain and growth, all of which are areas of research focus of the division.

INDEK's research is organized in three research centers: Center for Business Model Innovation/CBIM (Servitization, Service business models, Proactive market strategies, Value chain sustainability), Center for Applied Research in SMEs/CAM (Value propositions, Business models, Sustainability, Digitalization and market strategies), and Digitisation and Management (Value creation, Service delivery, Capabilities, Knowledge management and control). The research questions addressed are of interest to academia and of industrial relevance, particularly so when issues of how to navigate in rapidly changing environments and sustainability discourses are in focus.

CBIM is described as the core research center of the division, functioning as a collaborative and communicative platform. The role of the Digitisation & Management center is not prominent, and CAM is described as the center where research and collaboration with local/regional SMEa is gathered.

The level of novelty in ongoing research is on a university standard level, if publications in high-quality outlets are used as a measure of novelty. However, the development of radically new concepts, new lines of thought, cross-disciplinary research or new methodological approaches is not evident in existing research. Nonetheless, there is an expressed intention to add more competence in quantitative research methods, and an aim for more cross-disciplinary research. Strategies for how to fully realize the intentions are not yet in place.

Impact outside academia

Success in winning project funding indicates industry relevance but there is room for improvement as the financial report attached to the self-evaluation report indicates. The rate of winning and losing project bids is not reported.

Quality of the research output

In terms of publications during the last 10 years, the division shows a steady flow of articles and conference publications, and the leading professors are well recognized and highly cited, as the Stanford University World's Top 2% Scientists list evidence. Analyzing the publication lists of the faculty members, some discrepancies in productivity and choice of outlets are to be noticed.

The self-assessment report identifies four challenges: project funding (larger/ technically oriented projects), collaboration, methodological portfolio (more quantitatively oriented methods), and publications in high-quality outlets (to convert results into meaningful publications). Solutions are presented and some measures have been taken. To mitigate the bias towards qualitative studies, quantitative competences are leveled up at the division, as mentioned.

The division has a good organizational structure with full-time active professors, associate professors and assistant professors. Currently there are few PhD researchers. With this set of resources and the challenges highlighted in the self-evaluation report, we echo the solutions suggested, i.e., to identify strategic partners for collaborations, and pooling of resources for large externally funded projects. Especially attempts to initiate cross-disciplinary research should be given priority. A brief look at ongoing research projects at LiU (across departments and divisions) give reasons to believe that cooperation and collaboration partners are also to be found in-house. The division would benefit from increasing the number of active PhD researchers. A larger cohort would most probably bring in new thinking, and, after graduation, extend the alumni network for future benefits.

In terms of research quality, the challenge is to keep up the good work among the senior researchers and to elevate the research commitment among the junior faculty members. The research quality in terms of new thinking and innovativeness could also be improved by a larger cohort of doctoral students.

Recommendations

To achieve research excellence in future development, we recommend that the division:

1) **Collaboratively establish a shared understanding of research ambition and specific targets**. While the division has produced impactful research, the research quality could be further improved if a stronger alignment is created across the division in terms of research ambitions and what should be the specific future research targets for the division.
2) **Clarify and narrow research focus to improve external visibility and impact.** The current research areas are broad and would benefit from a sharper focus for improved strategic positioning.
3) **Develop and implement incentive structures that support high-quality and -impact publications, cross-disciplinary research, and successful grant acquisition.** The division expresses a desire to continue publishing high-quality research, engage in more cross-disciplinary research, and acquire more and larger externally funded research projects, but the incentive structures to support such a development are not clear.

Research Culture

The self-evaluation report gives the impression of a sound and vibrant research culture, including meetings, seminars and workshops for faculty members, external guests and PhD researchers to present and discuss their ongoing research. An inviting atmosphere is promoted, and the value of keeping face to face meetings is recognized as the issue of post-COVID behavior may distance people from each other.

Recruitment and opportunities for early-career researchers to develop their originality and independence

The recruitment of employees has primarily been internal, which in the self-evaluation report's SWOT analysis has been listed as a weakness due to the lack of external academic experience and perspective. It is also important to prepare the PhD students for both academic and non-academic careers, including at universities outside LiU. In this respect, the role of the senior faculty members is to be emphasized. There seems to be a stronger connection between the senior faculty members and their PhD students than between the senior and the junior faculty members.

Academic as well as non-academic networks and collaborations

The researchers at the division seem to have stronger research connections to external actors than internally, which may weaken the feeling of having a joint research culture. The self-

evaluation report does not evidence any clear strategy for how to achieve a stronger social and scientific impact. The absence of a more detailed publication strategy is also noticed.

The division is strong on industry driven research in collaboration with its many industry partners. This is a good basis to argue for the strong relevance of research as noted before.

Quality of PhD training

The self-evaluation report and the information collected during the interviews point to the need to develop a stronger research culture starting from the PhD program and the need to get a larger cohort of PhD students, involvement of all faculty members, setting goals for research, and systematic monitoring.

Recommendations

To foster a stronger research culture, we recommend that the division:

1) **Promote a collective research identity and prioritize resources for research.** Collectively recognize the importance of research in all its dimensions and integrate this recognition into practice, supported by an updated resourcing model to enhance the focus on research.
2) **Improve the transparency and clarity of career advancement criteria.** Clearly communicate the personnel plan, including the criteria for career advancement.
3) **Develop a clear retention and succession strategy**. Address the risk that only a few faculty members publish in top-ranked journals. Their retention is crucial not only for maintaining high-quality publications but also for enhancing the division's image, securing project funding, and increasing its overall attractiveness.
4) **Expand the number of PhD students.** As PhD students are externally funded, we propose that the division establish a more structured application process, with a particular focus on EU funding instruments.

Conditions for Research

Staffing

In terms of overall personnel structure, the unit has a good mix of senior and junior researchers, and the high-profile senior researchers are recognized and seem to act as role models for the PhD students. Furthermore, the research activities listed in terms of different types of meetings, and the workplace flexibility (work at office or at home) convinced us that the conditions for research are good. However, when it comes to sourcing of research, the link between success in bringing in external project funding and time for research is very tight, which may create a vicious circle. This implies in practice that no project funding leads to no or very little time for research.

Funding

The main Swedish funding agencies have been approached, and the division seems to have a good understanding of the project requirements, although they have changed. The self-evaluation report positions funding trends in the "Threats" category. To draft winning research projects is resource demanding. Although there is some research support available, someone must do the work. It is stated that all researchers are encouraged to write applications, but one can question if this is enough? What other incentives are offered?

The notion of younger researchers (BULs) having somewhat less teaching and more time resources for research is good for developing an academic career. The logic of attracting own PhD students to continue in academia as junior researchers can also be considered as a good strategy. However, it comes with the risk of losing the new and innovative perspectives external recruitment can contribute with. The low number of active PhD students is a point of concern. With available resources at the unit used to their full capacity, the issue of prioritizing becomes evident. The importance of increasing the number of externally funded project applications is university wide. A question we raised during the interview gave the impression that the model for resource allocation could be updated.

Recommendations

To generate more resources, we recommend that the division, with CBMI as the central collaborative and communicative platform:

1) **Explore opportunities for international funding and strengthen long-term collaborations with selected key industry partners to diversify the division's financial base.**
2) **Update recruitment strategies to attract international talent and diverse expertise.** Ensure that future recruitment processes and job offerings are of interest to international applicants to reduce the strong dependence on internal recruitment.

See also recommendation 3 under "Research and the Research Quality" and recommendation 4 under "Research culture".

Concluding Remarks

The Industrial Management division (INDEK) excels in Business to Business (B2B) research, with two strong research centers and three clearly defined research areas, all highly relevant to both academia and industry. Despite a strong publication record and high citation rates, there is room for improvement in cross-disciplinary research, internal collaboration, external funding, and attractiveness. The resources are there, now it is time to pull them together.

Panel I Report: IEI.LOGQ

Introduction

This report summarizes the panel's evaluation of the Logistics and Quality Management (LOGQ) division at IEI. The evaluation draws on the division's self-assessment report, bibliometric analysis, and interviews with junior and senior faculty and PhD students.

Please refer to the separate document with general observations and recommendations for a presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Evaluated Unit's Name: IEI.LOGQ Logistics and Quality Management

Research and the Research Quality

LOGQ is the result of a 'merger' taking place about 10 years ago after QM as a relatively small division started to search systematically for potential partners and approached LOG. The division has in common a focus on social and environmental sustainability/resilience, i.e. societal impact, within a range of sectors and they also use similar research designs. They would like to expand more into digitalization and AI, but this would require recruitment. QM is expanding into leadership and learning. Their 'income' is quite equally distributed between teaching and external funding and has been quite stable over the years.

Relevance and novelty of the research topics covered by the evaluation unit

The combination of quality and logistics is highly relevant and can also stimulate novelty. LOGQ has consciously tried to develop as a group through joint brown-bag seminars, common PhD courses, e.g. in methodology, and having all PhD students in the same room. The division focuses on societal impact and needs. Promising future areas are mentioned, but rather vaguely presented, and there seems to be a need for a properly developed research strategy going forward. The division works in many different contexts and publishes their research in quite a wide range of different journals. One can question whether the division aims too broadly and could benefit from a somewhat clearer focus.

Quality of research output

In terms of research output and quality, there is more potential both when it comes to quantity and quality. Articles constitute 80% of total publications, with 6% in level 2, 38% in Q1 journals and 4% among top 10% most cited globally, which is lower than the LiU average. 93% are open access, which is higher than LiU's average. The division conducts much of their

research in close cooperation with practice but has relatively low scientific impact. Many are conference proceedings which do not seem to be taken to the next step into international refereed journals. This is acknowledged in the self-evaluation report, and they point out the need for more publications in higher ranked journals. However, they explicitly state they do not want to push for this, rather 'make it happen' voluntarily.

Impact outside academia

LOGQ publishes quite a lot of 'grey' literature in terms of reports and other more 'popularized' outputs in practitioner journals. They also conduct multiple seminars and workshops with practitioners and aim for societal and practical impact through their extensive teaching activities as well as through developing and testing applications using action-research approaches. They state that such applied research can be challenging to publish in high-level journals. However, multiple higher ranked journals call for design science-based papers, so the potential is there in line with their goal to 'continuously bridge the gap between academia and practice, fostering impactful research and innovation'. Furthermore, it is not clear how impact is measured.

Strategies, priorities and future research plans

We did not observe any explicit strategies, visions and plans.

Recommendations

To foster research excellence, we recommend the following:

1) **Develop an explicit research strategy and implementation plan.** We recommend developing a better understanding of what research is and that external funding is not a prerequisite for publishing good research. A research strategy would contain directions for what types of projects to aim for (avoiding 'pure' consultancy), collaboration with other universities and the role of industrial partners. We suggest developing a strategy/mission/vision to capitalize on commonalities between the two sub-groups (e.g. action-research and resilience/strategy), set a strategic direction and establish a shared understanding of ambitions for research and specific measures for achieving the set targets.
2) **Design an incentive system.** We recommend developing an incentive system to promote high-impact publications, securing long-term external project funding, and encouraging cross-disciplinary research.
3) **Encourage the publication of applied research in high-ranked journals through strategic planning and support.** Working strategically on getting the division's applied research published in higher ranked journals would not only be a way to strengthen the research impact; it would also be a way to document the societal/practical impact which is of high importance to the division.

Research Culture

What struck the panel immediately was that the division seems to have a good, friendly and supportive work environment across the two sub-groups (QM vs. Logistics) and levels. We recognized highly motivated younger scholars – both juniors and PhD students – and supportive seniors. PULSE meetings are held every Friday morning to discuss various issues including calls for grants, publications, and conference participation.

What also stood out in our conversations was that 'research' was implicitly defined as 3rd party funding, resulting in the perspective "No research without funding". This leads to high pressure, particularly on junior faculty, for chasing research projects. However, we noted that there is support and processes in place for helping each other in this chase. Particularly, the PhD students pointed out that they were surprised (compared with their fellow students in other divisions) about the high level of support from seniors. They currently have four PhD students (none in QM) and cooperate with other divisions to create a critical mass, for example by organizing joint 'kappa'-seminars.

In general, the division lacks explicit visions and goals that can help in prioritizing and particularly supporting junior faculty in their career planning and development. As elsewhere in LiU and in Sweden in general, faculty 'pay' their own salaries through teaching and externally funded projects. This does not create a good environment for high quality publications and leads to stress among faculty at all levels, particularly for the juniors. It is a misconception that all publications must be based on externally funded projects – there are ample opportunities for collecting and analyzing data at low cost. However, time is what is needed, and this is a constraint with high teaching loads and the constant pressure on writing grant proposals.

Publication strategies

While the division has no publication strategy, there is awareness that they must strengthen this aspect. They have seminars to discuss which journals could be relevant, but there seems to be a reluctance to lean on journal rankings. One could speculate if this is grounded in the need for keeping the 'cozy' atmosphere and avoiding more stress on faculty. Here we would say the division is 'lagging behind' – other universities and research divisions went through such discussions a long time ago.

Recruitment and opportunities for early-career researchers to develop their originality and independence

The division realizes the need for more internationalization. International collaboration is much lower (18%) than the LiU (50%) average. However, the division claims that Swedish language is needed both for research (data collection and interaction with industry) and teaching (although they do have and are developing more courses in English). This has consequences also for recruitment, which focuses on hiring Swedish speaking PhD students and then hiring their own graduates for junior positions. The division realizes the advantages

of hiring 'their own': they know the courses, the institution, the colleagues and can go directly into the tasks as hand such as teaching. They seem to be less aware of the disadvantages; danger of 'inbreeding', lack of innovation and lack of international benchmarks.

While there is a high danger of 'in-breeding' (own master students as PhD students which are then hired as junior faculty and many then staying until retirement) the present division is still quite diverse at the PhD level: different masters, nationalities and gender, some with practical experience. Some of these younger faculty have also indeed proved that Swedish language is not a necessity, even if it is advantageous. Accordingly, maybe it is time to break a myth: the absolute need for Swedish language.

They claim they get good candidates, but still point out that recruitment is a challenge, particularly when it comes to PhD candidates. Teaching constitutes the basis for recruitment. An explicit recruitment strategy is lacking. Furthermore, criteria for advancements are unclear (conference papers? revision of papers from the PhD thesis for submissions to journals? Which journals? What other criteria are important such as teaching evaluations, university service?). Publications are a stressful aspect for junior faculty with limited time to qualify, high teaching loads and the perceived need for externally funded projects to do research. This leads to a vicious circle: if no external funding, more teaching and less time for writing grants, less publications, fewer grants, then even more teaching and so on.

Quality of PhD training

In terms of the PhD training, there is a structure with seminars, licentiate (most students do this) and internal seminar before defense. However, the students point out a lack of relevant subject-related PhD courses to fulfill the requirements of 75 credits. They do get support from supervisors in identifying courses and some can also be reading courses constructed by the supervisors. A PhD thesis should constitute 4-5 papers and a kappa, with 2 papers published 'in good enough' journals, some papers even ending in predatory journals. This might prevent the PhDs from getting a good position outside of LiU after completion.

Recommendations

To foster a stronger research culture, we recommend the following:

1) **Enhance the research culture and develop a publication strategy with clear quality and quantity expectations, including guidelines for targeting appropriate journals.** We highly recommend developing a common publication strategy with explicit goals/requirements in terms of quality and quantity. Top journals would normally have good, structured review processes (the speed might vary which is also of importance and might suggest for example encouraging PhD students to submit to special issues). QM journals are interested in action-research/design-science. Combined with suggesting relevant journals in the 2nd tier, such a strategy would help faculty at all levels. However, publishing good action-research requires a well-thought-through

research design before the project's start based on recommendations from the methods literature.

2) **Increase international collaboration through research stays, international visitors, and strategic partnerships.** We recommend planning which conferences to aim for, encouraging and incentivizing PhD students and junior faculty for research stays abroad and inviting international researchers for seminars and workshops, e.g. 'how to publish in high-ranked journals'.
3) **Support junior researchers in getting out of the 'vicious circle' of teaching and short-term external funding.** We strongly encourage helping junior faculty to get out of the 'catch-22' vicious circle of teaching and external funding, particularly short-term 'consultancy' projects which are hard to use as basis for good publications.
4) **Create a more structured and transparent pathway for early-career development, including clear promotion criteria, and address the risk of academic inbreeding.** Clearer expectations for requirements in a PhD thesis and for getting tenure are needed. Consciousness on the potential disadvantages of 'in-breeding' must be taken seriously. Once set, clearly communicate the strategy, including the criteria for career advancement.

Conditions for Research

Much is done to make faculty feel safe and well taken care of, which also shows up in the latest employee survey with 5/5 based on an 88% response rate. Recurring research seminars in addition to PhD student-specific events create a good atmosphere where senior researchers give feedback to PhD students on papers and proposals. They do, however, acknowledge the need for a more structured approach. Sometimes juniors or PhD students are invited very late into grant applications, which makes them unable to influence research questions and methods. Hence, the results may be somewhat fragmented. There were also comments on 'silo-thinking'. The division recognizes the need to work on professionalizing the application process to benefit younger researchers.

Staffing

LOGQ has a relatively good mix of seniors and juniors with a total of 27 employees – 9 in QM and 18 in LM and with a good mix across levels, except for QM who presently has no PhD students. Their focus on teaching as a basis for recruitment may provide stability compared to external funding but limits long-term research planning. There is little turnover, which is a positive sign for the work environment, but this also means that the division is aging, with several retirements in 5-7 years.

Funding

The division has some large nationally funded projects, but an overweight of small and short-term funding. The external funding has been relatively stable over time, accounting for 60-70% of total income. They have implemented structured processes, track approved vs. rejected applications and are piloting models to strengthen abilities in proposal development. EU-funding is traditionally low, but they have attempted two Horizon applications recently (however without success). They realize there is a need for international collaborations and have started to develop such.

Research infrastructure and support functions

In terms of research infrastructure and support functions, they are relatively satisfied. However, they would like support with language editing and filesharing as well as software licensing for PhD students. They also state some friction in legal support for contracting and the need for a better LiU website.

Recommendations

To improve conditions for research, we recommend the following:

1) **A more structured process for grant applications, in particular for EU funding.** While the division has had, and continues to have success in getting external funding, they acknowledge the need for a more structured approach and professionalizing the application process. Particularly, the division should develop a process for approaching EU-funding through international collaboration.
2) **Develop a Long-Term Strategic Personnel Plan to address recruitment and succession**. We recommend the creation of a long-term strategic personnel plan that outlines clear pathways for recruitment, career progression, and succession planning across all academic levels. It is worrisome that at present QM has no PhD students, so a plan for funding and attracting students (based on their 'new' approach to research in QM) is needed.

Concluding Remarks

In conclusion, LOGQ has a good working environment and has great potential for developing the combination of logistics and quality management into an interesting and relevant research area. The division's close interaction with industrial partners is a good basis on which to develop further but requires adjustments in their research approach to develop more rigorous design-science/action-research methods. This would make their research publishable in higher-ranked journals, making them more internationally attractive for collaborations attracting longer-term external funding.

Panel I Report: IEI.PEK

Introduction

This report outlines the panel's evaluation of the Production Economics (PEK) division at IEI. The assessment draws on the division's self-evaluation, bibliometric data, and interviews with junior and senior faculty and PhD students.

Please refer to the separate document with general observations and recommendations for a presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Evaluated Unit's Name: IEI.PEK Production Economics

Research and the Research Quality

Relevance and novelty of the research topics covered by the evaluation unit

PEK is structured into two subgroups: Financial Engineering (FE) and Operations Management (OM). Historically, the researchers in PEK were closer together but the two subgroups have over the years drifted apart.

OM is currently engaged in research concerning the analysis of public and freight transport, energy models and production planning. FE is engaged in research on fixed income and equity markets. Though having drifted apart, the two sub-groups share a common vision, and thereby a common methodology, in using mathematical models as the core of analysis. The quantitative methodology knowledge is strong in PEK.

There is no direct statement in the self-evaluation report about the novelty in research. However, all research fields covered by the division are highly relevant from either a societal or a business perspective, enabling PEK researchers to publish their research in high-ranked journals.

PEK contributes meaningfully to ongoing academic discourses, particularly through national leadership roles such as in the K2 center (Sweden's national center for research and education on public transport). However, the division would benefit from exploring more interdisciplinary or cross-group research initiatives.

Quality of the research output

As noted above, PEK publishes generally in high level journals, but the bulk of this output seems to be concentrated on a few people. Despite publishing in relatively high-level journals,

the scientific impact based on field weighted citation score (0.6) and share of publications in Top 10% journals (5%) is relatively low.

Furthermore, the self-evaluation report states that many conference papers are apparently not registered in the bibliometric analysis. This may pinpoint the importance of establishing firm guidelines for when a conference paper can be classified as a research output and can be registered. It might also mean that there is potential for taking conference papers to the next step – publishing in good international peer-reviewed journals.

Impact outside academia

The self-evaluation report describes an extensive collaboration with industry. Some efforts have been taken to disseminate the research knowledge into "popular" articles and webinars. Nonetheless, the Altmetrics scores of the division are very low.

Strategies, priorities and future research plans

The two subgroups, OM and FE, seem to be very much aware of the fact that they currently do not do joint research, and that they ought to do this more in the future. The self-evaluation report and the interviews point to some initial efforts, with some targeted activities mentioned to bridge the FE and OM groups—for example, studying earnings in operational and financial contexts.

Given the age profile and the size of PEK, it seems obvious that PEK needs to recruit PhDs as well as junior researchers. Since compilation of the self-evaluation report, one PhD student has been hired, and another recruitment is in the pipeline.

Recommendations

To foster research excellence, we recommend the following:

1) **Foster collaborative research initiatives across FE and OM**. It would be very recommendable if PEK can define relevant common research projects that involve both subgroups.
2) **Support recruitment of new PhD students and junior faculty, focusing on long-term succession planning.** It is important to recruit more PhD students as well as junior personnel. However, recruitment is not enough in itself, if it is not backed up by solid mentoring and onboarding to give the PhDs/juniors good working conditions and the opportunities to be able to fully excel in research (please also see the recommendations under Research Culture).
3) **Establish mechanisms to monitor research output and encourage broader faculty participation in publishing.** As research output appears to be concentrated on relatively few people and some publications (mainly conference papers) are apparently not formally registered, an increased awareness on producing and making scientific output more visible could further strengthen the group's research presence and impact.

Research Culture

Publication strategies

Given a relatively low scientific impact, PEK is beginning to consider adjusting its publication strategy to also include publishing in journals with a higher interdisciplinary and societal impact, actively engaging with open access channels, and to showcase relevance beyond academia.

Recruitment and opportunities for early-career researchers to develop their originality and independence

There do not appear to be any formalized plans for recruitment. Recruitment is often tied to funding availability and appears to lack a structured long-term approach.

Regarding the early-career researchers, the self-evaluation report acknowledges the importance of mentor relationships and a good working environment.

Quality of the PhD training

The self-evaluation report states that "The PhD program could probably be improved". The interviews with the PhD students revealed that the individual study plan is not considered very useful. The general study plan is shared with three other divisions, where the other divisions are relatively more qualitatively oriented. There is only one mandatory course in the general plan, but during the interviews it was suggested there might be something to be learned from the way PhD training is done within Computer Science. Thus, there appear to be several issues for improvement. Such improvements could involve better onboarding through a buddy program and more support and guidance for navigating through the requisites of the study program in order to avoid making course selection in the first years of study "a detective's work". The challenges mentioned here may be more present for the PhD students within the OM group, as the FE group base their PhD course program on what is offered by the Swedish House of Finance.

Academic as well as non-academic networks and collaborations

PEK appears to have many academic and non-academic networks, but most relations appear to be strongly tied to individuals, and not to the division.

Equal opportunities and gender equality

Although there are few females in the division and the self-evaluation report states that the uneven gender needs to be addressed in recruitment processes, gender equality does not seem to be a practical concern to PEK.

Research in relation to teaching

The self-evaluation report has an elaborate description of the teaching programs that PEK are involved in but does not relate teaching to PEK's research strengths. The same courses seem to be offered for several programs which could reveal some suboptimal features of the matrix organization of LiU.

PEK also offers teaching for businesses. Currently, nine small companies in the Linköping area take one-day courses with PEK. PEK only gets paid for part of the teaching time, so they must spend other resources to develop these courses. Thus, PEK actually loses money on the company courses, but the network building more than compensates for this, as the companies often also do master theses with students and ideally these theses could even be spun off into research projects.

Recommendations

To foster a stronger research culture, we recommend the following:

1) **Recruitment of more early-stage researchers, with an attention to a more equal gender distribution.** Given the aging profile and the number of employees in PEK, it is recommended to develop initiatives to recruit new staff members, including PhD students. Furthermore, the panel recommends an intensified effort to implement LiU's Gender Equality Plan, which includes taking gender aspects into account in the preparation of employment profiles and by encouraging applications from persons of under-represented genders.

2) **Improve research conditions for junior staff.** It is unfortunate if a junior's research career becomes stranded due to lack of external funding (as an unfortunate result of the "no research without funding" environment that characterizes LiU and the Swedish university system in general, as also described in the general comments). Therefore, it is recommended that seniors take an active role in mentoring the juniors. This could, e.g., include involving junior staff in the senior researchers' own research projects. In addition, it is recommended that junior researchers are protected from a too heavy teaching load, for instance facilitated by juniors having higher norms for teaching than senior researchers.

3) **Improve PhD program quality with clearer study pathways, flexible course options, and structured onboarding.** The observations presented above in relation to PhD training indicate the existence of some low-hanging fruits regarding improvements of the PhD program.

Conditions for Research

Organization and Staffing

PEK is organized into two subgroups, FE and OM, which currently do not do joint research but share a strong sense of unity concerning their quantitative methodology base, as commented previously.

Approximately half of the faculty are full professors, where some are approaching retirement. There are not many young people in PEK, highlighting a need for junior recruitment.

Funding

PEK relies primarily on national funding sources. External funding levels are moderate and concentrated. There is no mentioning of efforts to attract EU funding, which may limit long-term sustainability and international engagement.

Research infrastructure

OM researchers express a desire for improved infrastructure, particularly access to a lab environment for big data and ERP systems (e.g. SAP). Investment in such infrastructure could substantially enhance the division's research quality and training capabilities.

Recommendations

To improve conditions for research, we recommend the following:

1) **Recruit early-stage researchers and provide strong onboarding and mentoring**.
2) **Improve access to research infrastructure, particularly in OM.** If the desires expressed in relation to research infrastructure can lead to improved research output with higher quality and higher societal relevance and impact, it is an issue that requires attention, possibly at department level.
3) **Explore opportunities for EU funding to diversify the division's financial base**.

Concluding Remarks

Overall, PEK has a solid research profile applying a common quantitative methodology base as the foundation for its research. However, more collaboration regarding a shared common ground of research would obviously make PEK appear more as a united group. There are some challenges for PEK concerning recruitment and the retention of junior personnel. Also, the PhD program seems suboptimal in its current state.

Panel I Report: IEI.PIE

Introduction

This report summarizes the panel's evaluation of the Project, Innovations and Entrepreneurship (PIE) division at IEI. The evaluation draws on the division's self-assessment report, bibliometric analysis, and interviews with junior and senior faculty and PhD students.

Please refer to the separate document with general observations and recommendations for a presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Evaluated Unit's Name: IEI.PIE Project, Innovations and Entrepreneurship

Research and the Research Quality

Relevance and novelty of the research topics covered by the evaluation unit

The division conducts research at the international research front in innovation, technology management and entrepreneurship. It is among the leading research groups in Sweden in these areas and highly visible internationally. The division studies topics which are relevant for industrial and policy stakeholders, with a strong focus on major current societal challenges, such as sustainability transitions, digitalisation and artificial intelligence. The research is interdisciplinary, being mainly oriented around research problems.

The novelty and relevance of the research is ensured through regular applications for external grants from organisations such as SEA and Vinnova, and through the organisation of research groups within clearly defined topic areas.

Quality of the research output

The division publishes research of high quality. Several of the researchers have strong citation track records and publish regularly in leading journals in the fields of innovation and sustainability. The bibliometric analysis shows that the division published a good number of journal articles in the period 2018-22. The share of articles in level 2 journals is slightly below the LiU average, while the share of Q1 journals is well above the LiU average. The division itself relies mainly on the Academic Journal Guide from the Association of Business Schools, which is widely used in the economics and business fields internationally. The stated aim is to publish in journals at ABS 4 or 4*, which is a sound ambition. The publications are distributed across several different well-ranked journals. One of the five most frequent journals is

Norwegian level 2 (not included in ABS), while the remaining four are ABS level 3. This reflects research at a solid level internationally. The division also tracks the citation impact of its journal articles, going beyond the reputation of the journal to also assess the impact of the article. The share of articles co-authored with international researchers is well below the LiU average. This is surprising given the overall international orientation of the division. It is composed of many nationalities and has researchers at all levels with backgrounds from universities outside Sweden. The potential for international collaboration is therefore high.

Impact outside academia

The division has a great interest in making an impact on industry and policy, which is also a research area for the division. It has a tradition of centres involving industrial stakeholders and includes industrial partners in several current research projects. The research groups represent an important arena for interacting with relevant stakeholders. The division publishes or contributes to policy reports both in Sweden and internationally, including for the European Commission and the OECD. Impact activities are mainly oriented at direct collaboration with industry and policymakers. The self-assessment report does not mention publications in general news media or broader outreach activities towards the general public and the Altmetrics scores are relatively low.

Strategies, priorities and future research plans

The division does not have an explicit strategy and appears fragmented. The three research groups each have clear priorities and plans for their activities, but an overall alignment of priorities at the division level is missing. This creates unclear expectations for junior researchers and a lack of collaboration among seniors. Strategies are developed at the individual or research group level rather than at the division level. As a result, the development of research areas is mainly organic.

Recommendations

To foster research excellence, we recommend the following:

1) **Aim for larger and more integrative projects that bring together researchers across the division.** The division might consider aiming for larger and more long-term projects to create the conditions for more collaboration within the division and more impactful research.
2) **Develop a shared strategic direction and shared arenas between research groups to improve internal cohesion.** The creation of projects and arenas that include researchers from different research groups can help to integrate the currently disparate research areas.
3) **Enhance international collaboration and promote co-authorship and joint funding proposals with international partners.** The division can increase the number of internationally co-authored publications by capitalising on its international faculty,

bringing international researchers into funding proposals and reorienting the funding strategy towards EU programmes.

Research Culture

Publication strategies

The division does not have an explicit publication strategy but does have a well-established culture of publishing journal articles in leading international journals within the field. The senior researchers refer to the ABS list with a clear set of journals in which the division aims to publish. The self-assessment report foresees more publications in journals that combine engineering and management, which might imply looking beyond the ABS list to more interdisciplinary outlets. Some interdisciplinary journals which are currently important for the division are also not included in the ABS list. Overall, the strategy is not very clearly communicated and remains largely implicit. This creates somewhat unclear expectations for junior researchers on how research quality is assessed and how publications in different outlets will be counted. There is also a high level of competition, which can create a stressful environment.

Recruitment and opportunities for early-career researchers to develop their originality and independence

The division recruits internationally and has several researchers, both senior and junior, with educational background and/or work experience from other universities in Sweden or abroad. Recruitment is mainly based on teaching needs or for already acquired external projects. It is therefore typically oriented towards immediate needs, rather than reflecting a more long-term and proactive approach. Junior researchers are typically hired to fill a teaching need and are responsible for acquiring external funding for their own research time.

This also creates challenges with retainment, as early-career researchers often face a high teaching load and pressure to acquire external funding for their own research. This can be difficult as most early-career researchers lack experience in writing good funding proposals. There does not appear to be a strong culture of collaboration between senior and junior researchers on funding proposals or journal articles. Mentoring is dependent on personal relationships or research alignment rather than being institutionalised.

There is a recognised and long-standing work environment problem within the division, and the division is currently addressing this with external support. While it is beyond the remit of the panel to assess the work environment, its implications for the research culture are apparent in the form of a lack of support, collaboration and community across the division. This particularly affects the career development of early-career researchers. The pressure to acquire external research funding also creates stress which contributes to the challenging work environment.

Quality of the PhD training

The division currently has eight PhD students, creating a reasonable environment for PhD training. However, the number of students is fluctuating depending on external funding, and maintaining a stable critical mass is a challenge. There is an extensive offer of PhD courses both internally and externally through collaborations such as the Nordic Research School in Innovation. Some PhD students are also part of the WASP-HS Graduate School, which creates a larger environment. Apart from this, there is limited contact with PhD candidates at other divisions, making for a relatively small and vulnerable community. There is a lack of onboarding also for PhD students.

Academic as well as non-academic networks and collaborations

The division is well-connected both with international academic groups and with industry and policymakers. Networks are mostly individual or at the level of research groups, and it is unclear to what extent the division capitalises on these at the division level.

Equal opportunities and gender equality

The division has a good gender balance, with an equal number of male and female researchers. This is the case at all levels of faculty, from seniors to PhD students. PIE also has a good diversity of international researchers with backgrounds from different countries.

Research in relation to teaching

Research is poorly aligned with teaching, as the division has a strong teaching tradition in project management, but its research is mainly in innovation and entrepreneurship. The organisation of teaching also appears inefficient, as the division teaches many small courses across several different educational programmes. While the panel has not evaluated the teaching programme, this has consequences for research. The high number of different courses limits available time for research and requires a lot of time for preparation. This is even more demanding when PhD students and junior faculty need to teach subjects outside their research area. The lack of a teaching programme at the division also means that the division does not have a joint programme around which to unite.

Recommendations

To foster a stronger research culture, we recommend the following:

1) **Address work environment problems**. The division can consider creating arenas for collaboration across research groups and between senior and junior researchers, to foster a more supportive environment and improve retention.
2) **Establish structured onboarding and mentoring programmes for both PhD students and junior faculty.** Both junior faculty and PhD students would benefit from an onboarding programme that makes the expectations, procedures and standards more explicit. Appointing more experienced researchers within the same staff category as mentors for newly recruited colleagues can help share more tacit knowledge and create a more welcoming environment.

3) **Allocate protected time for junior staff to develop research ideas and avoid overburdening with teaching (Treat juniors as juniors).** To support the development of early-career researchers, senior faculty can invite them into joint projects and papers and support them more strongly in the development of their own ideas. The division should be careful not to leave junior faculty on their own in pursuit of external funding. The division should pay particular attention to how seniors can support the career development of researchers who were not trained internally or who are not part of research groups. Juniors could also be shielded from teaching responsibilities by allocating extra hours for the first time teaching a new course.
4) **Create free time for research by reorganising courses.** The department can consider combining small courses offered to different programmes into larger courses.

Conditions for Research

Organization

The division is divided into relatively small research groups and has a challenge integrating the different research streams at the division level. Many of these research streams appear more closely connected with research at other divisions than with each other, raising the question of whether the division would benefit from a different organisation. Researchers also participate in several centres that work independently of divisions. The centres are temporary and very dependent on funding, and not always open to everyone. Developing activities that integrate researchers working in different research groups and centres is a major challenge.

There is pressure for high-level publication and a very competitive environment. However, the expectations are not always balanced with resources and conditions. The low level of research time and support from senior faculty make it challenging, especially for junior researchers, to deliver high-impact publications, creating stress.

Staffing

The division is reasonably large, being comparable with several leading international groups within its field in terms of the number of senior faculty. The average age is also relatively low, providing a good foundation for long-term development. There are few assistant professors and postdocs, and the division recognises the need to recruit more at this level to get a better balance between senior and junior faculty.[1] The division currently has a good number of PhD students, although this fluctuates depending on external funding. To get a robust environment for PhD education, closer integration with other divisions would be beneficial.

[1] The data collected for the self-evaluation report does not fully reflect the current balance between junior and senior staff.

Funding

The division is competitive in securing external funding from national sources, especially SEA and Vinnova, and has a healthy share of external funding. The self-evaluation report does not mention any ongoing EU projects, but the division has subsequently reported that they are currently involved in two EU projects. The division has recently been involved in two large centres with long-term funding involving many researchers. These have now ended, and the division currently has many small and mid-sized projects of shorter duration, creating pressure to consistently bring in new projects. The division has recently acquired one larger project and is waiting for the outcome of two other large proposals.

Recommendations

To improve conditions for research, we recommend the following:

1) **Develop a more proactive long-term strategy for recruitment and retention, which is aligned with research priorities.** Recruitment is currently based on immediate needs, usually for teaching. This leads to a heavy teaching load and strong pressures to acquire external funding, creating poor conditions for research and challenges with retention of talented researchers. The division can consider developing a more proactive approach to recruitment that reflects the direction in which it wants to develop as a division in the long term. This more long-term approach to recruiting talent should be combined with actively creating conditions that support the development of early-career researchers.
2) **Balance expectations and conditions when it comes to research output, funding and teaching responsibilities.** While the division has a competitive research environment striving for excellence, there is a need to create sufficient support and time for research to enable junior researchers to live up to expectations.

Concluding Remarks

Overall, PIE has a strong research environment with a healthy stream of external funding and publications in solid international field journals. However, the division is internally divided between different research groups. It also struggles with retention and career development. High levels of stress due to pressures for external funding and a heavy teaching load seems to have led to challenges in creating a supportive and collaborative work environment in which early-career researchers can thrive. Improving the work environment and supporting the career development of early-career researchers is the most important step in developing the research in the division.

Panel I Report: ITN.KTS

Introduction

This report outlines the panel's evaluation of the Communications and Transport Systems (KTS) division at ITN, located at the Norrköping campus. The evaluation incorporates the division's self-assessment, bibliometric data, and interviews with junior and senior faculty and PhD students.

Please refer to the separate document with general observations and recommendations for a presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Evaluated Unit's Name: ITN.KTS Communications and Transport Systems

Research and the Research Quality

Relevance and novelty of the research topics covered by the evaluation unit

The KTS division was established in 1997 alongside the founding of the Norrköping campus, emerging from the growing need for a dedicated focus on transport planning and logistics, both in education and research. By integrating these fields with communication systems, the division carved out a unique niche.

Today, KTS encompasses nine distinct research profiles. Some of these profiles have historical roots, while others have developed organically, shaped by the expertise of individual researchers, research project opportunities, and societal demands for specialized areas of focus. The division's researchers bring a wide range of methodological approaches, from optimization and simulation techniques to qualitative methods. This blend of methodologies and research profiles has made KTS's research highly relevant to societal needs, while also fostering cross-disciplinary collaboration, innovation, and novel research contributions. As one senior researcher stated in the interview: "The success lies in the combination of competences and methodologies. Problems and opportunities have naturally flowed into the division. The challenge is not the lack of opportunities – it's deciding where to focus." As noted in the self-evaluation report, there is a pressing need to discuss research priorities and to consolidate the division's efforts, given the abundance of emerging research questions.

Quality of research output

In terms of publication output, bibliometric analysis reveals that KTS's average performance on certain publication metrics is lower than, or on par with, the LiU average. While KTS researchers have published several papers in highly ranked international journals between 2018 and 2022, the distribution of publications could be more evenly spread across a larger number of researchers.

Impact outside academia

The division has achieved significant success in industry collaboration, becoming a sought-after partner for externally funded research projects and contributing extensively to substantial societal impact. Their outstanding track record in securing external research funding has been a key driver behind the division's huge expansion. The competence of the researchers is highly regarded and attractive, as evidenced by their involvement in major initiatives such as LiU's excellence area in Transport and Mobility.

However, this expansion has also led to some challenges. One issue is the continual need to secure new external funding, which places pressure on the division. Additionally, many of the externally funded projects are highly applied and closely aligned with consultancy, which can hinder publication in top-tier international journals. Furthermore, the extensive administrative and collaborative demands of industry-funded projects can detract from time spent on core research activities.

Strategies, priorities and future research plans

Looking ahead, KTS aims to maintain its strength in application-oriented research while also enhancing its theoretical foundations. However, the division appears fragmented, and the self-evaluation report highlights the need for more cohesive collaboration and less individual-focused research. The division also faces challenges due to the small size of some research profiles. KTS recognizes the need to increase its visibility and is actively seeking to recruit senior researchers from diverse international backgrounds. Recently, the division has begun developing a more structured publication strategy.

In general, the proposed measures and reflections for future development appear sound. However, a clear overall research strategy and mission statement are currently lacking. While division management believes that the absence of a formal strategy has not been detrimental so far, there is a need to establish a clearer framework for guiding research efforts and aligning the work of individual researchers with the division's long-term goals.

Recommendations

To foster research excellence, we recommend the following:

1) **Develop a Clear Research Strategy and Implementation Plan.** We suggest collaboratively establishing a research strategy that outlines key research profiles and methodological areas to prioritize in the future. These focus areas should be well-

supported by a critical mass of researchers, enabling effective project execution, PhD supervision, and contributions to teaching activities within the field. The strategy should also clearly articulate the division's research ambitions, outlining specific measures required to achieve these objectives. Furthermore, an implementation plan should be developed with a strong emphasis on strategic management by the division's leadership team to ensure its successful execution.

2) **Establish a Clear and Well-Anchored Mission Statement to Guide Direction and Foster a Shared Identity**. We recommend the creation of a clear and well-defined mission statement that aligns with the division's long-term goals and values. This statement should be broadly supported within the division, fostering a shared understanding and direction for all involved.

Research Culture

The self-evaluation report presents a collaborative and supportive research environment at KTS, characterized by permissive leadership and a limited hierarchy. Researchers at all levels work closely together, fostering a sense of unity within the division. From a social perspective, KTS operates as a cohesive group, with common social activities helping to strengthen the foundation for research collaboration. There is significant collaboration both within and between the research profiles, with externally funded projects facilitating cross-profile engagement and partnerships beyond the division.

However, the division's heavy reliance on external funding places considerable pressure on both senior and junior researchers, as well as PhD students, to secure project approvals. Despite this challenge, senior researchers provide strong support by mentoring juniors and PhD students, guiding them through project writing processes, and involving them in their professional networks.

Publication strategies

KTS has recently developed a publication strategy, emphasizing the importance of extracting publications from research projects. This strategy highlights the goal of publishing in highly ranked journals, with co-authorship typically driven by externally funded projects. Currently, there appear to be limited direct incentives or external pressures to publish, although publication remains a criterion for salary increases.

Recruitment and opportunities for early-career researchers to develop their originality and independence

Career development is discussed during performance reviews, but there seems to be a lack of a formalized plan for juniors' career progression, particularly regarding promotion. Juniors are aware of the general guidelines from the university regarding promotion requirements. However, it appears that success in securing external research funding is essential for career advancement. Some juniors are more inclined toward teaching or industry-related projects

rather than pursuing an international research career with a focus on international research collaboration, international conferences, and high-level publications. Many juniors have expressed difficulty transitioning from PhD positions to junior researcher roles, as these come with a broad range of new responsibilities and tasks.

The self-evaluation report also notes that many researchers at all levels are recruited internally, and future recruitment efforts should focus more on attracting international candidates.

Quality of PhD training

The PhD program at KTS has recently undergone evaluation and revision. With over 20 PhD students, most of whom are involved in one or more research projects, the program benefits from a diverse group of researchers who support one another. PhD students generally feel they receive adequate supervision and appreciate the opportunities for international mobility. However, many PhD students feel pressure to secure funding for their own positions through research projects. Additionally, some PhD students question the requirement for 90 course credits and a licentiate thesis, especially since some divisions at LiU only require 60 credits and make the licentiate thesis optional. Adopting a similar approach could attract a wider range of candidates.

Academic as well as non-academic networks and collaborations

KTS has extensive collaborations with companies, authorities, and organizations, both nationally and internationally. Moving forward, KTS aims to consolidate these existing partnerships, with a particular focus on facilitating international guest visits and research exchanges for PhD students, rather than seeking new collaborations.

Equal opportunities and gender equality

There is an unequal gender balance with males accounting for approximately three quarters of all staff. This is acknowledged in the self-evaluation report, where it is also stated that there currently isn't an effective strategy for getting more female applicants for positions.

As far as the interviewed researchers were aware, there is currently no initiates supporting females at LiU, except for some informal, self-organised setups among primarily more junior female employees.

Research in relation to teaching

The evaluation committee has noted the strong connection between KTS's courses and its research areas. Many of the division's programs and courses have been developed directly from its research. However, over the past decade, there has been a decline in student enrollment in these programs, which has had a negative impact on student engagement in research projects, PhD recruitment, and teaching opportunities for researchers.

Recommendations

To foster a stronger research culture, we recommend the following:

1) **Strengthen the Research Culture by Establishing Clear Expectations, Developing Incentive Structures, and Cultivating a Culture of Recognition.** We recommend further developing the division's research culture by setting clear expectations for participation in international conferences for both senior and junior researchers, as well as PhD students. Encourage the publication of high-quality work in internationally recognized journals and actively work to expand the division's global research network. It may also be beneficial to introduce incentives at both individual and team levels to drive high-impact publications, secure external funding, and increase international research engagement. Additionally, fostering a culture of recognition, such as through celebrations or other forms of acknowledgment, would help highlight and celebrate achievements.
2) **Reconsider requirements within the PhD Program.** We suggest reconsidering the requirements within the PhD program, particularly regarding the number of course credits required and whether the licentiate thesis should be mandatory or optional. A more adaptable approach could make the program more appealing to a wider range of candidates and provide students with more tailored career development opportunities.
3) **Strengthen External Recruitment.** We recommend continuing to prioritize external recruitment, ensuring a balanced and diverse research environment in terms of both nationality and gender. A well-balanced faculty strengthens the division's international standing and research impact.
4) **Enhance International Research Collaborations and Consolidate Existing Industry Partnerships.** We advise further expanding international research collaborations and networks to improve opportunities for EU project partnerships and funding as well as publication in high-ranked journals. At the same time, we suggest focusing on consolidating existing non-academic collaborations rather than establishing new ones to ensure strategic alignment and efficiency.

Conditions for Research

KTS, located at the Norrköping campus, is often regarded as the "second campus" of LiU, which presents challenges related to internal visibility and alignment with various aspects of the university's overarching strategy. The limitations on marketing individual campuses have likely contributed to a reduction in student interest and enrollment at Norrköping, potentially affecting the division's overall visibility.

Staffing

As one of the largest research divisions at LiU, KTS has an academic staff of approximately 60 individuals and has experienced consistent growth over the past 10-15 years. The division has adopted an expansive recruitment strategy, whereby some senior, junior, and PhD staff members are hired even if only part of their salaries are guaranteed through government grants or external funding at the time of recruitment. Consequently, KTS must apply for additional external project funding to cover the remaining salary costs.

Funding

The heavy reliance on external research funding creates a high-risk environment, requiring researchers at all levels—seniors, juniors, and PhD students—to devote substantial time to securing and managing research projects. This focus on obtaining funding leaves limited time for publishing, independent thinking, exploring new research areas, mobility, and the development of new collaborations. As previously mentioned, this pressure can lead to significant stress, especially for junior researchers and PhD students.

The decreased student attractiveness has resulted in some researchers, who previously concentrated on teaching, being redirected toward externally funded research work. This shift has been challenging for certain individuals.

The university's funding model, which relies on direct government grants for both educational and research activities, remains largely fixed. This results in a decrease in the funding rate per researcher as the staff grows, further increasing the division's dependence on external research grants. With a better understanding of this funding structure, there may be opportunities to leverage it more effectively in strategic management and decision-making at the division level.

Recommendations

To improve conditions for research, we recommend the following:

1) **Evaluate the Balance Between Growth and Consolidation to Ensure Long-Term Sustainability.** We recommend conducting a thorough evaluation of the trade-offs between continued growth and consolidation. This assessment should focus on ensuring long-term financial sustainability while maintaining research excellence. The division should consider whether the current expansion strategy aligns with its long-term objectives and the available resources.
2) **Enhance Support for Junior Researchers and PhD Students, Including Structured Mentorship and Workload Management**. To reduce the strain caused by the high-risk funding model, we suggest implementing measures to better support junior researchers and PhD students. This could include mentorship programs and structured career development initiatives.
3) **Develop a Long-Term Strategic Personnel Plan to Guide Recruitment, Retention, and Succession.** We recommend the creation of a long-term strategic personnel plan that

outlines clear pathways for recruitment, career progression, and succession planning across all academic levels. Such a plan would ensure sustainable growth and development within the division, as well as a more transparent approach to human resource management.

Concluding Remarks

In conclusion, KTS has experienced impressive growth and success in advancing research in transport planning, logistics, and communication systems. The division's strong collaborations and industry partnerships have led to significant societal impact. While there are areas for improvement, such as increasing publication output and strengthening internal cohesion, KTS is actively addressing these challenges. We recommend the division to solidify its strategic direction, enhance international collaborations, and provide more flexibility in its PhD program. With a focus on recruitment, career development, and balancing research priorities, KTS is well-positioned for continued growth and research excellence.

LiRE25 – Linköping University Research Evaluation 2025

Panel J Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of the following professors: Panel Chair Maria Bengtsson, Dept of Business Administration at Umeå University, Hanne Sondergaard Birkmose, Dean of the Faculty of Business and Social Sciences at the University of Southern Denmark, Per Skålén, Business Administration at Karlstad University, Tone Bratteteig, Design of Information Systems at the University of Oslo, Liam Delaney, Behavioural Science at London School of Economics and Katarina Eckerberg Dept of Political Science at Umeå University.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. Each disciplinary panel expert was given special responsibility for its disciplinary unit at LiU. The panel highly appreciated the clear structure and instructions from the LIRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU. The self-evaluation was comprehensive and enlightening.

The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews, and we also found that the answers during the interviews supported the self-evaluation report. Interviews were also conducted with the management of the IEI department to get a better understanding of the structure and responsibilities at the university, faculty, department and division level. As Katarina Eckerberg was Charing another panel, she could only participate during our interviews with the Political Science division, which made it difficult to involve her in the evaluation of the other divisions. Drafts for the final report including both evaluations of and recommendations to the divisions, and more general observations and recommendations have been developed and discussed several times within the panel, resulting in this final report presented to Linköping University.

The evaluation unit assessed in this report is the division of Commercial and Business Law, Department of Management and Engineering (IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel was impressed throughout our visit by the dedication and professionalism of the participants across all five units. The materials were well-prepared, and all participants engaged in a professional and engaging fashion. The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Observation regarding department, faculty- and/or university management levels.

1. Complex organization: The university has an overall research strategy, but only one of the units referred to LiU's strategy in their self-evaluation. The difficulty to be identified and accounted for in LiU's research strategy was mentioned by other units. The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU. The organization becomes complex as the faculties are not part of the line organization. Two Faculties, Science and Enginering, and Arts and Science order teaching from the units within IEI and the later grant funding for research to the units evaluated. The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles. Furthermore, the IEI department is quite large, consisting of many diverse units both from engineering and social sciences. The department has no research strategy besides the ambition to stimulate inter-disciplinary collaboration through seed funding, support and openness for cooperation. Seed funding from the department is highly appreciated by the units, but its organization is unclear.

- The department could work more strategically with the units to ensure alignment between university, department and the units' research strategies.
- The seed funding could be reviewed in terms of objectives and outcomes.

- Systematic ways to measure, evaluate, communicate and reward societal impacts from research could be developed.
- The department could also support the divisions in other ways, for example by providing funds for ethical review.

The advantage of a large department is that it stimulates inter-disciplinary research, but disadvantages can at the same time exist. First, interdisciplinarity is difficult if there are large differences between the collaborating disciplines. Second, some units are involved in interdisciplinary research with units outside of the department that accordingly are not supported by the department. Third, some of the units are quite small while researchers within their discipline are spread throughout the university at other departments. It can be difficult to guarantee a critical mass of intra-disciplinary research that is needed to improve the quality of the research within small units and match research with the teaching load.

- A review of the department structure is suggested to optimize the incentives for inter-disciplinary research at LiU while at the same time guaranteeing a critical mass of researchers and research in each division.

2. Grants office/support for research applications: All units are working hard on applying for external funding, which secures research time for them. Panel J is however puzzled that a university that relies so heavily on external funding doesn't offer support that meets the needs of all parts of the university. The grants office appears to selectively prioritize technical and natural science projects over social science projects and to concentrate its support on EU funding, and larger grants, which is of course excellent. Generally, the units appreciated this existing support but also asked for more flexible and agile support including support for smaller applications and fundraising efforts that are left entirely to the individual researcher to pursue. Smaller grants are more approachable for younger researchers, hence support from LiU, the Faculties or the department would help them. The Grants Office needs to be able to meet the researchers' needs for assistance in devising research applications and contracts with national and international partners including both academic and public organizations. The panel offers the following recommendations:

- Consider how well the University's Grants Office supports bottom-up needs for research applications that contain collaborations with academic, private and public partners.
- Strive to support and facilitate emerging research applications since the university relies on initiatives taken from the various research units themselves.
- As a first step, some clarifying meetings between the units (including other research units at LiU with similar challenges), the department and the grant office on how to align expectations of support and to identify promising areas that are being under-supported.

3. Visibility and the central communication function: Visibility of core research can potentially become an issue. Many of the units we met would generally appear in a business school or social science college. Thinking about how to make them more visible in the next period would be good, including through more identity-driven web design. Some units also wish for a better visibility of their areas of expertise towards the public sector and external partners, both to make them aware of the expertise that exists at LiU and to make it possible

to identify potential partners for funding. Many have experienced that there is support for some but not for all research that the units want to communicate to a broader audience. Therefore, the central communication function should be improved. Several self-evaluation reports describe the central communication department as an administrative structure that brings too little real value. The panel offers general and specific recommendations:

- The communication service should focus less on giving advice about how to communicate and more on doing the actual communication.
- LiU's communication function should collaborate more closely with the research units to develop a wider range of research communication means.
- The webpages should be made more relevant, and up to date by, for example, presenting research results and societal impacts in attractive ways.

Observations that are common for all units

Positioning/Strategy: All divisions conduct excellent research within certain areas with strong researchers or research groups either at the unit or in collaboration with other researchers at the university. These areas are however strongly connected to specific individuals, which makes the units vulnerable. Examples include when some individuals partly left the unit to take on managerial duties at other places within the university. Ambitions to further develop some new areas of research were also mentioned. Although the units need a broad research base to support their extensive teaching assignments, a clearer research strategy would help to reduce the dependency of certain individuals and help to position a few strong research areas within the national and international scientific community. The units also lack a clear publication strategy. Hence:

- The units would benefit from developing a clear research strategy and to implement it beyond putting it on paper. The strategy should include a publication strategy.

Internationalization: A stronger focus on internationalization could have been expected in LiRE as a whole. The instructions for evaluation provided to panel members and report templates for the evaluation lack a focus on internationalization. It is mentioned only in connection to international publications, but neither in terms of strengthening the LiU brand internationally nor to bring international elements into the local work environments. International guest professors are absent in all our five evaluation divisions.

- Some researchers have rich international networks and participate in the international scientific communities as individuals, but the units could develop clearer internationalization strategies.

Balance between teaching and research*:* The teaching-to-research ratio is unfavorable for all five evaluation units, and some even describe the IEI department as a "teaching factory". Given these poor circumstances for research, Panel J is overall impressed with the

amount and quality of the research the units are producing. The university or at least the IEI department seems to be in a transition from a teaching to a research institution. All units are in this transition, but at different stages: some employees teach 80% of the time, some teach 50% of the time. For a university that relies on research-based teaching the panel was puzzled to learn that the university does not even secure funding for research time for all faculty members in a research position. Not only does this severely limit the ability to produce high quality research, but it also places some researchers in a position where they by default are forced to do research in their free time. Any employer should seek to secure working conditions where a decent work-life balance can be upheld. We also observed a difference between people that are promoted internally and people recruited externally as several units offer significantly less teaching for positions recruited externally by using the divisions surplus funding.

- An overview of differences in the division of labor from a justice perspective can be beneficial.

***Two different career paths**:* We met with LiU employees who were positive about the turn to research, but they all mentioned that some employees are not positive and prefer to focus on teaching. All units have some personnel that teach 80% (= 100% minus 20% self-development time). It was also mentioned that the research productivity was imbalanced within the units.

- One suggestion is to accept the imbalance and create a separate career path for those who primarily want to teach by implementing clear guidelines for how teachers can become merited or excellent teachers based on pedagogical merits and experiences from interacting with society.

Mentoring of junior researchers: Although most of the junior researchers were satisfied with how more senior researchers are mentoring them and helping them in their career development, few of them had a formalized and structured approach to mentoring. Instead, mentoring is dependent on different individuals and could differ depending on the mentors. We believe that the units would benefit from:

- Developing a more structured and formalized approach to mentoring within the units.
- Organize regular career planning for young scholars across faculties and/or departments with shared disciplinary orientation.

***PhD education**:* Most of the divisions expressed that they would have preferred to have a larger group of PhD students, but many of them have established excellent connections with the wider PhD education networks compensating for the limited number of PhD students. Recruitment of PhD students is largely dependent on external funding. PhD students asked for better information about available courses, for example a web page with an overview of

which courses are arranged when and more could maybe be done at departmental level including offering some basic courses. However, developing one's own study path is an important part of PhD training. The ISP is perceived as a purely administrative tool and should be reformed.

- Increase the regularity/predictability of Faculty/Department funding toward PhD positions to help in planning.
- Offer PhD courses in collaboration across LiU's social science-oriented divisions and units on general mandatory topics such as research design, qualitative and quantitative methods.

Evaluated Unit's Name: IEI.ARÄTT Commercial and Business Law

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Panel J notices that the evaluation unit (the unit) state to have very difficult conditions for doing research as they as a starting point spend 80% of their working time on teaching, leaving only 20% for a range of other activities, including research, applying for funding and competence development. That being said, the unit states in the self-evaluation report (SER) that they are very proud of what they have accomplished under these conditions. It is also the assessment of the panel that the unit on several parameters are doing really well. However, the task of the committee is to give recommendations in areas where they find that changes are necessary to improve the quality of the unit's research.

Panel J finds that the research of the unit does not differ substantially from research in many other legal environments, where books and book chapters dominate the output, and article journals play a smaller role. The panel also notices that the share of chapters at level 2 is close to the LiU share, which witness high-quality publications. Looking at the most frequent journals and most frequent publisher for books and chapters these reflect output channels that are expected to be prioritised for a business law environment. Based on the data sets and the bibliometric analysis provided, it is very difficult to make any conclusions on the relevance and novelty of the research topics covered by the unit or the quality of the research output.

The unit is responsible for a bachelor's programme and a master's programme in business law. Panel J finds that the obligation to research-cover these programmes seem to be somewhat guiding for the research that is done at the unit. This is also to some extent supported by the publications found in DiVA. The link between the research done at the unit and the programmes ensures that the research enrich part

the teaching. However, there seems to be at least some misalignment between what is needed for the teaching programmes and what the unit aims for in their research (SER p. 2 “begins with a social phenomenon, rather than the traditional approach of starting with legal rules”, and a desire to do interdisciplinary work).

Panel J notices that the unit does not have a research strategy that guide them. At p. 12 of the SER a research policy is mentioned, but it doesn’t seem to play a role. The seniors interviewed mentioned that they are already being specialized by being a small unit and only focused on business law. However, business law covers a number of disciplines and due to the very scarce resources available to the unit, the panel finds that resources can be put more effectively to use, if a more focus approach is chosen. It may also be problematic that to the development of junior staff if there is not a senior researcher in their field (or a closely related field). This may also affect the career development dialogue which is crucial to younger researchers.

Legal research and legal publications are to a large extent also relevant to practitioners and professionals within the legal field, such as lawyers and judges. In line with what is seen at other legal research environments the unit engages in a number of outreach activities where they present their research and engage with relevant audiences.

Recommendations

- Panel J believes that the unit would benefit from a more structured and approach to research. This would include the adoption of a research strategy or a research policy that guide the research.
- Although the unit needs a broad research base to support their extensive teaching assignments, the panel finds that it is important to define key research areas that will allow the unit to position themselves within the national and international scientific community.
- The unit could consider concentrating their research focus even further to strengthen their impact in areas where they already have a strong position and where a focus on adjacent or complementary area may leverage the overall output.
- Finally, the panel recommends that the unit explore the possibility of inviting international guest professor, which could help improve their research quality

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The unit has a research leadership team that supports and promotes the research agenda at the unit. Still, there seems to be no formal guidance for the work of the leadership team and the development of research and researchers rely heavily on these individuals.

The development of the unit's research primarily takes place at weekly meeting and unit seminars a couple of times per semester. The attendance of these meetings is quite high, and they are used to discuss different themes in relation to research. It is the opinion of the senior researchers that the meetings, which have become more structured and strategic in recent years, have improved the quality of research and the research culture at the unit, and the junior researchers mention that they find the meetings helpful in supporting their research development.

The unit does not have an output or publication strategy either. Panel J finds that it could be beneficial to have a more formalized strategy, as it could support the unit in realizing the possible improvements, they outline at p. 4. The panel finds that the suggestions made here could be beneficial to the unit.

The unit has a collaboration with Karlstad University and Örebro University on the PhD programme, and the PhD students express overall satisfaction with the programme and the courses. However, they stress that they would like to see more structure and support from the unit/the department, so there is less reliance on the supervisors. They mention career development dialogue, uncertainties regarding course points and publications strategies as areas that could be strengthened from having more structure.

The legal environments in the Nordics rely heavily on PhD recruitment as their food chain, because law is primarily a national rooted discipline. Also, in certain areas, such a business law, it is very difficult for the university to compete with private employers, in particular in relation to salary offered. Therefore, attracting excellent (national) candidates for PhD positions and retaining them are crucial. The unit could utilize the access to qualified master students at LiU and seek to make them interested in an academic career. It could be through the use of research assistants or by offering an elective in academic writing with the possibility of being published. It is however still a challenge that internal funding can only fund one PhD student at a time. Large scale in the programme would enhance the quality.

Recruitment at all levels should prioritize recruitment that supports the research strategy.

It is clearly a problem that the faculty members have very limited research time. As starting point it is as low as 20%, which cover all activities but teaching. Panel J finds that this severely limits the young scholars' ability to create strong research profiles that allow them to secure external funding. This is also the case for senior researchers,

but in their case, it also means they are limited in their capacity to support younger colleagues and build up strong research environments at the unit. If this is not changed, the committee finds that the unit cannot fulfil the potential, the research-intensive researchers hold. This harms not only the unit, but also the department (IEI) and other departments, which could have benefitted from legal perspectives in their projects.

The unit is active in research projects with other units within IEI and within the university in general. Panel J finds that these projects are important for the development of the unit's research and should be prioritized. Large externally financed research projects in law are few in the Nordic countries, why participating interdisciplinary project with better funding opportunities could be priorities. It can be difficult to establish such collaborations though, as legal research is sometimes not understood outside of social sciences, and even within social sciences legal research differentiates for instance in relation to methodology. Therefore, the committee were pleased to see that the unit has produced a paper, where they present the value of legal research in interdisciplinary work that is shared with colleagues outside the legal discipline.

The unit also have good collaborations and engage in network with Swedish colleagues in particular. The most formalized seems to be the KÖL cooperation on the PhD programme. The unit could consider whether some of these networks could be leveraged further to include project collaborations. The same goes for already established Nordic and European networks.

Recommendations

- The unit should maintain their focus on pushing the research agenda and the activities that support this push. With such a small group of researchers, it is important that those in research positions continuously take an active role in increasing the quality and quantity of the units' research output.
- The unit should consider developing a research strategy and a publication strategy to guide in particular junior researchers. It may guide them in making certain priorities and it may also relieve the research management team and make the mentoring of juniors less dependent on a few seniors, which is vulnerable.
    - The suggestions at p. 4 of the SER are relevant to include in such strategy
    - The strategy should be followed by concrete actions such as co-authorships between seniors and juniors, utilizing of existing networks, and coaching for interdisciplinary cooperation.
- The unit should strengthen their existing collaborations and networks further as they may serve as a way into relevant research projects both interdisciplinary and within law.
    - In this regard all available support opportunities within the faculty and the department such as small travel grants should be explored. Also, as far as possible this is something that the unit should support financially.

  - A more concentrated research focus could also support the moved from networks being dependent on the individual researcher to something that smaller groups withing the unit benefit from.
  - Besides the paper on the value of legal research in interdisciplinary projects the unit could also consider other avenues to become more visible to relevant LiU units in particular. Inviting chosen researcher leaders or researchers with specific profiles to participate in a seminar at the unit could be one such way.
- The unit could appoint a PhD coordinator to secure more structure and support to the PhD students. It would secure that every PhD student has access to the same information rather than having to rely on individual supervisors.
- The unit should work more systematic to utilize the access to qualified master students at LiU in their PhD recruitment.
- Visibility is essential for funding opportunities. We therefore support and encourage the ongoing efforts to target not only the academic community, but also a broader audience within and outside the legal field.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The evaluation unit is responsible for a bachelor and a master programme in business law, while around 50% of the unit's teaching is within other programmes outside the unit. Thus, it is necessary for all researchers to teach outside their own field. Given the limited number of faculty, the teaching load is quite high. It is Panel J's understanding that it is substantially higher across all types of positions at the unit than what is usually the case at the department. In fact, as we understand it, there are no difference whether you are employed in a teaching position (universitetsadjunkt) or in a research position. The conditions for research at the unit are therefore quite challenged and severely affect the unit's ability to produce research of high quality. Still, they do quite well based on the available data-set.

Being a rather small unit, the unit relies heavily on collegial management and responsibility. Such an organisation entails a vulnerability, because if the culture bearers leave for one reason or another, there is no default structures to rely on. It relies on the good will of faculty members as there seems to be no incentive structures to support those "taking one for the team". The unit could consider how more formal structures around the organization could make it less vulnerable. At the same too formalistic structures should be avoided as they will not create value and may even be counterproductive.

Panel J notices that the department offers funding for certain types of activities, such as seed-funding for interdisciplinary projects and coverage of travel expenses. To the extent that the unit does not make full use of these possibilities, it should be encouraged. However, the panel doesn't see that the department supports the unit to engage in a more proactive leadership towards research quality.

Given the extensive teaching load the unit should work strategically with teaching planning to free much time as possible for researchers at the unit. This could include, reconsidering the number of teaching hours offered, pooling of teaching in certain periods, and group supervision in relation to bachelor and master theses. It could also be considered whether the large number of lecturer (universitätsadjunkter) the unit relies on, could be used strategically to allow researchers to pool their teaching in areas closely to their research.

The unit mentions in the self-evaluation report that in relation to funding, the primary challenge lies in increasing the number of applications submitted. Given the limited research resources within the unit, the committee finds that it is crucial that the applications submitted has the highest possible quality and that they match the profile of the applicant to increase the success-rate. It is therefore important that the unit prioritize a quality process at the unit before submission and that the unit work with funding planning for the individual researcher to build up their qualifications and resumes. The committee are aware though that the department/university seems to lack a support structure regarding funding that match the unit's needs. It does not seem to be an efficient use of the unit's resources that strong support competences in regard to funding should be with the (few) senior researchers. It is also a concern of the unit that the structures around research ethics support are inefficient.

Recommendations

- The unit needs establish structures and conditions that give the researchers the most possible time to do research. This can only be done if teaching is restructured.
- The unit should support the research management team to the largest extent by giving them a structured framework to guide their work
- The unit should secure a formalized quality assurance process for funding applications to increase the likeliness of success
- The unit should make the most possible use of the funding offered by the department for certain types of activities, such as seed-funding for interdisciplinary projects and coverage of travel expenses
- The department should actively support the unit to engage in more proactive leadership towards research quality

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The business law unit seems to be struggling to find its feet in the university's transformation from being largely a teaching university to a high-quality research university. Still, Panel J finds that they are very determined to further this transition at the unit level, despite the high teaching load almost all faculty members face. If the transition was supported better at department level it is the assessment of the panel that it could have a substantial impact on the unit's research and research quality.

LiRE25 – Linköping University Research Evaluation 2025

Panel J Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of the following professors: Panel Chair Maria Bengtsson, Dept of Business Administration at Umeå University, Hanne Sondergaard Birkmose, Dean of the Faculty of Business and Social Sciences at the University of Southern Denmark, Per Skålén, Business Administration at Karlstad University, Tone Bratteteig, Design of Information Systems at the University of Oslo, Liam Delaney, Behavioural Science at London School of Economics and Katarina Eckerberg Dept of Political Science at Umeå University.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. Each disciplinary panel expert was given special responsibility for its disciplinary unit at LiU. The panel highly appreciated the clear structure and instructions from the LIRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU. The self-evaluation was comprehensive and enlightening.

The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews, and we also found that the answers during the interviews supported the self-evaluation report. Interviews were also conducted with the management of the IEI department to get a better understanding of the structure and responsibilities at the university, faculty, department and division level. As Katarina Eckerberg was Charing another panel, she could only participate during our interviews with the Political Science division, which made it difficult to involve her in the evaluation of the other divisions. Drafts for the final report including both evaluations of and recommendations to the divisions, and more general observations and recommendations have been developed and discussed several times within the panel, resulting in this final report presented to Linköping University.

The evaluation unit assessed in this report is the division of Business Administration, Department of Management and Engineering (IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

- The panel was impressed throughout our visit by the dedication and professionalism of the participants across all five units. The materials were well-prepared, and all participants engaged in a professional and engaging fashion. The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Observation regarding department, faculty- and/or university management levels.

1. Complex organization: The university has an overall research strategy, but only one of the units referred to LiU's strategy in their self-evaluation. The difficulty to be identified and accounted for in LiU's research strategy was mentioned by other units. The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU. The organization becomes complex as the faculties are not part of the line organization. Two Faculties, Science and Enginering, and Arts and Science order teaching from the units within IEI and the later grant funding for research to the units evaluated. The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles. Furthermore, the IEI department is quite large, consisting of many diverse units both from engineering and social sciences. The department has no research strategy besides the ambition to stimulate inter-disciplinary collaboration through seed funding, support and openness for cooperation. Seed funding from the department is highly appreciated by the units, but its organization is unclear.

- The department could work more strategically with the units to ensure alignment between university, department and the units' research strategies.
- The seed funding could be reviewed in terms of objectives and outcomes.

- Systematic ways to measure, evaluate, communicate and reward societal impacts from research could be developed.
- The department could also support the divisions in other ways, for example by providing funds for ethical review.

The advantage of a large department is that it stimulates inter-disciplinary research, but disadvantages can at the same time exist. First, interdisciplinarity is difficult if there are large differences between the collaborating disciplines. Second, some units are involved in interdisciplinary research with units outside of the department that accordingly are not supported by the department. Third, some of the units are quite small while researchers within their discipline are spread throughout the university at other departments. It can be difficult to guarantee a critical mass of intra-disciplinary research that is needed to improve the quality of the research within small units and match research with the teaching load.

- A review of the department structure is suggested to optimize the incentives for inter-disciplinary research at LiU while at the same time guaranteeing a critical mass of researchers and research in each division.

2. Grants office/support for research applications: All units are working hard on applying for external funding, which secures research time for them. Panel J is however puzzled that a university that relies so heavily on external funding doesn't offer support that meets the needs of all parts of the university. The grants office appears to selectively prioritize technical and natural science projects over social science projects and to concentrate its support on EU funding, and larger grants, which is of course excellent. Generally, the units appreciated this existing support but also asked for more flexible and agile support including support for smaller applications and fundraising efforts that are left entirely to the individual researcher to pursue. Smaller grants are more approachable for younger researchers, hence support from LiU, the Faculties or the department would help them. The Grants Office needs to be able to meet the researchers' needs for assistance in devising research applications and contracts with national and international partners including both academic and public organizations. The panel offers the following recommendations:

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- Offer PhD courses in collaboration across LiU's social science-oriented divisions and units on general mandatory topics such as research design, qualitative and quantitative methods.

Evaluated Unit's Name: IEI.FEK Business Administration

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research of the Business and Administration Division (BAD) is novel, focuses on relevant topics and is well positioned at the international research front. The research quality and scientific impact are internationally competitive, with 31% (compared to the 21% LiU mean) of the publications on Level 2 of the Norwegian list and a field-normalized citation rate of 1.4 (compared to the 1.1 LiU mean). The journals in which faculty members publish and serve as editors/associate editors further strengthen this impression. The hiring of a professor in finance (who will be shared with other divisions at IEI) is likely to strengthen this even further. The BAD has not defined specific research profiles, which reflects the broad teaching assignment it has.

An issue that the BAD highlights in its self-evaluation report (SER) is the low average research productivity. There is a gap between research-active and non-research-active members of the division. The SER lists relevant strategies for addressing this issue as well as for improving the overall research output and quality of the division. How these strategies will be implemented is less clear from the SER but became clearer during the on-site visit. For instance, the seminar series has already included presentations on publishing in high-quality journals and both individual and collective mentorship is provided for younger researchers. In addition, a recent reorganization (see more below) will give senior professors more time to mentor junior researchers.

The junior scholars feel an increased pressure to publish in high-ranking journals, but mentions that publishing in lower-quality journals is also valued at the BAD. Senior and junior researchers co-write, which is a good way for the latter to learn. There is also a

working paper series that encourages staff to publish articles. Researchers can present and get feedback on manuscripts that are anywhere in the publication process. For example, researchers can get feedback on a rejected paper and get advice about how to develop it.

Faculty members can participate in at least one international conference every year, which promotes internationalization. However, some members of staff are calling for a stronger international presence at the BAD. The BAD publishes few papers with practitioners but has many applied research projects on topics that are relevant to societal stakeholders.

Recommendations

BAD has limited research resources relative to the high teaching load (according to information given at the on-site meeting, the ratio between teaching and research activities is currently 86% to 14%) and was more of a teaching division 15 years ago. Against this backdrop, the division is performing very well in terms of research and research quality. Having said that, we offer some recommendations:

- The BAD lacks clearly defined research profiles. Implementing a few research profiles could help improve the quality of the research even further. However, the research also needs to align with the broad teaching assignment.
- The SER includes research strategies, but these could be formalized and elaborated on somewhat. Some junior staff and PhD students are not well aware of them.
- We advise the division to encourage researchers to publish in high-quality journals. This has been successful historically and will continue to pay off in the future.
- We also recommend more emphasis on internationalization. Increasing international presence at the division that BAD staff can cowrite with and learn from is likely to further promote high-quality research.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The evolution from a teaching-oriented division to one that combines high-quality teaching and research has created some tensions between the "old" staff, who are primarily focused on teaching, and the "new" staff, who place greater emphasis on research. However, the general impression is that the working environment at BAD is positive. For example, several junior researchers and PhD students described the research environment as supportive.

BAD publishes in relevant scientific channels, and the measures outlined under the publication strategy in the SER, as well as the strategy concerning personnel resources, can further maximize the impact of publications.

BAD has recently strengthened its resources in strategy with the successful recruitment of a full professor, an asc. professor and an ass. professor. A professor of Finance is currently being recruited. The BAD has also been successful in recruiting ambitious and talented junior researchers and PhD students. The research/teaching ratio for junior staff interviewed at the on-site meeting is about 50/50, which implies that they have the time needed to develop originality and independence in their research. While most of them clearly understand the requirements for promotion, some do not. They are internationally oriented, publish in relevant scientific outlets, and aim for high-quality publications. However, some have expressed a need for more individualized mentoring.

Eight PhD students graduated during the evaluation period (four men and four women). BAD has outlined relevant strategies for strengthening both the PhD education and the department through PhD engagement. At the on-site meeting some PhD students reported initial confusion about expectations and the organizational structure, partly due to the disruptions caused by COVID-19 lockdowns. Some of them called for a more structured PhD program with better coordination and improved planning for courses in advance. They believe that requiring 90 ECTS credits in coursework is excessive. The 20% teaching load is not evenly distributed over the five years, meaning that certain periods can be extra demanding. Several PhD students are concerned about their job prospects after completing their degrees. However, they are generally positive about the newly introduced common seminar for the entire division.

The research-active faculty at BAD maintain strong national and international networks, and senior researchers actively integrate junior researchers into their established connections. While gender equality is balanced overall, disparities remain at the professorial level. Seminars encourage good research practices.

The broad research profile of BAD aligns well with the teaching focus. However, the current uneven balance between teaching and research activities poses a long-term risk to the research quality.

Recommendations

- To address tensions between teaching- and research-oriented staff, a dual career path for teaching and research could be implemented.

- The division head would benefit from increased support when it comes to navigating in the large department. It is not always clear who is responsible for what and what services the department can provide.
- Despite valuable mentoring initiatives, we recommend additional mentoring for junior staff at the individual level. We further recommend that senior researchers together develop common guidelines for and an approach to mentoring.
- The PhD program could be more formalized and better coordinated, especially during the first year. Developing the director of PhD studies function could help improve the structure of the PhD program and the integration of them across the department. The BAD could also consider reducing the course work from 90 to 60 ECTS credits. PhD students also require more support when they begin teaching and could be allocated extra preparation time compared to permanent staff. Involving PhD students in funding applications is a good strategy that should be pursued further.
- Senior researchers should continue introducing junior researchers to their networks.
- Swedish universities have implemented initiatives to support underrepresented genders, which BAD could leverage to address gender imbalance at the senior level.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

A reorganization of the division has been carried out removing the three former units, which primarily served administrative and teaching purposes rather than research objectives. Instead, a management group consisting of the division head, the deputy division head, the director of studies and a professors' council is being formed.

At present, there are three full professors and five associate senior professors out of 45 employees, with a fourth professor joining soon. This grants BAD considerable senior capacity to supervise PhD students. Additionally, there are 23 senior lecturers and six lecturers that have about 20% competence development or research time.

The annual research funding for BAD has during the last years been slightly less than 20 MSEK, with about one-third coming from external grants. The BAD submits approximately 50 applications per year, with a success rate of about 10%. Funding is flagged as a concern in the SWOT analysis, especially the low grant acceptance rate for external funding. A recent drop in external funding is attributed to increased national competition. Increasing applications for EU grants (which are currently almost absent) and collaborating with other departments at LiU are identified as opportunities. There is a general push within BAD to encourage grant applications. A first funding workshop was recently held, which was highly appreciated by junior staff. BAD also organizes internal proposal seminars and has begun

learning from both rejected applications and successful ones, including those awarded funding from the Swedish Research Council by applicants outside of BAD. Junior researchers are involved in applications and initiate applications by themselves.

So far, BAD has little experience with EU funding and is somewhat reluctant to engage in it, due to the administrative burden it involves. Additionally, the key individuals who would need to lead such efforts are already successful in securing national funding.

Recommendations

- We recommend that BAD fully implement the new organizational structure and management group that is currently being formed. The new structure will reduce obstacles to cross-division collaboration and has the potential to foster high-quality research and good working conditions. It will also free up time for senior researchers to mentor junior researchers.
- We recommend that BAD continue with funding workshops, proposal seminars and involving junior researchers in applications as well as to systematize the learning process from both rejected and successful applications. This is essential for the quality assurance process of applications and can help increase the success rate.
- Senior lecturers that are motivated to conduct research but that only have 20% competence development time should be encouraged to do so. For some, this can lead to publications and applications.
- While we understand BAD's concerns about engaging in EU funding, we advise them to start doing so. They could start to participate as a partner in an EU project application to learn. Collaborating with a division at LiU that already has EU funding experience is a strategy we strongly recommend.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The BAD is high performing in terms of research and research quality, although the output is somewhat uneven distributed. The panel encourages the division to continue building on its strengths while addressing challenges around the teaching to research ratio, uneven productivity, mentorship, and research funding. The division is well-positioned to maintain and enhance its contribution to the university and the wider research community.

LiRE25 – Linköping University Research Evaluation 2025

Panel J Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of the following professors: Panel Chair Maria Bengtsson, Dept of Business Administration at Umeå University, Hanne Sondergaard Birkmose, Dean of the Faculty of Business and Social Sciences at the University of Southern Denmark, Per Skålén, Business Administration at Karlstad University, Tone Bratteteig, Design of Information Systems at the University of Oslo, Liam Delaney, Behavioural Science at London School of Economics and Katarina Eckerberg Dept of Political Science at Umeå University.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. Each disciplinary panel expert was given special responsibility for its disciplinary unit at LiU. The panel highly appreciated the clear structure and instructions from the LIRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU. The self-evaluation was comprehensive and enlightening.

The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews, and we also found that the answers during the interviews supported the self-evaluation report. Interviews were also conducted with the management of the IEI department to get a better understanding of the structure and responsibilities at the university, faculty, department and division level. As Katarina Eckerberg was Charing another panel, she could only participate during our interviews with the Political Science division, which made it difficult to involve her in the evaluation of the other divisions. Drafts for the final report including both evaluations of and recommendations to the divisions, and more general observations and recommendations have been developed and discussed several times within the panel, resulting in this final report presented to Linköping University.

The evaluation unit assessed in this report is the division of Information Systems and Digitization, Department of Management and Engineering (IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel was impressed throughout our visit by the dedication and professionalism of the participants across all five units. The materials were well-prepared, and all participants engaged in a professional and engaging fashion. The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Observation regarding department, faculty- and/or university management levels.

1. Complex organization: The university has an overall research strategy, but only one of the units referred to LiU's strategy in their self-evaluation. The difficulty to be identified and accounted for in LiU's research strategy was mentioned by other units. The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU. The organization becomes complex as the faculties are not part of the line organization. Two Faculties, Science and Enginering, and Arts and Science order teaching from the units within IEI and the later grant funding for research to the units evaluated. The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles. Furthermore, the IEI department is quite large, consisting of many diverse units both from engineering and social sciences. The department has no research strategy besides the ambition to stimulate inter-disciplinary collaboration through seed funding, support and openness for cooperation. Seed funding from the department is highly appreciated by the units, but its organization is unclear.

- The department could work more strategically with the units to ensure alignment between university, department and the units' research strategies.
- The seed funding could be reviewed in terms of objectives and outcomes.

- Systematic ways to measure, evaluate, communicate and reward societal impacts from research could be developed.
- The department could also support the divisions in other ways, for example by providing funds for ethical review.

The advantage of a large department is that it stimulates inter-disciplinary research, but disadvantages can at the same time exist. First, interdisciplinarity is difficult if there are large differences between the collaborating disciplines. Second, some units are involved in interdisciplinary research with units outside of the department that accordingly are not supported by the department. Third, some of the units are quite small while researchers within their discipline are spread throughout the university at other departments. It can be difficult to guarantee a critical mass of intra-disciplinary research that is needed to improve the quality of the research within small units and match research with the teaching load.

- A review of the department structure is suggested to optimize the incentives for inter-disciplinary research at LiU while at the same time guaranteeing a critical mass of researchers and research in each division.

2. Grants office/support for research applications: All units are working hard on applying for external funding, which secures research time for them. Panel J is however puzzled that a university that relies so heavily on external funding doesn't offer support that meets the needs of all parts of the university. The grants office appears to selectively prioritize technical and natural science projects over social science projects and to concentrate its support on EU funding, and larger grants, which is of course excellent. Generally, the units appreciated this existing support but also asked for more flexible and agile support including support for smaller applications and fundraising efforts that are left entirely to the individual researcher to pursue. Smaller grants are more approachable for younger researchers, hence support from LiU, the Faculties or the department would help them. The Grants Office needs to be able to meet the researchers' needs for assistance in devising research applications and contracts with national and international partners including both academic and public organizations. The panel offer the following recommendations:

- Consider how well the University's Grants Office supports bottom-up needs for research applications that contain collaborations with academic, private and public partners.
- Strive to support and facilitate emerging research applications since the university relies on initiatives taken from the various research units themselves.
- As a first step, some clarifying meetings between the units (including other research units at LiU with similar challenges), the department and the grant office on how to align expectations of support and to identify promising areas that are being under-supported would be very useful.

3. Visibility and the central communication function: Visibility of core research can potentially become an issue. Many of the units we met would generally appear in a business school or social science college. Thinking about how to make them more visible in the next period would be good, including through more identity-driven web design. Some units also wish for a better visibility of their areas of expertise towards the public sector and external partners, both to make them aware of the expertise that exists at LiU and to make it possible to identify potential partners for funding. Many

have experienced that there is support for some research but not for all research that the units want to communicate to a broader audience. Therefore, the central communication function should be improved. Several self-evaluation reports describe the central communication department as an administrative structure that brings too little real value. The panel offers general and specific recommendations:

- The communication service should focus less on giving advice about how to communicate and more on doing the actual communication.
- LiU's communication function should collaborate more closely with the research units to develop a wider range of research communication means.
- The webpages should be made more relevant, and up to date by, for example, presenting research results and societal impacts in attractive ways.

Observations that are common for all units

Positioning/Strategy: All divisions conducted excellent research within certain areas with strong researchers or research groups either at the unit or in collaboration with other researchers at the university. These areas were strongly connected to specific individuals, which makes the units vulnerable. Examples of the vulnerability were when some individuals partly left the unit to take on managerial duties at other places within the university. Ambitions to further develop some new areas of research were also mentioned. Although the units need a broad research base to support their extensive teaching assignments, a clearer research strategy would help to reduce the dependency of certain individuals and help to position a few strong research areas within the national and international scientific community. The units were also lacking a clear publication strategy

- The units would benefit from developing a clear research strategy and to implement it beyond putting it on paper. The strategy should include a publication strategy.

Internationalization: A stronger focus on internationalization could have been expected in LiRE as a whole. The instructions for evaluation provided to panel members and report templates for the evaluation lack a focus on internationalization. It is mentioned only in connection to international publications, but not in terms of strengthening the LiU brand internationally or the need to bring international elements into the local work environments. International guest professors are absent in all our five evaluation divisions.
Some researchers had rich international network and participated in the international scientific communities as individuals, but the units could develop clearer internationalization strategies.

Balance between teaching and research*:* The teaching-to-research ratio is unfavorable for all five evaluation units, and some even describe the IEI department as a "teaching factory". Given these poor circumstances for research, Panel J is overall impressed with the amount and quality of the research the units are producing. The university or at least the IEI department seems to be in a transition from a teaching to a research institution. All units are in this transition, but at different stages: some employees teach 80% of the time, some teach 50% of the time. For a university that rely on research-based teaching the panel has been puzzled to learn that the university does not even secure funding for research time for all faculty members in a research position. Not only does it severely limit the ability to produce high quality research, but it also places some researchers in a position where they by default are forced to do research in their free time. Any employer should seek to secure working conditions where a decent work-life balance can be upheld. We also observed a difference between people that are promoted internally and people recruited externally as several units offer significantly less teaching for positions recruited externally by using the divisions surplus funding to make it possible.

An overview of differences in the division of labor from a justice perspective can be beneficial.

Two different career paths*:* We met with LiU employees who were positive about the turn to research, but they all mentioned that some employees are not positive and prefer to focus on teaching. All units have some personnel that teach 80% (= 100% minus 20% self-development time). It was also mentioned that the research productivity was imbalanced within the units.

- One suggestion is to accept the imbalance and create a separate career path for those who primarily want to teach by implementing clear guidelines for how teachers can become merited or excellent teachers based on pedagogical merits and experiences from interacting with society.

Mentoring of junior researchers: Although most of the junior researchers were satisfied with how more senior researchers were mentoring them and helping them in their career development, few of them had a formalized and structured approach to mentoring. Instead, mentoring was dependent on different individuals and could differ depending on the mentors. We believe that the units would benefit from:

- Developing a more structured and formalized approach to mentoring within the units.
- Organize regular career planning for young scholars across Faculties/Departments with shared disciplinary orientation.

PhD education*:* Most of the divisions expressed that they would have preferred to have a larger group of PhD students, but many of them have established excellent connections with the wider PhD education network compensating for the limited number of PhD students. PhD students asked for better information about the courses, for example a web page with an overview of which courses are arranged when and more could maybe be done on the departmental level. However, developing one's own paths of studies is an important part of PhD training. The ISP is perceived as a purely administrative tool and should be reformed.

- Increase the regularity/predictability of Faculty/Department funding toward PhD positions.
- Offer PhD courses in collaboration across social science-oriented divisions and units on general mandatory topics such as research design, qualitative and quantitative methods.

Evaluated Unit's Name: IEI.INDIG Information Systems and Digitalization

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Information Systems and Digitalization (INDIG) unit focuses on digitalization and its consequences, in particular digitalization in the public sector. Their research in Information Systems includes empirical studies of digitalization practices representing an original perspective in eGovernment research. The unit's research is recognized nationally and internationally, e.g., by unit members in editorial boards in leading journals. Their focus on the realities of digitalization and automation processes is timely and relevant. The unit also conducts research on digitalization in the private sector and wants to become more visible for this research . The unit already collaborates with a large number of organizations.

The INDIG unit has a better publication record than reported, as the self-evaluation made them aware that several publications and projects were not reported and therefore not visible or counted. The self-evaluation report mentions that the unit has too few publications for citation analysis and describes the low number of (especially journal) publications as a weakness. The percentage of high-level publications (25% in level 2; 67% in Q1-journals) is above the average at LiU (21% in level 2; 48% in Q1-journals). The publications are equally divided between journal and conference papers, many in eGov outlets. The INDIG unit has started working on improving their publications both in quantity and quality.

The INDIG unit also produces a large number of reports aimed at their public and private research partners. They engage in “third task” activities like public talks and media appearances. The unit finds it important that their research is relevant for practice.

Today most of the research in the unit is organized in two large projects. In 2024 the unit became part of a new multidisciplinary research environment on Resilient Institutions in the Digital Era (RIDE) focusing on the societal consequences of digitalization of public authorities. INDIG’s Ida Lindgren was co-founder of the environment, which is led by Elin Wihlborg at IEI.STATS The INDIG group is applying for more funding connected to RIDE, which will be strategically important in the group’s future research. In addition, the unit continues working on utilizing the diversity of the unit members.

Recommendations

- Panel J suggests that the unit develops a more explicit research strategy based on their previous and current research and includes the diversity of competencies represented by the unit members.
- Although Ida Lindgren is currently being promoted to full professor Panel J suggests hiring an international guest professor or adjunct professor that can support the unit in its work on improving the unit as a whole and its research quality. This should also include making a shared publication strategy for the whole unit.
- The unit is internationally recognized, but the international recognition of their eGov research can be increased by publishing in journals that encourage empirical studies like Computer-Supported Cooperative Work, Human-Computer Interaction, or STS outlets with high ranking.
- Panel J recommends that the unit is more recognized by the faculty and the university for their outreach to the public (the “third task”) through reports aimed at their industry and public research partners. The panel suggests that improved support for research communication to the public and practitioners would be valuable for the unit and increase their societal impact.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The INDIG unit has “lost” the only two professors to management positions and has also grown recently. The unit has thereby become more heterogeneous, and the diversity makes it difficult to develop a shared publication strategy for the unit. Their current strategy for

improving their publications is stepwise increasing the ambition level from workshop – conference – journal and organizing seminars for discussing work-in-progress. The unit has an open and accepting atmosphere: all employee groups in the INDIG unit appreciate the open and welcoming research environment. The organization of research emphasizing work-in-progress builds trust and group feeling.

There are large differences in the success rate for publication and funding between the members of the INDIG unit. Much of the research collaboration across units at LiU seems to depend on personal relationships, making it harder for the junior researchers to establish cross-unit cooperation and become part of grant applications. The "loss" of two professors thus has had severe consequences for the INDIG group and its ability to attract funding. The unit's strategy of having everyone engaged in writing papers and grant applications aims to change that.

The unit organizes much of its research discussions in two project-based groups, where junior researchers and PhD students are involved. Most of the unit's researchers are engaged in these two projects. The RIDE environment will also include many of the unit's members. The "strategic" management group in the unit suggests widening the research areas with one more area.

There seems not to be a clear formal strategy for working with junior researchers beyond the general guidelines for promotion at LiU. The junior researchers are fully integrated in the research projects.

PhD students have both formal and informal discussions with their supervisors and make a study plan together with their supervisors each year. In addition to the project-based groups, they are part of a national PhD school expanding their network as well as the number of available courses.

The PhD students seemed unaware of the fact that the "strategic" management group in the unit includes a role as the responsible for the PhD education.

The INDIG unit is responsible for a bachelor and a master program, both very popular. "Recruitment has primarily been based on a need for teaching staff." (SER, p. 9) However, the unit aims for 50% research for all their members and spend faculty funding and surplus external funding for making this possible.

Recommendations

- The unit is now in a period of writing a large number of grant applications involving everyone, and the long-term plan is to turn to a more quality focused process. In line with the plan, Panel J recommends focusing on working more with fewer applications and implementing some kind of quality assurance system for the applications. Larger applications get more administrative support from LiU.

- The unit may be stronger research-wise with a few focus areas that can attract groups of its members utilizing their disciplinary differences. Including more unit members in fewer applications can support the unit in better utilizing its diversity.
- The INDIG group has experienced that good applicants have chosen other work offerings while waiting on response from LiU. A shorter recruitment process would help them recruit their preferred applicants.
- One of the seniors in the unit's "strategic" group is responsible for the PhD education, but it was not clear to the panel if this was known by the PhD students. More structured support from the unit's "strategic" group can help PhD students orient themselves and find the information they need.
- The unit spends its surplus funding securing time for research for the people that they recruit. To increase the quality of the research, Panel J recommends that all employees have sufficient time for research in their contracts and that LiU supports this policy financially.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

All our interviewees mentioned that the unit "lacks a professor", and this seems to be a problem for all groups of employees. During the evaluation period the unit "lost" the only two professors to management positions and our impression is that the associate professors have had to "act as professors" with not enough support. As collaboration across units at LiU seems to depend on personal relationships, the personal networks of the "lost" professors were also lost when they left. It has taken time for the remaining unit members to develop their own networks. However, Ida Lindgren is promoted to full professor during the spring of 2025.

Funding is difficult and depends on personal relations. Grant applications have a very low success rate while smaller grants have higher chances but get less support. The unit aims to improve their grant application skills by having everyone practice application writing.

INDIG has established a "strategic" group with five people/roles: : (1) head of division (associate professor; swe: universitetslektor, docent); (2) research leader (senior associate professor, now being promoted to full professor); (3) research education leader (senior associate professor; swe: biträdande professor) - this person is also program manager of our master program; (4) study director (adjunct teacher); (5) program manager of bachelor education (associate professor; universitetslektor). Our impression from the interviews is that the research leader Ida Lindgren has been very active and carried much of the workload in the research group.

The expertise of the INDIG unit is not visible at LiU and there are no support mechanisms for cross-unit contact for research collaboration. Support for matching their own expertise with external sources for funding (grants and calls) could help establish grounds for research collaboration and grant applications. It seems that large funding opportunities require personal networks that not all unit members (like junior researchers) have. Smaller grants are more approachable for them. Seed funding is very useful and easy to get and is highly appreciated.

Recommendations

- Panel J recommends that there should be formal structures in place that support and secure research quality in divisions with few or no seniors / professors such as the INDIG case. This could be hiring a professor or engaging an international guest professor or adjunct professor that can support the unit for a period.
- Panel J recommends that both small and large grant applications get support from the grant office. This will improve the support for junior researchers.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The INDIG unit has developed as a research unit since the self-evaluation was written, and they have carried out several of the strategic activities described in the report. Panel J's impression is that the self-evaluation started a positive process for the unit to become more focused and better organized. Several improvement processes have been implemented.

The INDIG unit seems like a very successful research and teaching unit despite the lack of seniors in the unit. They all appreciate the diversity although recognizing that the internal diversity (making them a multidisciplinary group) also comes with challenges. The unit confirms our impression that research cooperation (publications and funding) is dependent on personal relationships. Ida Lindgren appears to have taken a senior role in the unit's research.

LiRE25 – Linköping University Research Evaluation 2025

Panel J Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

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The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. Each disciplinary panel expert was given special responsibility for its disciplinary unit at LiU. The panel highly appreciated the clear structure and instructions from the LIRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU. The self-evaluation was comprehensive and enlightening.

The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews, and we also found that the answers during the interviews supported the self-evaluation report. Interviews were also conducted with the management of the IEI department to get a better understanding of the structure and responsibilities at the university, faculty, department and division level. As Katarina Eckerberg was Charing another panel, she could only participate during our interviews with the Political Science division, which made it difficult to involve her in the evaluation of the other divisions. Drafts for the final report including both evaluations of and recommendations to the divisions, and more general observations and recommendations have been developed and discussed several times within the panel, resulting in this final report presented to Linköping University.

The evaluation unit assessed in this report is the division of Economics, Department of Management and Engineering (IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel was impressed throughout our visit by the dedication and professionalism of the participants across all five units. The materials were well-prepared, and all participants engaged in a professional and engaging fashion. The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Observation regarding department, faculty- and/or university management levels.

1. Complex organization: The university has an overall research strategy, but only one of the units referred to LiU's strategy in their self-evaluation. The difficulty to be identified and accounted for in LiU's research strategy was mentioned by other units. The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU. The organization becomes complex as the faculties are not part of the line organization. Two Faculties, Science and Enginering, and Arts and Science order teaching from the units within IEI and the later grant funding for research to the units evaluated. The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles. Furthermore, the IEI department is quite large, consisting of many diverse units both from engineering and social sciences. The department has no research strategy besides the ambition to stimulate inter-disciplinary collaboration through seed funding, support and openness for cooperation. Seed funding from the department is highly appreciated by the units, but its organization is unclear.

- The department could work more strategically with the units to ensure alignment between university, department and the units' research strategies.
- The seed funding could be reviewed in terms of objectives and outcomes.

- Systematic ways to measure, evaluate, communicate and reward societal impacts from research could be developed.
- The department could also support the divisions in other ways, for example by providing funds for ethical review.

The advantage of a large department is that it stimulates inter-disciplinary research, but disadvantages can at the same time exist. First, interdisciplinarity is difficult if there are large

differences between the collaborating disciplines. Second, some units are involved in interdisciplinary research with units outside of the department that accordingly are not supported by the department. Third, some of the units are quite small while researchers within their discipline are spread throughout the university at other departments. It can be difficult to guarantee a critical mass of intra-disciplinary research that is needed to improve the quality of the research within small units and match research with the teaching load.

- A review of the department structure is suggested to optimize the incentives for inter-disciplinary research at LiU while at the same time guaranteeing a critical mass of researchers and research in each division.

2. Grants office/support for research applications: All units are working hard on applying for external funding, which secures research time for them. Panel J is however puzzled that a university that relies so heavily on external funding doesn't offer support that meets the needs of all parts of the university. The grants office appears to selectively prioritize technical and natural science projects over social science projects and to concentrate its support on EU funding, and larger grants, which is of course excellent. Generally, the units appreciated this existing support but also asked for more flexible and agile support including support for smaller applications and fundraising efforts that are left entirely to the individual researcher to pursue. Smaller grants are more approachable for younger researchers, hence support from LiU, the Faculties or the department would help them. The Grants Office needs to be able to meet the researchers' needs for assistance in devising research applications and contracts with national and international partners including both academic and public organizations. The panel offers the following recommendations:

- Consider how well the University's Grants Office supports bottom-up needs for research applications that contain collaborations with academic, private and public partners.
- Strive to support and facilitate emerging research applications since the university relies on initiatives taken from the various research units themselves.
- As a first step, some clarifying meetings between the units (including other research units at LiU with similar challenges), the department and the grant office on how to align expectations of support and to identify promising areas that are being under-supported.

3. Visibility and the central communication function: Visibility of core research can potentially become an issue. Many of the units we met would generally appear in a business school or social science college. Thinking about how to make them more visible in the next period would be good, including through more identity-driven web design. Some units also wish for a better visibility of their areas of expertise towards the public sector and external partners, both to make them aware of the expertise that exists at LiU and to make it possible to identify potential partners for funding. Many have experienced that there is support for some but not for all research that the units want to communicate to a broader

audience. Therefore, the central communication function should be improved. Several self-evaluation reports describe the central communication department as an administrative structure that brings too little real value. The panel offers general and specific recommendations:

- The communication service should focus less on giving advice about how to communicate and more on doing the actual communication.
- LiU's communication function should collaborate more closely with the research units to develop a wider range of research communication means.
- The webpages should be made more relevant, and up to date by, for example, presenting research results and societal impacts in attractive ways.

Observations that are common for all units

Positioning/Strategy: All divisions conduct excellent research within certain areas with strong researchers or research groups either at the unit or in collaboration with other researchers at the university. These areas are however strongly connected to specific individuals, which makes the units vulnerable. Examples include when some individuals partly left the unit to take on managerial duties at other places within the university. Ambitions to further develop some new areas of research were also mentioned. Although the units need a broad research base to support their extensive teaching assignments, a clearer research strategy would help to reduce the dependency of certain individuals and help to position a few strong research areas within the national and international scientific community. The units also lack a clear publication strategy. Hence:

- The units would benefit from developing a clear research strategy and to implement it beyond putting it on paper. The strategy should include a publication strategy.

Internationalization: A stronger focus on internationalization could have been expected in LiRE as a whole. The instructions for evaluation provided to panel members and report templates for the evaluation lack a focus on internationalization. It is mentioned only in connection to international publications, but neither in terms of strengthening the LiU brand internationally nor to bring international elements into the local work environments. International guest professors are absent in all our five evaluation divisions.

- Some researchers have rich international networks and participate in the international scientific communities as individuals, but the units could develop clearer internationalization strategies.

Balance between teaching and research*:* The teaching-to-research ratio is unfavorable for all five evaluation units, and some even describe the IEI department as a "teaching factory". Given these poor circumstances for research, Panel J is overall impressed with the amount and quality of the research the units are producing. The university or at least the IEI

department seems to be in a transition from a teaching to a research institution. All units are in this transition, but at different stages: some employees teach 80% of the time, some teach 50% of the time. For a university that relies on research-based teaching the panel was puzzled to learn that the university does not even secure funding for research time for all faculty members in a research position. Not only does this severely limit the ability to produce high quality research, but it also places some researchers in a position where they by default are forced to do research in their free time. Any employer should seek to secure working conditions where a decent work-life balance can be upheld. We also observed a difference between people that are promoted internally and people recruited externally as several units offer significantly less teaching for positions recruited externally by using the divisions surplus funding.

- An overview of differences in the division of labor from a justice perspective can be beneficial.

***Two different career paths**:* We met with LiU employees who were positive about the turn to research, but they all mentioned that some employees are not positive and prefer to focus on teaching. All units have some personnel that teach 80% (= 100% minus 20% self-development time). It was also mentioned that the research productivity was imbalanced within the units.

- One suggestion is to accept the imbalance and create a separate career path for those who primarily want to teach by implementing clear guidelines for how teachers can become merited or excellent teachers based on pedagogical merits and experiences from interacting with society.

Mentoring of junior researchers: Although most of the junior researchers were satisfied with how more senior researchers are mentoring them and helping them in their career development, few of them had a formalized and structured approach to mentoring. Instead, mentoring is dependent on different individuals and could differ depending on the mentors. We believe that the units would benefit from:

- Developing a more structured and formalized approach to mentoring within the units.
- Organize regular career planning for young scholars across faculties and/or departments with shared disciplinary orientation.

***PhD education**:* Most of the divisions expressed that they would have preferred to have a larger group of PhD students, but many of them have established excellent connections with the wider PhD education networks compensating for the limited number of PhD students. Recruitment of PhD students is largely dependent on external funding. PhD students asked for better information about available courses, for example a web page with an overview of which courses are arranged when and more could maybe be done at departmental level

including offering some basic courses. However, developing one's own study path is an important part of PhD training. The ISP is perceived as a purely administrative tool and should be reformed.

- Increase the regularity/predictability of Faculty/Department funding toward PhD positions to help in planning.
- Offer PhD courses in collaboration across LiU's social science-oriented divisions and units on general mandatory topics such as research design, qualitative and quantitative methods.

Evaluated Unit's Name: IEI.NEK Economics

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division of Economics at IEI is currently in a strong and dynamic phase of research activity. The group demonstrates a clear sense of identity and coherence across its core themes, with an emphasis on applied economics in areas of high societal relevance—especially environmental and energy economics, health, labour markets, and behavioural economics. Despite its relatively small size, the division produces a substantial volume of internationally visible research, with an impressive share published in leading journals and a strong citation profile. The bibliometric data point to a field-normalised citation rate that significantly exceeds national benchmarks, and interviews with staff and PhD students revealed a well-structured and collegial research environment that supports both disciplinary depth and thematic breadth. The recent addition of professorial appointments in political economy and economic history opens up new opportunities and suggests a unit actively expanding its intellectual horizons while maintaining a strong foundational core. The discussions with senior and early career staff and PhD students presented a coherent idea of the research of the division and quite a bit of common purpose regarding research areas of concentration and publication aims.

Relevance and novelty: The division's research spans environmental economics, health and labor economics, behavioral and experimental economics, and applied econometrics. These are highly relevant fields, and their key areas such as energy, labour market inequality and health are well aligned with pressing societal challenges. In general, they are very

impressive in terms of how they have organised a relatively small group around thematic areas of high societal relevance.

Quality of output: Bibliometric data show strong journal publication patterns—98% of outputs are peer-reviewed articles, 54% are published in Q1 journals, and 21% are among the top 10% most cited in their fields. The field-normalized citation rate is 1.5, significantly above LiU and Faculty of Arts and Science averages.

Impact outside academia: There is strong evidence of engagement with Swedish government agencies and companies (e.g. Swedish National Road and Transport Research Institute, The Swedish Unemployment Insurance Inspectorate, The Swedish Retail and Wholesale Council, The National Board of Trade Sweden, the Riksbank, The Equality Ombudsman, Region Östergötland, Toyota and Invencon), and several publications have been cited in policy documents and media. A more systematic account of this impact would be beneficial in future self-evaluations and for the Department itself to understand its wider footprint.

Strategies and future plans: The recent hiring of two professors in new fields offers opportunities for innovation but will require institutional support to ensure successful integration and sustainability. The areas of history and political economy are highly promising and the senior colleagues had strong observations on how to balance with existing strengths but it will be a key factor in determining future development of department.

Recommendations

- Improve visibility of applied policy relevance and interdisciplinary links in future reporting and communications. Clearer positioning—internally within the department and externally through communication and web presence—can help ensure that the new areas complement and strengthen the existing research identity.
- Monitor integration of new professorial areas, including support for team development and teaching alignment. This should form part of a broader effort to clarify the division's evolving profile and contributions, particularly as the unit expands into new thematic areas.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

1) Publication strategies, Mostly very strong, Some confusion caused by different lists. Also needs to be a bit clearer on how non-Economics publications are counted towards promotion.

2) Recruitment, Opportunities for early-career researchers to develop their originality and independence,

3) Quality of the PhD training, The connection with the wider PhD training network is excellent. The 90 credit model seemed appropriate in terms of rigour and flexibility.

4) Academic as well as non-academic networks and collaborations,

5) Equal opportunities and gender equality,

6) Good research practice,

7) Research in relation to teaching.

Publication strategy: Strong overall. The unit has a good presence in top field journals (Energy Economics, JEEA, JOLE, etc.), Some clarity is needed around how interdisciplinary publications are recognised in career progression, in particular for behavioural staff publishing in psychology journals or staff who publish in specialist health or environmental journals.

Recruitment and early-career opportunities: The presence of associate senior lecturers and postdocs (with high female representation) suggests that early-career support is taken seriously. Developmental trajectories could be better articulated. This did not present as a major problem as early career staff seemed quite clear how the promotion process would work. But common to other divisions, a greater degree of definition of expectation with regard to research at different career stages would likely help to structure discussions around career progression.

PhD training: The 90-credit model and integration with the national PhD network were well outlined and were seen by the panel as a very good structure. Seven PhDs were awarded between 2018 and 2023, with completion times averaging around 4 years net and 7 years gross so in that context the alignment with other universities to provide training is very well thought-through and efficient. The interviews with the PhD students reinforced the impression that the Division is well structured in this regard and is working very effectively to provide strong mentorship to students, as well as networking them well in wider national initiatives.

Collaborations: 77% of publications have international co-authorship. Co-publication with agencies (e.g., VTI) and some companies indicates both academic and societal integration.

Gender equality: Gender diversity is a concern at senior levels (currently no women among full and associate professors), though recent hires show improvement at early career stages (67% of assistant professors and 100% of postdocs are women).

Recommendations

- Clarify promotion criteria especially in relation to interdisciplinary work.
- Consider initiatives to improve gender balance at senior levels.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Organization and staffing: 25 total staff (as of 2023), with 24 academic positions. The unit is stable but small; staff have a relatively high average age (45).

Funding: Total income remained steady at ~36 MSEK in 2023, with a small deficit (-0.2 MSEK). External research grants rose from 3.3 MSEK in 2021 to 5.9 MSEK in 2023. The top 2023 funders include the Swedish Research Council and the Wallenberg Foundations.

Infrastructure and support: A major concern related to infrastructure that was raised in the report and in our meeting with staff was the lack of large databases and laboratory facilities within LiU for social science. Similarly, further attention to digital communication and outreach infrastructure may help visibility. The website is good and well organised from a thematic point of view but clearly out of date in a number of places and some support on that would definitely help give external audiences a better sense of the strong activity in the Division.

Recommendations

- Strategically target external funding diversification.
- Enhance visibility infrastructure, especially for communicating research to non-academic stakeholders.
- The feasibility of developing a laboratory facility for Economics in collaboration with other colleagues in the University should be examined.
- Economics should prepare a concise case for investment in key data infrastructures to be considered either at the Department, Faculty, or University Research level for funding support.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The Division of Economics at IEI is a high-performing unit in terms of research output and international engagement. The panel encourages the unit to continue building on its strengths while addressing emerging challenges around mentorship, visibility, and support

for new research directions. The division is well-positioned to maintain and enhance its contribution to the university and the wider research community.

LiRE25 – Linköping University Research Evaluation 2025

Panel J Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of the following professors: Panel Chair Maria Bengtsson, Dept of Business Administration at Umeå University, Hanne Sondergaard Birkmose, Dean of the Faculty of Business and Social Sciences at the University of Southern Denmark, Per Skålén, Business Administration at Karlstad University, Tone Bratteteig, Design of Information Systems at the University of Oslo, Liam Delaney, Behavioural Science at London School of Economics and Katarina Eckerberg Dept of Political Science at Umeå University.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. Each disciplinary panel expert was given special responsibility for its disciplinary unit at LiU. The panel highly appreciated the clear structure and instructions from the LIRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU. The self-evaluation was comprehensive and enlightening.

The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews, and we also found that the answers during the interviews supported the self-evaluation report. Interviews were also conducted with the management of the IEI department to get a better understanding of the structure and responsibilities at the university, faculty, department and division level. As Katarina Eckerberg was Charing another panel, she could only participate during our interviews with the Political Science division, which made it difficult to involve her in the evaluation of the other divisions. Drafts for the final report including both evaluations of and recommendations to the divisions, and more general observations and recommendations have been developed and discussed several times within the panel, resulting in this final report presented to Linköping University.

The evaluation unit assessed in this report is the division of Political Science, Department of Management and Engineering (IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The panel was impressed throughout our visit by the dedication and professionalism of the participants across all five units. The materials were well-prepared, and all participants engaged in a professional and engaging fashion. The panel was also largely impressed by the workplace culture exhibited, with participants displaying a strong sense of collegiality and team-ethic.

Observation regarding department, faculty- and/or university management levels.

1. Complex organization: The university has an overall research strategy, but only one of the units referred to LiU's strategy in their self-evaluation. The difficulty to be identified and accounted for in LiU's research strategy was mentioned by other units. The panel was puzzled by the complexity of the organization, and it was unclear to us how the responsibility for research was divided between the different levels of the LiU. The organization becomes complex as the faculties are not part of the line organization. Two Faculties, Science and Enginering, and Arts and Science order teaching from the units within IEI and the later grant funding for research to the units evaluated. The Faculty's resource allocation model does not align with the research quality principles adopted in LiRE, and societal impact is not at all rewarded, which was both confusing and frustrating to some of the senior staff we interviewed. Our recommendation is to align resource allocation principles with the research quality principles. Furthermore, the IEI department is quite large, consisting of many diverse units both from engineering and social sciences. The department has no research strategy besides the ambition to stimulate inter-disciplinary collaboration through seed founding, support and openness for cooperation. Seed funding from the department is highly appreciated by the units, but its organization is unclear.

- The department could work more strategically with the units to ensure alignment between university, department and the units' research strategies.
- The seed funding could be reviewed in terms of objectives and outcomes.

- Systematic ways to measure, evaluate, communicate and reward societal impacts from research could be developed.
- The department could also support the divisions in other ways, for example by providing funds for ethical review.

The advantage of a large department is that it stimulates inter-disciplinary research, but disadvantages can at the same time exist. First, interdisciplinarity is difficult if there are large differences between the collaborating disciplines. Second, some units are involved in interdisciplinary research with units outside of the department that accordingly are not supported by the department. Third, some of the units are quite small while researchers within their discipline are spread throughout the university at other departments. It can be difficult to guarantee a critical mass of intra-disciplinary research that is needed to improve the quality of the research within small units and match research with the teaching load.

- A review of the department structure is suggested to optimize the incentives for inter-disciplinary research at LiU while at the same time guaranteeing a critical mass of researchers and research in each division.

2. Grants office/support for research applications: All units are working hard on applying for external funding, which secures research time for them. Panel J is however puzzled that a university that relies so heavily on external funding doesn't offer support that meets the needs of all parts of the university. The grants office appears to selectively prioritize technical and natural science projects over social science projects and to concentrate its support on EU funding, and larger grants, which is of course excellent. Generally, the units appreciated this existing support but also asked for more flexible and agile support including support for smaller applications and fundraising efforts that are left entirely to the individual researcher to pursue. Smaller grants are more approachable for younger researchers, hence support from LiU, the Faculties or the department would help them. The Grants Office needs to be able to meet the researchers' needs for assistance in devising research applications and contracts with national and international partners including both academic and public organizations. The panel offers the following recommendations:

- Consider how well the University's Grants Office supports bottom-up needs for research applications that contain collaborations with academic, private and public partners.
- Strive to support and facilitate emerging research applications since the university relies on initiatives taken from the various research units themselves.
- As a first step, some clarifying meetings between the units (including other research units at LiU with similar challenges), the department and the grant office on how to align expectations of support and to identify promising areas that are being under-supported.

3. Visibility and the central communication function: Visibility of core research can potentially become an issue. Many of the units we met would generally appear in a business school or social science college. Thinking about how to make them more visible in the next period would be good, including through more identity-driven web design. Some units also wish for a better visibility of their areas of expertise towards the public sector and external partners, both to make them aware of the expertise that exists at LiU and to make it possible to identify potential partners for funding. Many have experienced that there is support for some but not for all research that the units want to communicate to a broader audience. Therefore, the central communication function should be improved. Several self-

evaluation reports describe the central communication department as an administrative structure that brings too little real value. The panel offers general and specific recommendations:

- The communication service should focus less on giving advice about how to communicate and more on doing the actual communication.
- LiU's communication function should collaborate more closely with the research units to develop a wider range of research communication means.
- The webpages should be made more relevant, and up to date by, for example, presenting research results and societal impacts in attractive ways.

Observations that are common for all units

Positioning/Strategy: All divisions conduct excellent research within certain areas with strong researchers or research groups either at the unit or in collaboration with other researchers at the university. These areas are however strongly connected to specific individuals, which makes the units vulnerable. Examples include when some individuals partly left the unit to take on managerial duties at other places within the university. Ambitions to further develop some new areas of research were also mentioned. Although the units need a broad research base to support their extensive teaching assignments, a clearer research strategy would help to reduce the dependency of certain individuals and help to position a few strong research areas within the national and international scientific community. The units also lack a clear publication strategy. Hence:

- The units would benefit from developing a clear research strategy and to implement it beyond putting it on paper. The strategy should include a publication strategy.

Internationalization: A stronger focus on internationalization could have been expected in LiRE as a whole. The instructions for evaluation provided to panel members and report templates for the evaluation lack a focus on internationalization. It is mentioned only in connection to international publications, but neither in terms of strengthening the LiU brand internationally nor to bring international elements into the local work environments. International guest professors are absent in all our five evaluation divisions.
Some researchers have rich international networks and participate in the international scientific communities as individuals, but the units could develop clearer internationalization strategies.

Balance between teaching and research*:* The teaching-to-research ratio is unfavorable for all five evaluation units, and some even describe the IEI department as a "teaching factory". Given these poor circumstances for research, Panel J is overall impressed with the amount and quality of the research the units are producing. The university or at least the IEI department seems to be in a transition from a teaching to a research institution. All units are in this transition, but at different stages: some employees teach 80% of the time, some

teach 50% of the time. For a university that relies on research-based teaching the panel was puzzled to learn that the university does not even secure funding for research time for all faculty members in a research position. Not only does this severely limit the ability to produce high quality research, but it also places some researchers in a position where they by default are forced to do research in their free time. Any employer should seek to secure working conditions where a decent work-life balance can be upheld. We also observed a difference between people that are promoted internally and people recruited externally as several units offer significantly less teaching for positions recruited externally by using the divisions surplus funding.

An overview of differences in the division of labor from a justice perspective can be beneficial.

***Two different career paths**:* We met with LiU employees who were positive about the turn to research, but they all mentioned that some employees are not positive and prefer to focus on teaching. All units have some personnel that teach 80% (= 100% minus 20% self-development time). It was also mentioned that the research productivity was imbalanced within the units.

- One suggestion is to accept the imbalance and create a separate career path for those who primarily want to teach by implementing clear guidelines for how teachers can become merited or excellent teachers based on pedagogical merits and experiences from interacting with society.

Mentoring of junior researchers: Although most of the junior researchers were satisfied with how more senior researchers are mentoring them and helping them in their career development, few of them had a formalized and structured approach to mentoring. Instead, mentoring is dependent on different individuals and could differ depending on the mentors. We believe that the units would benefit from:

- Developing a more structured and formalized approach to mentoring within the units.
- Organize regular career planning for young scholars across faculties and/or departments with shared disciplinary orientation.

***PhD education**:* Most of the divisions expressed that they would have preferred to have a larger group of PhD students, but many of them have established excellent connections with the wider PhD education networks compensating for the limited number of PhD students. Recruitment of PhD students is largely dependent on external funding. PhD students asked for better information about available courses, for example a web page with an overview of which courses are arranged when and more could maybe be done at departmental level including offering some basic courses. However, developing one's own study path is an

important part of PhD training. The ISP is perceived as a purely administrative tool and should be reformed.

- Increase the regularity/predictability of Faculty/Department funding toward PhD positions to help in planning.
- Offer PhD courses in collaboration across LiU's social science-oriented divisions and units on general mandatory topics such as research design, qualitative and quantitative methods.

Evaluated Unit's Name: IEI.STATSV Political Science

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research unit of Political Science is quite small, especially when considering that the unit bears a lot of teaching duties at undergraduate and Masters' level as result of its history. The growth of its research during the evaluation period is however substantive and now represents about half of the unit's budget and resources. The division takes part in LiU's profile area Societal transformations.

The scope of the political science research covers several of the core fields within the discipline: Public policy, administration and governance focusing largely on Sweden, European politics and international relations. In addition, "Digital government" has emerged as a collaborative research effort with INDIG within the Dept of Management and Engineering (IEI) at LiU. The latter has become a strong and well-reputed research speciality of this unit and is pursued together with external colleagues both in Sweden and in Ukraine and East Europe. This research area is novel within political science and very promising for future development, including internationally. The division engages in some international research but could improve its quality and reach substantively by relying more on its international networks.

Another special trait of the unit's research is the focus on local government politics in close collaboration with the Centre for Local Government Studies (CKS), a collaborative unit within LiU with an excellent research reputation. CKS works with regional and local authorities and is to large extent funded by those. There is joint interest between the political science division and CKS in the fields of local politics and democracy, regional and local planning and development, with both theoretical and applied research. New external financing in 2024-25 will further strengthen the field of comparative politics and EU studies with a new professor, a postdoc and a junior lecturer.

The quality of the research output has become visibly stronger in recent years according to the bibliometrics as result of successful external research funding. From having relied on more low-impact publications, the share of peer-reviewed journal articles and book chapters has increased considerably. Still however, the 9% journal articles published in level 2 (21% LiU average) together with the fact that the data is too low for a robust citation analysis suggest room for further improvement. In addition, the co-authorship with international colleagues is quite moderate, with most co-authorships within LiU. The unit expressed that comparative politics and European studies will most likely become stronger with the recruitment of the unit's second professor.

Research impact beyond academia is considerable given the nature of most of the externally funded research projects, which build on extensive collaboration with public organisations, particularly in the fields of public policy and governance and digital government. However, the current altmetrics do not sufficiently reflect the societal impact of the research, which implies that the unit´s research impact is poorly rewarded by the university's allocation of funding. This is a concern for the entire university.

In short, we find that Political science is currently working well in developing and strengthening its core research areas through additional external funding and a growing emphasis on high-impact publications. This could however be scaled up to create a critical mass which can be done through further cooperation and communication.

Recommendations

1. There is need to develop the division's publication strategy in respect to raising its impact especially internationally by publishing more in "top-journals". This would imply offering more conceptual/theoretical contributions by comparative research and co-writing with the division's international networks.
2. The communication strategy for the division needs more attention and support, and the next iteration of the website could better highlight political science and the quality of the research.
3. The potential for a centre to be formed around digital governance, covering research from political science and collaborators in the Department and University more generally could be explored further.
4. Make the societal collaborations and societal impacts of the research more visible in the communication of the research quality.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

We were very impressed with the PhD structure and the general culture of PhD education in the Division. The PhD students that we met are indeed an asset and take internationalisation seriously. There is already instigated PhD course collaboration with political science in Karlstad and Örebro, including also joint workshops and network meetings. The range of options internally and externally for the students is very well received by the students as it allows targeting the individuals' needs. But so far, few relevant PhD courses for these students exist at LiU. Given the small numbers of PhD students in political science the potential for some mandatory courses – such as those in

research design, qualitative and quantitative methods - could be developed across the social sciences in the university in terms of efficiency. Indeed, the division of the responsibility for PhD students between the division, IEI and the Faculty could be clarified with more joint PhD courses and targeted LiU funding for PhD positions. We noted that since the divisions get 'block grants' for research and PhD training, this makes it difficult to fund new PhD student positions at regular intervals, including to plan for new PhD positions which often rely on matching external grants. Earmarking of PhD grants to the different divisions within the Faculty would help in this regard, for example, allocating specific new PhD funding to the division every 2-3 years. Further, specified faculty support for recruitment of junior researchers (biträdande universitetslektor) would strengthen the rejuvenation of the teaching staff and contribute to future research development.

Although the junior researchers seem to do very well, we find that there should be more explicit mentorship structures, particularly for early-career researchers to support the writing of research applications, international networking and delivering high level international publications. They would also benefit from a department and/or LiU wide initiative for junior/postdoc and PhD students' career planning.

We found the unit's research culture to be non-hierarchical, collaborative and supportive, but also stressful in view of the limited time for the staff's competence development. Still, the seminar culture is open and constructive, and the seminars have good attendance. Seed money is provided from the Department in competition for interdisciplinary research initiatives, and some such funding is also available at division level for conferences etc. In all, the research environment is supportive, and the juniors and PhD students express that they are generally content.

Recommendation

1. Continue to develop collaborations to offer high quality and relevant PhD education.
2. Nurture the well-functioning research climate and see to that all junior staff are included in the mentoring structure.
3. Consider special funding for hiring young lecturers as "biträdande universitetslektor".

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

A unique feature at LiU compared with other Swedish universities is that there are about as many political scientists employed in other research units at LiU than within the political

science division. There are institutionalised connections primarily with CKS political scientists but unclear otherwise. Political science scholars are scattered across LiU which could be an issue for their individual disciplinary research development. It could even be viewed as "research infrastructure" in terms of political science expertise at LiU which might now be underutilised.

The new recruitments based on external funding from a private foundation will likely increase the capacity within European and comparative politics. Given that several of the senior lecturers, who are male, will become replaced due to retirement by more junior staff, the current slight gender imbalance can be addressed. The unit relies on a variety of external funding sources but could well strive to diversify even more, and even go for EU funding, particularly in the Digital Government thematic. Some of the more complex research applications require support from the grants office in particular collaborative grants with public agencies which is currently not well-functioning.

Also, the LiU support functions in communication could be further improved in the form of more attractive and up-to-date webpages as well as other media channels.

Recommendations

1. Nurture your research networks both within LiU and beyond and invest particularly in strengthening the unit's international networks at collective as well as individual level.
2. Continue to search for external research funding from different sources and build strategic research groups that could be competitive for future EU applications.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

We see a well-functioning division of political science that despite its relatively small size and high proportion of teaching is delivering high quality research, especially considering the societal impacts of the research. The unit's research profile is well designed to meet the future, with many promising young scholars and an incoming second professor. We are however puzzled by the fact that there are as many LiU political science researchers outside the division of political science as within it and believe that LiU would benefit from greater support to foster the discipline of political science within LiU than is the case today. To institutionalize some kind of network of LiU political scientists could be an option, since currently such connections depend on individuals who have been around for a long time. This could strengthen the political science at LiU and facilitate such collaboration across Faculties and Departments.

Panel K Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The Review panel entrusted with the evaluation of three evaluation Units (K1-3) of the BKV Department consisted of Barbara Bohle, Medical University of Vienna; Teunis B.H. Geijtenbeek, University of Amsterdam; Carl-Henrik Heldin, University of Uppsala (chair); Catharina Larsson, Karolinska Institutet, Stockholm; and Ross Mc Manus, Trinity College, Dublin. Before the meeting, the Review panel had received information about numbers of staff of different categories, economy, and bibliometric analyses of the publications of the Units, as well as information about doctoral degrees at the BKV department. In addition, self-evaluations with descriptions of the activities in the evaluation Units, as well as SWOT analyses, were provided. At the meeting on April 7-10, 2025, the Review panel listened to presentations of the Vice-Chancellor of Linköping University and a representative of Region Östergötland. Then, short presentations by the PIs of the Units were given, followed by questions and discussions. Meetings with young scientists, PhD students and postdocs, also took place. In addition, the Review panel met in private to discuss its impressions, formulate recommendations, and to write the report.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

During its visit, the Review panel noticed that some of the issues were common to all three evaluation Units, particularly relating to PhD student education, Principal Research Engineers, and the Department homepage. These issues are therefore discussed first, whereafter we will discuss each Unit separately.

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Faculty of Linköping University, where partial support for PhD salary is provided by the Faculty and the remaining salary and costs are covered by the supervisor. In such a program, the interested supervisors could apply with a research program and education plan, and the positions would then be announced centrally by the Faculty, e.g. once a year. A similar program seems to have existed before, but has now become very small.

The three evaluation Units have a large number of PhD students and researchers engaged in clinical activities who are affiliated with, but not employed by, the Department. This is a great asset for the Unit, however, it was recurrently brought up that clinical PhD students often are less integrated in the research groups. The Review panel encourages further integration in relevant research groups by, for example, fostering the interaction between clinical PhD students and University employed research group members. Furthermore, providing a physical location within the department for clinical PhD students during research periods would give better opportunity for focused research work and training in laboratory techniques. Beyond this, clinical management needs to recognize this problem; better communication between university and hospital may help find a solution. One suggestion would be to compensate for loss of research time due to the prioritization of clinical duties, to allow students to more effectively and confidently plan their limited research time.

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In the University curriculum, the PhD student must accomplish 30 credits including courses and other modules. For many of the pre-clinical students some of the mandatory courses have already been covered during undergraduate and Master courses and are described as too basic for their PhD education. In this situation, the Review panel suggests increased flexibility so that more relevant courses can be taken instead. For the other modules, credits for active participation in seminar series could be made compulsory. Regular attendance at seminar series, and recurrent own presentations, are important components in the PhD education that should be encouraged. This would also strengthen the interaction within the Units between PhD students and between research groups.

The PhD progress is mainly reviewed at a half-time control after 2 years. The panel finds this to be late and suggests that review of the progress of the PhD research should start sooner. An external thesis committee, or similar, could be formed that yearly reviews the progress of the PhD research and the education of the PhD student. Such systems are common in other countries, and are generally seen as serving an important function to monitor progress and identify obstacles; the Review panel recommends that it is introduced also at Linköping University.

In order to be internationally competitive, life science researchers depend on sophisticated infrastructure, provided by centralized facilities that need to be run by qualified persons. For the moment, there is no specific career path for such staff. The Review panel recommends that good working conditions and attractive career paths are established for this category, to assure that the infrastructure facilities can recruit and maintain highly skilled personnel.

Among junior researchers with a PhD, the three evaluation Units generally have few Postdocs and Assistant Professors ("BUL"), but a larger number of Principal Research Engineers. This latter group has presently few possibilities of career development, as the time window for application to "BUL" positions is limited and Senior Lecturer positions are rarely announced at the University. The Principal Research Engineer group in general possesses a significant body of laboratory and theoretical knowledge and are also engaged in teaching. A route for them to merit themselves for the Docent title, would be of value for them to be able to supervise PhD students and serve on various panels. Notably, the University would also benefit from their services in functions where Docent competence is required.

The Review panel was informed that young independent group leaders have difficulties in being accepted as the main supervisor for PhD students. According to the rules of the University, the main supervisor needs to be Docent. While there may be good reasons for this, it is important that young scientist can be allowed to supervise PhD students, which is an important merit in the development of their academic careers. Thus, we recommend that an exception is made from the rule for young independent group leaders, so that they can be the main supervisors for PhD students, even before they obtain the Docent title.

The Review panel suggests that a mentorship program for young scientists is introduced to provide information and support in career development. Several postdocs and early career scientists were unaware of certain important rules and career possibilities and a mentor could provide support in these areas.

The independent research groups within the three evaluation Units have generally a low visibility at the University/Department homepage where in many cases information about group members, etc., cannot be found. It is recommended that the home page should be improved and present each group with members, including both employed and affiliated PhD students, Postdocs and other researchers, research projects, funding, and other

relevant information. The department home page could also present, e.g., their Docents to allow their engagement in thesis examinations and other expert evaluations, as well as all PhD theses with links to attract new candidate PhD students.

Recommendations

- Promote recruitment of full-time PhD students by introducing a program with centralized admittance and partial coverage of salary cost by the Faculty
- Introduce a program to make it possible for clinical PhD students to start their research training at an early stage
- Introduce thesis committees, or similar mechanisms, to regularly monitor progress of PhD students
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- Allow young independent group leaders to be main supervisors for PhD students, even before they have acquired the Docent title
- Provide a mentorship program for young scientists
- Improve the homepage

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research quality at this Unit is currently very good and overall has significant impact in various research fields. However, the research output can be improved in terms of the fraction of Norwegian Level 2 publications and field normalized citation rate, which would enhance the visibility at at the national and international levels; work towards more impactful studies with more data is recommended, which can lead to a higher publication profile for the Unit.

A particular strength of the cell biology Unit is its active collaboration with the hospital and highly translational research profile, which presents great opportunities for future growth, innovation and novel results. There are excellent core facilities and attendant specialist expertise which allows cutting edge research to be performed. Combined with access to national and local biobanks and cohorts, there is great potential to advance translational research in impactful ways. The development of a national high performance computation centre with artificial intelligence / machine learning expertise, is a very strong advantage in the development of expertise in 'omics studies and areas with a concentration of big data.

Currently, the Unit seems to be somewhat fragmented and the research groups are small with many senior staff compared to junior scientists and PhD students. There seem to be instances of limited interaction and communication between groups in the same Unit, which is less than optimal in terms of networking and amplifying the advantages of shared interests and expertise. This is particularly important in terms of the training and development of PhD students.

The proposal to focus on two core research themes, i.e. Cancer and Medical Genetics, Epigenetics and Proteomics, respectively, is logical and can remedy the issue of fragmentation, and is strongly endorsed by the Review panel. The groups are involved in highly competitive areas. There will thus be a need to prioritise research interests within these fields and identify areas where there is significant depth of expertise supported by core technologies, where the Unit can strive to develop an international profile. The PIs mentioned, for example, a shared interest in extracellular vesicles and organoids, which might be a future shared focus. This coalescing around areas of strength is important and

should be implemented. Rebuilding of the Cell Biology building could be used to further facilitate the focus on reserch themes.

It was most encouraging to see the recruitment of new young staff members to the Unit, who described exciting areas of research and presented great opportunities to advance areas, involving 'omics and data analytics at the interface of advanced computing.

Recommendations

- Aim for research projects that can deliver more impactful outcomes and publications in high-profile journals
- Proceed with the proposed reorganization of the Unit to focus on core areas of strength in Cancer and Medical Genetics, Epigenetics and Proteomics, respectively
- Focus on increasing internal collaborations, communication and cross-group expertise

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

In the presentations by the PIs, an ambition to perform more comprehensive research projects, the result of which can be published in high impact journals, was expressed. The Review panel supports this ambition, which, if successful, would increase the visibility of the unit. Members of the Unit are active on social media, which is commendable; the Review panel encourages members of the unit to enhance the communication of their research result to the general public.

The Unit has succeeded in the recruitment of two competitive DDLS Fellows, which is a great achievement and a measure of the attractiveness of the Unit. Further efforts to recruit early career stage scientists is recommended. The Review panel noted that there are many part-time clinical PhD students. These are a true asset for the Unit, however, this cohort should be complemented with more full-time PhD students. To achieve this, the Review panel recommends the introduction of a program with partial cost sharing between the Faculty and the PI, as described above. Such a program would make it easier for the PIs at the Unit to afford to take on highly qualified full-time PhD students.

The Review panel was informed that a mentorship program exists, however, it seemed that not all scientists have a mentor. It is recommended that the mentorship program is further developed so that, in particular, young researchers get qualified advice from experienced scientists in how to manage their groups and build their careers.

The PhD training seems to be of high quality and the PhD students that the Review panel met were all satisfied with their working conditions and supervision. However, regular scheduled meetings with their supervisors should be encouraged. In particular, the appointment of assistant supervisors, e.g. young scientists or Postdocs, should be encouraged, to assure that the PhD students get adequate help when needed. Moreover, the curriculum could be further improved if the PhD students had the opportunity to more often present their work at seminars, large ones as well as group seminars. This would enhance the spreading of information between groups and improve opportunities for collaborations and networking; furthermore, the PhD students would get training in their presentation skills. Regular Journal Clubs would also enhance communication and improve knowledge about their research fields. The ability of the PhD students to teach 20% during their studies is a strong point to improve experience and extend the time of the studies. Social or communal interactions between students to combat any potential problems of lone students and problematic isolation should be encouraged, including common activities and common areas for lunches and coffee breaks.

There is some involvement of the PIs in EU-funded research. Such participation should be further encouraged to strengthen funding and to improve international networking and collaborations.

In order to broaden contacts and increase exposure of PIs, it could be of advantage if the PIs were involved in teaching on the Valla campus. This could include theoretical but also practical subjects, such as courses in proteomics and genomics for external students. This may help in the recruitment of preclinical students for internships and/or PhD studies.

Recommendations

- Aim for larger, high-impact publications
- Increase the number of full-time PhD students within the Unit
- Introduce more opportunities for PhD students to present their work at seminars
- Enhance international networking and collaborations

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The Unit presented plans to reorganize themselves and focus on the themes of Cancer and Medical Genetics, Epigenetics and Proteomics, to develop more cohesive areas of research, counteracting fragmentation and promoting the creation of critical mass in select research areas. This plan involves recruitment of groups from the Valla campus and is strongly commended by the Review panel. The excellent facilities in the Unit and the available infrastructure, including supercomputing and bioinformatics, support the formation of such themes.

The number of PhD students within the Unit seems low compared to the number of supervisors and could be enhanced.

The groups have considerable outside grant funding, still this could be enhanced further. Applications for EU grants should be encouraged; for example, some of the young scientists seem to be in a good position to apply for ERC grants.

Research infrastructure is excellent with access to high end proteomics and genomics facilities with the excellent support of staff scientists. The facilities are widely accessible to the wider research community. Bioinformatics expertise seems to be very well developed, which is a critical skill and seems to be a major advantage for Linköping University, given the colocation with national infrastructure in this area. This expertise will have the potential to further increase innovation and scientific output, and attract funding to the Unit, and we view proactive collaboration between these Units as an area of opportunity.

Early career scientists viewed grant writing support as helpful and effective, and the availability of this service is commended. However, the involvement of more senior scientists in the peer review process of the scientific content of applications is regarded as best practice and could strengthen the grant applications further. In addition, this could foster internal exchange of information and collaborations. Such support was said to be mandatory for the early career scientists, but should also be strongly encouraged for all researchers, as this will increase the success rate for grant applications. The Review panel was informed that the ethical permits for animal experiments must be written in Swedish, which seems odd and is a hindrance for international PIs.

The researchers have teaching obligations and the division of teaching duties seems appropriate.

Recommendations

- Proceed with the reorganization of the Unit to further streamline and implement research themes and achieve critical mass
- Invite funding bodies to give seminars on how to write grant applications and on current and upcoming funding opportunities
- Introduce internal peer review of grant applications before they are submitted

- Efforts should be made to allow ethical applications to be written in English

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

This is a well-functioning Unit producing research of very good quality. The opportunities for increased number of high-impact publications will be enhanced by the planned reorganization of the Unit into two research themes, recruitment of a larger number of full-time PhD students, and enhanced interaction between the groups.

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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The research output from the Unit is extensive with many publications. The overall quality of the research is very good, however, the Review panel noted that most of the publications are in journals of medium impact. In their SWOT analysis, the Unit formulated an ambition to enhance the impact of their research, which would allow publications in more visible journals. The Review panel supports this ambition and encourages the Unit to develop a strategy to focus more on quality than quantity of publications.

The strong clinical association with the hospital represents a strong asset for the Unit, with excellent clinical cohorts and extensive access to biomaterials. There are opportunities to also delve more into mechanistic studies in some of the areas, to increase the value of the research.

Most of the groups are present in Linköping, but there are groups also in Jönköping and in Kalmar. An efficient way of keeping the outside groups involved in the community has been established, with regular online meetings and some physical visits.

There are intense interactions between certain groups in the Unit, which is a strength. However, the cohesion between some of the groups in the Unit could be intensified. The Review panel encourages the Unit to further develop their shared research interests and to identify common themes and synergies between the different exciting research areas in the Unit, thereby increasing opportunities for excellent, impactful research.

Some of the outputs of the Unit have direct valuable societal impact, for example by hosting national centers for tick borne illnesses, and the development of a startup company based on the generation of new diagnostic tools for these diseases based on epigenetic analyses, among others.

Recommendations

- Develop a strategy to publish in highly visible journals
- Formulate common research themes and identify synergies between the groups
- Increase participation in international networks

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Some groups within the Unit have various international collaborations, but this could be developed further. This may also help raise the publication profile. Potential opportunities for researchers in the Unit to take the lead in collaborations or EU research networks should be pursued.

There is a great deal of expertise and experience in the individual groups within the Unit. While there is evidence of strong academic collaboration among some of the groups within, for example, the MIIC program, the Review panel believes that there are further opportunities for synergies between the different groups, which can be translated into more extensive and effective interactions and collaborations. This would also increase awareness of research interests and networking opportunities among the younger researchers and PhD students.

This is a large Unit with many well-functioning research groups. However, there is a paucity of staff at the postdoctoral level. Also, the Unit should develop strategies to attract or foster early career researchers.

Young scientists identified the need for a more structured mentorship program, which could stimulate them to consider developing as independent researchers, help plan their career path, and help them to increase their scientific expertise and output.

The MIIC program, which is selected as an area of strength at Linköping University, is very beneficial to the Unit, including seminars, funding and courses. The Unit should encourage attendance at these seminars and also develop seminars in other thematic areas, which would provide the students across all disciplines more opportunities to regularly present their data. This would further encourage internal cooperation, social interactions and cohesion within and between Units.

The Review panel commends the Unit for identifying that some of the clinical PhD students are somewhat isolated from their peers. A reason for this is that clinical activities are prioritized over research time, which limits the PhD student´s attendance at seminars and other Unit activities. The Review panel supports the initiative to remedy this problem and encourages attempts to find ways to better integrate the clinical PhD students in preclinical laboratories. Additionally, directors of clinical units should be made aware of the importance of research to guarantee that clinical PhD students can use their allocated research time. In cases where clinical work reduces the individual research time, potential ways of compensation should be developed.

Recommendations

- Recruit more Postdocs and young independent scientists
- Intensify cooperation and exchange of knowledge and expertise between the groups
- Encourage attendance at seminars and initiate seminar series in all research areas
- Introduce a mentorship program for young scientists
- Integrate clinical PhD students in the Unit and encourage heads of the clinics to support their research

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The Review panel felt that organizational and management structures could be strengthened and better defined, to promote greater cohesion and participation in academic activities, which would help staff development, interaction and communication. This is particularly relevant for junior staff.

The young scientists and PhD students expressed satisfaction with working conditions and core facilities, which were viewed as being of high standard.

The Review panel noticed an imbalance in staffing levels and advise that the Unit should try to recruit more Postdocs and early career researchers. This is a strategic investment to strengthen the development of the Unit.

The Review panel noted with satisfaction that the PhD student representatives all reported having co-supervisors; we encourage the Unit to ensure that, in particular, clinical PhD students have preclinical co-supervisors. Principle Research Engineers or Senior Postdocs could fulfill such a role, for example to help in technical training, and with professional development. All students further reported that they had good and timely access to their supervisors.

Many of the groups reported healthy levels of funding which appears very good across the Unit. As previously mentioned, the Review panel encourages the Unit to increase applications for EU grants and other national and international funding.

The administrative unit supporting grant applications was regarded as very effective, however, concern was expressed about the speed with which legal advice and some other administrative functions were provided.

Recommendations

- Focus on recruitment of more early stage researchers and postdoctoral scientists
- Ensure that all PhD students, and particularly clinical students, have co-supervisors
- Increase applications for EU funding
- Strengthen some of the centralized support functions, e.g. legal support

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The researchers at this Unit are productive and have published many papers of very good quality. An ambition to publish in more visible journals has been formulated; development of a strategy to achieve this should be encouraged. The opportunities for even more impactful research would be promoted by the recruitment of more Postdocs and young independent scientists.

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The three evaluation Units have overall a low number of full-time PhD students with a background in basic science, which is partly explained by the high costs of financing four years of full-time work, and the shortage of long-term funding. At the same time, there was an expressed concern that the recruitment of PhD students with this background need to be increased. The Review panel proposes the introduction of a PhD program at the Medical

Faculty of Linköping University, where partial support for PhD salary is provided by the Faculty and the remaining salary and costs are covered by the supervisor. In such a program, the interested supervisors could apply with a research program and education plan, and the positions would then be announced centrally by the Faculty, e.g. once a year. A similar program seems to have existed before, but has now become very small.

The three evaluation Units have a large number of PhD students and researchers engaged in clinical activities who are affiliated with, but not employed by, the Department. This is a great asset for the Unit, however, it was recurrently brought up that clinical PhD students often are less integrated in the research groups. The Review panel encourages further integration in relevant research groups by, for example, fostering the interaction between clinical PhD students and University employed research group members. Furthermore, providing a physical location within the department for clinical PhD students during research periods would give better opportunity for focused research work and training in laboratory techniques. Beyond this, clinical management needs to recognize this problem; better communication between university and hospital may help find a solution. One suggestion would be to compensate for loss of research time due to the prioritization of clinical duties, to allow students to more effectively and confidently plan their limited research time.

The average age of PhD students at the time of the degree is 40 years. The high age is partly explained by the fact that a large number of PhD students carry out their PhD thesis work in parallel with clinical work, e.g. as resident or specialist at Region Östergötland. At the same time, it is important to promote an early start of research education for clinical PhD students, either from the last part of the basic medical education or just after the medical education is finalized. “Forskarlinjen” at Linköping University for medical students is an appreciated program in this respect and a worthwhile investment. The “Forskar AT” program has been another such opportunity, but is now much reduced (and expected to be terminated), because of the new medical education program that will no longer be followed by general practice (“AT”). Introduction of an alternative program to “Forskar-AT” is encouraged, possibly in financial collaboration with Region Östergötland.
In the University curriculum, the PhD student must accomplish 30 credits including courses and other modules. For many of the pre-clinical students some of the mandatory courses have already been covered during undergraduate and Master courses and are described as too basic for their PhD education. In this situation, the Review panel suggests increased flexibility so that more relevant courses can be taken instead. For the other modules, credits for active participation in seminar series could be made compulsory. Regular attendance at seminar series, and recurrent own presentations, are important components in the PhD education that should be encouraged. This would also strengthen the interaction within the Units between PhD students and between research groups.

The PhD progress is mainly reviewed at a half-time control after 2 years. The panel finds this to be late and suggests that review of the progress of the PhD research should start sooner. An external thesis committee, or similar, could be formed that yearly reviews the progress of the PhD research and the education of the PhD student. Such systems are common in other countries, and are generally seen as serving an important function to monitor progress and identify obstacles; the Review panel recommends that it is introduced also at Linköping University.

In order to be internationally competitive, life science researchers depend on sophisticated infrastructure, provided by centralized facilities that need to be run by qualified persons. For the moment, there is no specific career path for such staff. The Review panel recommends that good working conditions and attractive career paths are established for this category, to assure that the infrastructure facilities can recruit and maintain highly skilled personnel.

Among junior researchers with a PhD, the three evaluation Units generally have few Postdocs and Assistant Professors ("BUL"), but a larger number of Principal Research Engineers. This latter group has presently few possibilities of career development, as the time window for application to "BUL" positions is limited and Senior Lecturer positions are rarely announced at the University. The Principal Research Engineer group in general possesses a significant body of laboratory and theoretical knowledge and are also engaged in teaching. A route for them to merit themselves for the Docent title, would be of value for them to be able to supervise PhD students and serve on various panels. Notably, the University would also benefit from their services in functions where Docent competence is required.

The Review panel was informed that young independent group leaders have difficulties in being accepted as the main supervisor for PhD students. According to the rules of the University, the main supervisor needs to be Docent. While there may be good reasons for this, it is important that young scientist can be allowed to supervise PhD students, which is an important merit in the development of their academic careers. Thus, we recommend that an exception is made from the rule for young independent group leaders, so that they can be the main supervisors for PhD students, even before they obtain the Docent title.

The Review panel suggests that a mentorship program for young scientists is introduced to provide information and support in career development. Several postdocs and early career scientists were unaware of certain important rules and career possibilities and a mentor could provide support in these areas.

The independent research groups within the three evaluation Units have generally a low visibility at the University/Department homepage where in many cases information about group members, etc., cannot be found. It is recommended that the home page should be improved and present each group with members, including both employed and affiliated PhD students, Postdocs and other researchers, research projects, funding, and other

relevant information. The department home page could also present, e.g., their Docents to allow their engagement in thesis examinations and other expert evaluations, as well as all PhD theses with links to attract new candidate PhD students.

Recommendations

- Promote recruitment of full-time PhD students by introducing a program with centralized admittance and partial coverage of salary cost by the Faculty
- Introduce a program to make it possible for clinical PhD students to start their research training at an early stage
- Introduce thesis committees, or similar mechanisms, to regularly monitor progress of PhD students
- Integrate better clinical PhD students in the laboratories
- Establish an attractive career path for staff running the core facilities
- Allow young independent group leaders to be main supervisors for PhD students, even before they have acquired the Docent title
- Provide a mentorship program for young scientists
- Improve the homepage

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

This is a very active Unit that produces research of excellent quality. Several important discoveries have been made during recent years, and publications are often placed in high impact journals. The publications are highly cited (11% among the top 10% most cited papers). The research is overall original and innovative, and cutting-edge techniques are used. A strength is that there are extensive collaborations between the groups in the Unit, and many methods, techniques and instruments are shared between the groups. There is a clear focus on performing mechanistic research.

The premises contain common spaces where the personnel can gather for coffee, lunch and for informal research meetings, which promotes interactions. Regular retreats also contribute to an interactive and collegial atmosphere, promoting the production of high-quality research.

The Unit contains an adjunct group in Forensic Science, which offers opportunities for interesting novel input into the research activities. At the moment, this group appears somewhat isolated; attempts should be made to integrate the group in the community. There is extensive involvement in clinical trials, which is commendable.

The Unit appears well organized and there is a vision for future directions. Further interactions across thematic areas between this Unit and other Units are strongly encouraged.

Recommendations

- Develop thematic research areas within the Unit and with other Units
- Integrate the Forensic Group in the community

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research culture in the Unit seems excellent. There is a focus on publication of high-quality, impactful papers, often in leading journals. The publication strategy of the Unit is thus successful and published papers receive many citations.

Academic and non-academic interactions and collaborations appear excellent, including the MIIC program, a cancer network, and the Wallenberg Centre for Molecular Medicine. This also applies to interactions at the national and international levels.

Good research practice includes effective exchange of knowledge and of protocols, engagement with the core facilities, use of clinical material and biobanks, and combined acquisition and use of reagents minimizing wasteful duplication.

A merit of the Unit is that it has been successful in recruiting many junior staff through various Wallenberg Foundation initiatives. Moreover, junior staff show evidence of excellent professional progress since appointment.

Overall, the PhD students seemed to be satisfied with their working conditions and experience in the Unit. They reported good access to their supervisors and all have co-supervisors that also are accessible. The Review panel was impressed by the social activities organized by the PhD students and Postdocs, which contributes to a good work environment. It was noted with satisfaction that the students regularly present their research in seminars, which are well attended (e.g. MIIC). There is also a cancer seminar series which, however, is less frequent (one seminar per month). It would be good to have more frequent seminars in the cancer series, to allow the young, and more senior, scientists to present their work to each other.

While there is a mentor program for young scientists, the Review panel was informed that often there is not much interaction between mentors and mentees. Outside mentors fulfill an important role by helping, especially young scientists, with advice regarding career options, grant applications, how to interact with other scientists, how to lead a group, etc. Thus, the establishment of an active mentorship program for junior career researchers and Postdocs is strongly recommended. This would be especially valuable for international Postdocs. The PhD students expressed a wish that PIs would help disseminate information about student activities and to support and encourage students to engage in these.

It was mentioned that some PIs may be too demanding regarding out-of-time work, leading in some cases to stress among the PhD students. Attention should be made to ensure that justified encouragement is not sliding over to inappropriate excessive demands.

The core facilities were much appreciated, with easy access and qualified help from the staff at the facilities.

Recommendations

- Establish a mentorship program for postdocs and junior scientists
- Extend participation in seminars across thematic areas

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

There is evidence of good organizational structure in the Unit. Initiatives, such as after work meetings (pizza) to promote knowledge exchange and use of Journal Clubs, effectively contribute to a stimulating working environment, and appear popular and well attended by staff at all levels. There is evidence of a good level of seminar activity, e.g. in the MIIC program.

There seems to be a satisfactory balance between new and established / advanced staff.

Funding acquisition seems very successful with a high level of external grant funding. However, the PIs should be encouraged, based on existing evidence of excellence, to apply for grants through EU and ERC funding mechanisms.

The Review panel was informed that the administrative burden and the teaching responsibilities were increasing to the extent that PIs may have too little time for research and supervision. This is a potentially serious threat that could jeopardize the possibilities to perform internationally competitive research at the Unit. Attempts should be made to distribute administrative and teaching responsibilities as fairly as possible.

Recommendations

- Distribute administrative and teaching responsibilities fairly
- Try to secure funding from EU and the ERC

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

This is a well-organized and highly productive Unit, with a large number of publications of excellent quality, including contributions in high-impact journals. Further development of common research areas is recommended

Panel L Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The evaluation unit covered the following research areas: pediatrics and obstetrics/gynecology, clinical chemistry and pharmacology, general surgery, plastic surgery, oncology, and orthopedics.

Review Panel L consisted of five internationally recognized scientists with substantial academic and leadership experience:
1. Two professors of pediatrics with strong research credentials, who had served as directors of a children's hospital and a department of women's and child health, respectively, and had previously held positions as deans of medical faculties.
2. Two professors of surgery with extensive experience in research, experience within international research consortia and in the development of integrated cancer care structures.
3. One professor with a medical background of with recognized expertise in genomics and a specific research focus on forensic medicine.

The panel held two virtual preparatory meetings prior to the on-site review. During these meetings, the distribution of responsibilities for the audit was agreed upon, and specific requests for additional documentation and clarification were formulated. During the on-site visit, the panel prepared and conducted interviews, and engaged in thorough discussions regarding the scope of the evaluation, the content of the submitted self-assessment reports, and the outcomes of the interviews. These discussions formed the basis for drafting the initial versions of the review reports which were shared with all five panel members. The draft was then revised by all panel members in sequential online rounds until a consensus on the final versions was reached.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Linköping University has articulated a clear and ambitious vision to become a leading European research university by 2030. To this end, strategic goals have been defined with a strong focus on strengthening the research environment across disciplines. In the field of medicine, the university has established a robust and rich academic infrastructure, ensuring reliable and easy access to state-of-the-art research facilities for both clinician and basic scientists. However, the specific nature of medical research requires a well-functioning partnership between the university and the affiliated hospital. While the university provides access to an excellent research environment and attractive academic positions, the hospital

serves as the primary site for clinical research and career development of physician scientists. Close cooperation between these two institutions is therefore essential to ensure a critical mass of excellent researchers across all career stages, to support clinical innovation and excellence, and to maintain the societal relevance and reputation of the hospital itself. The career development of clinician scientists is thus a shared responsibility of both the university and the hospital. In light of increasing financial constraints on both sides, it is essential to establish formal agreements between university and hospital management that guarantee protected research time for clinician scientists. This is particularly essential in cases where third-party funding has been secured. In such instances, the availability of clinical substitutes must be ensured to prevent disruptions in research, because the clinician scientist always will have -for ethical reasons- to give priority to patient care. The review panel strongly recommends that this issue be prioritized by university leadership.

Another key challenge lies in the dual affiliation of many advanced clinical researchers, who are simultaneously pursuing academic careers as adjunct professors with a predominant employment at the hospital. This dual role complicates the development of a shared identity within the Faculty of Medicine and Health Sciences. Additionally, the current exclusion of adjunct professors from full integration into the faculty, such as serving on the faculty board, limits the university's ability to benefit from the research expertise and engagement of a significant number of qualified colleagues. This could also skew the faculty priorities away from clinical research, thus further alienating the academic clinicians.

Although general career paths for early-career researchers are in place, structured and personalized mentoring—especially beyond the postdoctoral phase—is not taken up as a responsibility by many supervisors. University management, in collaboration with senior principal investigators, should address this gap and actively promote a culture where mentoring and career planning is recognized as a core responsibility of senior academic staff. A stronger emphasis should also be placed on providing early-career researchers with the opportunity to establish their own research groups and achieve academic independence.

As the recruitment of young research talent has become increasingly competitive—both nationally and internationally—a more proactive strategy is needed. At present, the university predominantly relies on internal recruitment; however, to achieve its strategic objectives, it must also succeed in attracting excellent candidates from outside Linköping. This requires enhanced visibility. In particular, English-language websites that showcase the university's research strengths in medicine and the unique opportunities in the hospital to combine high-quality clinical training with supportive research conditions would greatly strengthen international recruitment. The establishment of a structured clinician scientist curriculum and the acquisition of third-party funding, such as from foundations, could further enhance the university's attractiveness to this target group.

Leadership recruitment is another area that requires strategic improvement. A clear and structured process for replacing retiring senior faculty must be implemented by the faculty if not actively pursued by the senior PI. This should begin at least four years in advance, with a dialogue between the dean, the department chief, and the senior PI about future directions and priorities. Active and transparent recruitment processes must follow to ensure the continuity and renewal of research leadership.

A further strategic priority of Linköping University is to foster interdisciplinary research across faculties and departments. However, it must be considered that for functional reasons the current presence of very small research groups lacking a critical mass necessary to reach a certain level of excellence is not in line with this strategy. While interdisciplinarity is not a goal in itself, the university's excellent infrastructure in fields such as artificial intelligence and materials science presents valuable opportunities for innovation at the interface of disciplines. These opportunities should be actively pursued. Moreover, cross-disciplinary collaboration within the Faculty of Medicine and Health Sciences should be promoted through the provision of open spaces for informal interaction and through regular events that showcase ongoing research and stimulate collaboration. These initiatives would contribute to the development of a stronger, research-oriented identity within and across the medical disciplines.

During the evaluation, the review panel noted that the current organizational structure of Linköping University does not effectively support its strategic goals. On the contrary, the structure often appears confusing to researchers at all career levels and may even hinder progress toward the university's long-term ambitions. The panel considers this a potentially major barrier to achieving the university's strategic objectives. An effective organization must have clearly defined responsibilities and transparent decision-making processes. At present, these elements are insufficiently developed, particularly regarding cooperation between the university and the hospital. While this is especially detrimental to clinical research, similar concerns were also raised by PhD students in basic sciences, suggesting that the current matrix organization is not well-suited to fully unlocking the existing research potential.

Even at the level of faculty management, there appears to be uncertainty about who holds responsibility for key strategic and operational decisions—for example for decisions in the areas of recruitment, hospital agreements and use of the research environment. These ambiguities contribute to a high degree of frustration among researchers, particularly those who require timely and reliable administrative support.

One illustrative example discussed by the panel concerned the unclear authority for implementing English as a mandatory working language in research environments. This step—viewed by many as essential to fostering an inclusive atmosphere for international researchers—was met with uncertainty as to whether the Vice-Chancellor, the Dean, or the Heads of Department would be responsible for pushing and issuing such a directive.

In contrast to many other countries, newcomers in Northern European countries often encounter challenges in establishing informal personal networks, and social integration can be limited. Therefore, the university should actively work to create an inclusive, welcoming environment for international researchers because otherwise the ambition to increase international collaboration and mobility is unlikely to succeed.

The panel also observed a continuing gender imbalance in senior academic leadership positions, where male professors remain predominant. This is also evident among adjunct faculty. In contrast, gender parity is achieved at the PhD level, where female and male candidates are equally represented. This highlights the need for more active and structured measures to promote gender equity in academic career progression.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Based on the evaluation of the submitted documents the research performance in terms of output in relation to funding is not adequate. Taking further into account the knowledge about the lack or low rate of applications to funding agencies the research performance needs to be improved. However, three areas of research strength with external funding were identified as potential foundations for a further development:

1. In obstetrics and gynecology, a nationally significant research focus has been established on obstetric care, particularly the study of labor, birth complications, and their effects on offspring in a nationwide cohort.

2. A clinical trial investigating early intervention in children with type 1 diabetes using intralymphatic GAD injections aims to preserve β-cell function. This research has the potential to achieve international impact.

3. Especially, preclinical research in epigenetics and DNA methylation—specifically the study of X-inactivation patterns affecting T-cell biology in immune-related disorders—is an emerging as well as a promising field with a considerable potential, including also relevance to cancer research.

In neonatology, a growing research focus has been identified in the area of nutrition and the microbiome as well for valuable outcome studies in preterms and high-risk newborns. In addition, the clinical pediatric oncology unit in Linköping has been recognized as one of six national pediatric cancer centers in Sweden.

Although the overall research output, particularly high-impact publications, is not yet internationally competitive, the evaluated unit shows notable national influence. However, the principal investigators currently lack a clear and coherent vision for advancing research in pediatrics and obstetrics/gynecology in a more focused and synergistic manner. An opportunity is also to build research with a focus on the diagnoses centralised to Linköping through the licenses obtained in the national specialised care processes, of which two are found within the obstetrics/gynecology field. Moreover, stronger integration with other departments at Linköping University would be necessary to meet the objectives of the

university's Life Sciences 2024–2027 profile areas, which emphasizes interdisciplinary research across medicine, natural sciences, and engineering to drive clinical innovation.

While collaboration between clinical departments appears constructive, broader interdisciplinary engagement remains underdeveloped.

Recommendations

Given the size of Linköping University and the limitations of institutional and, in particular, hospital-based funding, it is recommended that the evaluated unit concentrates its efforts on a smaller number of clearly defined focus areas of research. To improve research quality and visibility, active promotion of synergies between clinical and research groups is recommended, including shared access to infrastructure and joint grant applications.
The university should initiate a strategic development plan for the fields of pediatrics and obstetrics/gynecology. This process should be supported by targeted incentives that encourage consolidation around a limited number of strong, competitive research themes.
To enhance the novelty and impact of research, greater alignment with existing strengths at Linköping University—such as advanced imaging technologies and the application of artificial intelligence—should be actively pursued. In this context, closer collaboration with the Departments of IMT (Department of Biomedical Engineering) and IFS (Department of Computer and Information Science) is strongly encouraged. In addition, public health and epidemiological perspectives on childhood physical and behavioral development represent a promising area for further research focus.
Research groups that lack the potential for international visibility and impact should be considered for integration into larger, thematically aligned units—or, where appropriate, phased out—to ensure the concentration of resources and efforts on competitive and high-potential areas.

- The three research areas identified from the documentation as having a solid foundation of external funding could potentially be developed into a single, integrated preclinical and clinical research unit in perinatology, encompassing topics such as obstetrical/labor related complications, reproductive medicine, immunology, and endocrinology, including clinical research on long-term outcomes in survivors of early-life complications.
- To increase research innovation and output of research, a strategic restructuring process should be initiated for research in pediatrics and obstetrics/gynecology by the faculty with the aim of enhancing focus, fostering interdisciplinary collaboration, and improving international competitiveness.
- The faculty in cooperation with the university should enable structures in pediatrics with a stronger culture of interdisciplinary collaboration and shared vision among the different pediatric disciplines.

- Since the preclinical research in epigenetics is strong on international level the faculty should explore how other groups -also from other units- can build on the strength and if incentives for an increased cooperation can be provided.
- Regarding clinical research the potential of the group with a focus on the complications of labor support of the faculty should be offered to expand the beyond the national level and to explore the possibilities of an EU application.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Recruiting and developing the next generation of clinician scientists and basic researchers is vital to achieving Linköping University's goal of becoming a leading research university by 2030.
The successful epigenetics group is encouraged to include more PhD candidates with medical backgrounds to strengthen clinical relevance and integration.
A key concern, also noted in the self-evaluation, is the absence of a structured career development pathway from PhD or postdoc to independent researcher.
Creating an English-language website highlighting research and clinical career opportunities would aid international recruitment.

Recommendations

- A strategic and formalized succession planning process should be established for senior faculty approaching retirement. At least four years before retirement, a clear vision for the future structure and direction of the relevant research area should be developed, and active recruitment efforts should begin. In cases where a suitable successor is identified early, a short-term rolling replacement model may be considered.
- The recruitment and support of early-career scientists, particularly clinician scientists, must become a university-wide priority. Following best practices from other countries, generally 50% protected research time should be guaranteed for clinician scientists to maintain the quality, competitiveness, and integrity of medical research. This right to research time must be formally recognized and clearly regulated.
- Failure to protect research time not only risks lowering research quality and integrity but also places an unfair burden on clinician scientists, forcing them to prioritize patient care over scientific work. The university must ensure that hospitals fulfil their obligation to recruit compensatory staff when externally funded research time is granted.
- To foster collaboration, the university should provide informal meeting spaces within clinical environments, including open-space areas and designated rooms for scheduled interdisciplinary meetings.

- Senior PIs must take responsibility for cultivating a stronger culture of interdisciplinary research and shared academic goals.
- Structured career mentoring programs should be implemented for PhD students and postdocs, with particular attention to pathways for non-physician health professionals.
- An English-language web presence in cooperation with the hospital should be developed to demonstrate research opportunities and the possibility for clinical employments to achieve clinical competencies to improve international visibility and recruitment.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Linköping University has successfully established a research environment capable of supporting state-of-the-art scientific work. The university offers access to cutting-edge infrastructure, including advanced capabilities in artificial intelligence and imaging technologies. Core facilities are readily available, and their use is considered both accessible and affordable. Furthermore, researchers report that external funding can be effectively utilized, as overhead rates are reasonable and do not represent a barrier to conducting research. While these conditions are good, the review panel has concerns regarding the current structure of research activities. Many small and relatively isolated research groups lack the critical mass—both in terms of scientific personnel and technical staff—needed to fully capitalize on the potential of the university's research campus. This fragmentation may limit scientific productivity, interdisciplinary collaboration, and international visibility.

Recommendations

- The panel therefore recommends exploring the consolidation of smaller research units into larger, thematically focused research centers. Such centers could promote collaboration, improve the use of shared infrastructure, and support a more strategic allocation of resources. A more integrated approach would also enhance the attractiveness of the university for external partners and early-career researchers seeking dynamic and supportive environments.
- The direct administrative support available to researchers is generally rated positively. However, some concerns were raised regarding difficulties in reaching the appropriate contacts for specific research-related inquiries. Clarifying responsibilities and improving the accessibility of administrative personnel would help ensure that researchers receive timely and effective support.
- A structured process should be established to explore the possibilities of cooperation with other departments of the university.

- Research oriented meetings of the university (conferences, summer schools) with a thematic orientation of clinical and basic scientists from different departments should be organized by the faculty to stimulate interdisciplinary research.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Linköping University, as a comparatively young institution, has made remarkable progress in the development of its university campus. This consolidated campus represents an excellent opportunity to foster synergy and collaboration across disciplines—an advantage that is far more difficult to achieve at older, more traditional European universities of comparable size, which are often geographically fragmented. The panel acknowledges the significant efforts undertaken by the university and recognizes its clear potential to achieve excellence in selected research areas. However, the potential in Medicine and Health Sciences—combined with the advantage of a unified campus—also entails a responsibility to further develop a responsive and future-oriented administrative and research environment for the clinical units. In an era marked by rapid technological change and digital transformation, adaptability has become a key requirement for academic institutions. There is an urgent need to concentrate on focusing on research strengths present in Linköping in medicine and health sciences. Although this is undoubtedly a complex and demanding process, it should be treated as a strategic priority. Given current geopolitical developments and emerging global challenges, specific fields such as disaster medicine, forensic medicine, and global health are likely to gain increasing scientific and societal relevance and impact in the coming years. In pediatrics and obstetrics there is a solid basis for research in birth complications, effects in survivors of early life severe complications, childhood nutrition and immunology and childhood diabetes, but the current structures and management processes will not allow to leverage the basis into research which is competitive on an international level.

The panel is however convinced that with appropriate structural and administrative reforms, Linköping University can successfully realize its strategic objectives also in these fields. It is the hope that the recommendations provided in this report will be considered helpful and sufficiently concrete to support timely and effective decision-making and implementation. The panel also offers to serve as a sounding board for the final report to the Swedish government and would be prepared to help to evaluate whether the proposed measures and actions are adequately implemented to achieve the intended outcomes.

For future evaluations, we recommend that clinical units within Medicine and Health Sciences be assessed by a single, obviously larger panel to ensure a comprehensive review of the entire field.

Panel L Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The evaluation unit covered the following research areas: Clinical Chemistry, Pharmacology, Forensic Sciences, Anaesthesiology and Intensive Care and Emergency Medicine

Review Panel L consisted of five internationally recognized scientists with substantial academic and leadership experience:
1. Two professors of paediatrics with strong research credentials, who had served as directors of a children's hospital and a department of women's and child health, respectively, and had previously held positions as deans of medical faculties.
2. Two professors of surgery with extensive experience in research, experience within international research consortia and in the development of integrated cancer care structures.
3. One professor with a medical background of with recognized expertise in genomics and a specific research focus on forensic medicine.
The panel held two virtual preparatory meetings prior to the on-site review. During these meetings, the distribution of responsibilities for the audit was agreed upon, and specific requests for additional documentation and clarification were formulated. During the on-site visit, the panel prepared and conducted interviews and engaged in thorough discussions regarding the scope of the evaluation, the content of the submitted self-assessment reports, and the outcomes of the interviews. These discussions formed the basis for drafting the initial version of the review report, which was shared with all five panel members. The draft was then revised by all panel members in sequential online rounds until a consensus on the final versions was reached.

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serves as the primary site for clinical research and career development of physician scientists. Close cooperation between these two institutions is therefore essential to ensure a critical mass of excellent researchers across all career stages, to support clinical innovation and excellence, and to maintain the societal relevance and reputation of the hospital itself. The career development of clinician scientists is thus a shared responsibility of both the university and the hospital. Considering increasing financial constraints on both sides, it is essential to establish formal agreements between university and hospital management that guarantee protected research time for clinician scientists. This is particularly essential in cases where third-party funding has been already secured. In such instances, the availability of clinical substitutes must be ensured to prevent disruptions in research, because the clinician scientist always will have -for ethical reasons- to give priority to patient care. The review panel strongly recommends that this issue be prioritized by university leadership.

Another key challenge lies in the dual affiliation of many advanced clinical researchers, who are simultaneously pursuing academic careers as adjunct professors with a predominant employment at the hospital. This dual role complicates the development of a shared identity within the Faculty of Medicine and Health Sciences. Additionally, the current exclusion of adjunct professors from full integration into the faculty limits the university's ability to benefit from the research expertise and engagement of a significant number of qualified colleagues.

Although general career paths for early-career researchers are in place, structured and personalized mentoring—especially beyond the postdoctoral phase—is not taken up as a responsibility by many supervisors. University management, in collaboration with senior principal investigators, should address this gap and actively promote a culture where mentoring and career planning is recognized as a core responsibility of senior academic staff. A stronger emphasis should also be placed on providing early-career researchers with the opportunity to establish their own research groups and achieve academic independence.

As the recruitment of young research talent has become increasingly competitive—both nationally and internationally—a more proactive strategy is needed. At present, the university predominantly relies on internal recruitment; however, to achieve its strategic objectives, it must also succeed in attracting excellent candidates from outside Linköping. This requires enhanced visibility. English-language websites that showcase the university's research strengths in medicine and the unique opportunities in the hospital to combine high-quality clinical training with supportive research conditions would greatly strengthen international recruitment. The establishment of a structured clinician scientist curriculum and the acquisition of third-party funding, such as from foundations, could further enhance the university's attractiveness to this target group.

Leadership recruitment is another area that requires strategic improvement. A clear and structured process for replacing retiring senior faculty must be implemented by the faculty if not actively pursued by the senior PI. This should begin at least four years in advance, with a dialogue between the dean, the department chief, and the senior PI about future directions and priorities. Active and transparent recruitment processes must follow to ensure the continuity and renewal of research leadership.

A further strategic priority of Linköping University is to foster interdisciplinary research across faculties and departments. However, it must be considered that for functional reasons the current presence of very small research groups lacking a critical mass a necessary to reach a certain level of excellence. While interdisciplinarity is not a goal-in-itself, the university's excellent infrastructure in fields such as artificial intelligence and materials science presents valuable opportunities for innovation at the interface of disciplines. These opportunities should be actively pursued. Moreover, cross-disciplinary collaboration within the Faculty of Medicine and Health Sciences should be promoted through the provision of open spaces for informal interaction and through regular events that showcase ongoing research and stimulate collaboration. These initiatives would contribute to the development of a stronger, research-oriented identity within and across the medical disciplines.

During the evaluation, the review panel noted that the current organizational structure of Linköping University does not effectively support its strategic goals. On the contrary, the structure often appears confusing to researchers at all career levels and may even hinder progress toward the university's long-term ambitions. The panel considers this a potentially major barrier to achieving the university's strategic objectives. An effective organization must have clearly defined responsibilities and transparent decision-making processes. At present, these elements are insufficiently developed, particularly regarding cooperation between the university and the hospital. While this is especially detrimental to clinical research, similar concerns were also raised by PhD students in basic sciences, suggesting that the current matrix organization is not well-suited to fully unlocking the existing research potential.

Even at the level of faculty management, there appears to be uncertainty about who holds responsibility for key strategic and operational decisions—for example for decisions in the areas of recruitment, hospital agreements and use of the research environment. These ambiguities contribute to a high degree of frustration among researchers, particularly those who require timely and reliable administrative support. One illustrative example discussed by the panel concerned the unclear authority for implementing English as a mandatory working language in research environments. This step—viewed by many as essential to fostering an inclusive atmosphere for international researchers—was met with uncertainty as to whether the Vice-Chancellor, the Dean, or the Heads of Department would be responsible for pushing and issuing such a directive.

In contrast to many other countries, newcomers in Northern European countries often encounter challenges in establishing informal personal networks, and social integration can be limited. Therefore, the university should actively work to create an inclusive, welcoming environment for international researchers because otherwise the ambition to increase international collaboration and mobility is unlikely to succeed. The panel also observed a continuing gender imbalance in senior academic leadership positions, where male professors remain predominant. This is also evident among adjunct faculty. In contrast, gender parity is achieved at the PhD level, where female and male candidates are equally represented. This highlights the need for more active and structured measures to promote gender equity in academic career progression

Evaluated Unit's Name: BKV.KKF Clinical Chemistry and Pharmacology

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The evaluation had to cover a range of research areas, as the division encompasses laboratory-oriented research in clinical pharmacology, clinical chemistry, and forensic medicine, as well as two related clinical disciplines: anaesthesiology and emergency medicine. As a result, the report presents specific findings for each of these distinct entities.

The forensic science group focuses on forensic toxicology and forensic genetics at large. Their infrastructural strength lies on the extensive collaboration and dual positions with the Swedish National Board of Forensic Medicine (RMV). The leadership with two Professors and several experienced principal investigators, has made LiU-RMV scientific and service work a world class model. The know-how, technical capabilities with the latest instruments used in the toxicology and genetics fields combined with steadily funded governmental institute (RMV) and highly successful grants by Professors and PIs (Swedish Research Council) are rarely seen in other countries. Another unique feature of the government – LiU co-operation is the SOFO-project where seed-money is allocated to the younger scientist for their PhD or postdoc studies. The research focus is on psychoactive substances, post-mortem metabolomics, pharmacoepidemiology, and post-mortem toxicology, and innovations in forensic genetics. In toxicology these often go beyond the practical day-to-day forensic realm, and can be seen as basic pharmacology science, which may later be applicable in forensic sciences or even in clinical needs. Forensic genetics has a fascinating angel on using the new DNA sequencing technologies, e.g. in investigative genetic genealogy as a search tool for extended kinship and even has solved an old murder case. The laboratory forensic sciences are clearly in a progressive and attractive place for future younger scientists with life-science and pharmacology/toxicology background. If thinking of the future of forensic medicine, it would be greatly beneficial that in the future also forensic pathologists (with medical background) would get engaged to research. Perhaps the best way is to advertise the field in the basic medical studies and engage those interested with a fascinating career-path.

Clinical Chemistry includes six research areas—, cardiovascular disease with a focus on coagulation, bone and mineral metabolism, endocrinology, glycobiology neurochemistry and metrology. A visible focus in research is lacking and the publication record is solid, but not excellent.

Pharmacology research is closely linked with forensic science and includes strong contributions to pharmacogenomics, particularly in cancer treatment. The field is part of Genome Medicine Sweden. However, leadership vacancies due to retirements and slow succession planning have weakened both pharmacology and clinical chemistry. The unit reports challenges in appointing non-physicians to academic positions, which hampers recruitment and retention of young researchers.

The anaesthesiology research group focuses on cardiovascular studies in high-risk patients, including participation in large international trials, as well as on perioperative care in collaboration with a British research group. The group has successfully attracted substantial

third-party funding, including support from the Swedish Research Council, and has reached a critical size necessary to perform internationally competitive research. As a result, Linköping University has established itself as a national reference center for research in perioperative medicine and intensive care. The research topics are of high clinical relevance, and the size of the patient cohorts is noteworthy. This research area holds strong potential to contribute meaningfully to Linköping University's strategic goals. The output from the anaesthesia and intensive care research group is both impressive and sustainable, with new or updated clinical guidelines developed as a direct outcome.
However, it is concerning that the principal investigator—who has been the key driving force behind this research—has left Linköping University and is now employed full-time at Karolinska Institutet. This raises questions regarding the long-term sustainability, leadership, and strategic direction of the anaesthesiology research programme. It is essential that the university take timely action to secure continuity, either through the appointment of a suitable replacement or by identifying and supporting emerging leaders within the existing group. This will be crucial to preserve and build upon the strong foundation that has been established.
The Emergency Medicine research group is led by a young and dynamic principal investigator who currently holds a Clinical Research Fellowship from the Wallenberg Centre for Molecular Medicine. While the group demonstrates considerable energy and potential, its research profile is not yet strongly focused, instead seeking to leverage the large number of patients treated at the university hospital for more focused topics. The group aims to bridge clinical emergency medicine with technological innovation, with the goal of deepening the understanding of basic physiological processes and improving patient care.
Significant effort has been devoted to developing the emergency medicine department in Linköping in line with national standards for academic clinical research units set by the Ministry of Health and Welfare. Notable areas of strength include novel imaging methods for microcirculation, advanced physiological modelling of acute and critical illness, and the processing of complex healthcare data.
Critical care medicine, as represented by the two research groups within the evaluated unit, is often underestimated in terms of research potential. However, in the context of digital transformation, the field offers substantial opportunities for large-scale data collection and from this innovation potential—particularly in areas that are major drivers of healthcare costs. Furthermore, given current geopolitical developments and associated risks, both clinical units provide a vital foundation for generating scientific evidence to guide clinical responses in emergency situations. As such, the research conducted within these groups is highly valuable and carries significant potential for societal impact beyond academic dimensions.

Recommendations

- The faculty should urgently review and revise academic appointment procedures to enable timely succession, particularly in pharmacology and clinical chemistry.
- Fragmented laboratory research groups should be strategically consolidated to create shared infrastructure and a critical mass of expertise.
- Publication output and visibility should be improved, particularly in pharmacology and clinical chemistry.

- The university should continue and expand its strategic partnership with RMV. This includes continuation of the SOFO network and other support, such as space and recruitment with the dual position possibilities.
- The faculty and the university must give high priority to the recruitment of a new chair in anaesthesiology to avoid disruption to the successful trajectory of research in this area. It is also recommended that the circumstances leading to the departure of the former research group leader—who had demonstrated a high level of ambition and achievement—are carefully examined. Understanding any potential structural or institutional barriers is essential to inform future leadership development and recruitment strategies.
- The head of the Emergency Medicine research group has contributed significantly to the advancement of research within the evaluated unit. These achievements appear closely linked to the opportunities provided through the Wallenberg Fellowship, which enabled the recruitment of promising early-career researchers. To sustain this positive development, it is crucial that the faculty and the university ensure the continuation of favourable conditions that support long-term research growth and talent development in this field.
- From a structural and strategic perspective, and particularly if external recruitment proves challenging, it may be worth considering the integration of the thematically related fields of anaesthesiology and emergency medicine under the leadership of the current head of anaesthesiology. Such an approach could help to maintain the continuity of recent achievements and foster a critical mass of researchers working collaboratively across clinical, technical, and biomedical domains at the university.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The evaluation unit maintains strong national and international collaborations. In forensic sciences the research culture has been well developed. The group is steadily publishing and obviously innovative and ambitious. The group has several experienced scientists but also have been able to recruit younger PhD students and postdocs. The network between LiU and RMV are unique and ambitious. Research practice is good, partially also thanks to the RMV's service laboratory where many of the researchers work having GLP understanding.

Emergency medicine has developed a dynamic and motivated research culture under its new leadership. In contrast, pharmacology and clinical chemistry suffer from small, fragmented groups and insufficient generational renewal. The organ bath methodology in pharmacology represents a unique resource and should be further developed as a transdisciplinary core facility.

Recommendations

- Forensic science publications should aim for higher-impact journals, given the uniqueness of the data.
- Immediate action is needed to replace senior researchers and restructure clinical chemistry and pharmacology.
- Full support should be provided to the emergency medicine group.
- Anaesthesiology requires the recruitment of a research-active department head to preserve research level and momentum.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

As in other evaluation units the infrastructure conditions for research are very good or excellent.

Forensic science research conditions are excellent provided that LiU and RMV co-operation continues. Staffing and funding are also excellent.

The organ bath system in pharmacology is underutilized and should be transformed into a core facility.

Collaboration with industry, especially in cancer research, should be explored more actively.

medicine and health sciences.

Recommendations

- Research capacity in clinical chemistry and pharmacology must be strengthened through structural and strategic support.
- The organ bath platform should be formalized as a university-wide research resource.
- The collaboration with RMV should be maintained and developed further to ensure continued excellence in forensic sciences.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Linköping University, as a comparatively young institution, has made remarkable progress in the development of its university campus. This consolidated campus represents an excellent

opportunity to foster synergy and collaboration across disciplines—an advantage that is far more difficult to achieve at older, more traditional European universities of comparable size, which are often geographically fragmented. The panel acknowledges the significant efforts undertaken by the university and recognizes its clear potential to achieve excellence in selected research areas. However, the potential in Medicine and Health Sciences—combined with the advantage of a unified campus—also entails a responsibility to further develop a responsive and future-oriented administrative and research environment for the clinical units. In an era marked by rapid technological change and digital transformation, adaptability has become a key requirement for academic institutions. There is an urgent need to concentrate on focusing on research strengths present in Linköping in medicine and health sciences. Although this is undoubtedly a complex and demanding process, it should be treated as a strategic priority. Given current geopolitical developments and emerging global challenges, specific fields such as disaster medicine, forensic medicine, and global health are likely to gain increasing scientific and societal relevance and impact in the coming years.

The panel is convinced that with appropriate structural and administrative reforms, Linköping University can successfully realize its strategic objectives also in these fields. It is the hope that the recommendations provided in this report will be considered helpful and sufficiently concrete to support timely and effective decision-making and implementation. The panel also offers to serve as a sounding board for the final report to the Swedish government and would be prepared to help to evaluate whether the proposed measures and actions are adequately implemented to achieve the intended outcomes.

For future evaluations, we recommend that clinical units within Medicine and Health Sciences be assessed by a single, obviously larger panel to ensure a comprehensive review of the entire field.

Panel L Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The evaluation unit covered the following research areas: pediatrics and obstetrics/gynecology, clinical chemistry and pharmacology, general surgery, plastic surgery, oncology, and orthopedics.

Review Panel L consisted of five internationally recognized scientists with substantial academic and leadership experience:
1. Two professors of pediatrics with strong research credentials, who had served as directors of a children's hospital and a department of women's and child health, respectively, and had previously held positions as deans of medical faculties.
2. Two professors of surgery with extensive experience in research, experience within international research consortia and in the development of integrated cancer care structures.
3. One professor with a medical background of with recognized expertise in genomics and a specific research focus on forensic medicine.

The panel held two virtual preparatory meetings prior to the on-site review. During these meetings, the distribution of responsibilities for the audit was agreed upon, and specific requests for additional documentation and clarification were formulated. During the on-site visit, the panel prepared and conducted interviews, and engaged in thorough discussions regarding the scope of the evaluation, the content of the submitted self-assessment reports, and the outcomes of the interviews. These discussions formed the basis for drafting the initial versions of the review reports which were shared with all five panel members. The draft was then revised by all panel members in sequential online rounds until a consensus on the final versions was reached.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Linköping University has articulated a clear and ambitious vision to become a leading European research university by 2030. To this end, strategic goals have been defined with a strong focus on strengthening the research environment across disciplines. In the field of medicine, the university has established a robust and rich academic infrastructure, ensuring reliable and easy access to state-of-the-art research facilities for both clinician and basic scientists. However, the specific nature of medical research requires a well-functioning partnership between the university and the affiliated hospital. While the university provides access to an excellent research environment and attractive academic positions, the hospital

serves as the primary site for clinical research and career development of physician scientists. Close cooperation between these two institutions is therefore essential to ensure a critical mass of excellent researchers across all career stages, to support clinical innovation and excellence, and to maintain the societal relevance and reputation of the hospital itself. The career development of clinician scientists is thus a shared responsibility of both the university and the hospital. In light of increasing financial constraints on both sides, it is essential to establish formal agreements between university and hospital management that guarantee protected research time for clinician scientists. This is particularly essential in cases where third-party funding has been secured. In such instances, the availability of clinical substitutes must be ensured to prevent disruptions in research, because the clinician scientist always will have -for ethical reasons- to give priority to patient care. The review panel strongly recommends that this issue be prioritized by university leadership.

Another key challenge lies in the dual affiliation of many advanced clinical researchers, who are simultaneously pursuing academic careers as adjunct professors with a predominant employment at the hospital. This dual role complicates the development of a shared identity within the Faculty of Medicine and Health Sciences. Additionally, the current exclusion of adjunct professors from full integration into the faculty, such as serving on the faculty board, limits the university's ability to benefit from the research expertise and engagement of a significant number of qualified colleagues. This could also skew the faculty priorities away from clinical research, thus further alienating the academic clinicians.

Although general career paths for early-career researchers are in place, structured and personalized mentoring—especially beyond the postdoctoral phase—is not taken up as a responsibility by many supervisors. University management, in collaboration with senior principal investigators, should address this gap and actively promote a culture where mentoring and career planning is recognized as a core responsibility of senior academic staff. A stronger emphasis should also be placed on providing early-career researchers with the opportunity to establish their own research groups and achieve academic independence.

As the recruitment of young research talent has become increasingly competitive—both nationally and internationally—a more proactive strategy is needed. At present, the university predominantly relies on internal recruitment; however, to achieve its strategic objectives, it must also succeed in attracting excellent candidates from outside Linköping. This requires enhanced visibility. In particular, English-language websites that showcase the university's research strengths in medicine and the unique opportunities in the hospital to combine high-quality clinical training with supportive research conditions would greatly strengthen international recruitment. The establishment of a structured clinician scientist curriculum and the acquisition of third-party funding, such as from foundations, could further enhance the university's attractiveness to this target group.

Leadership recruitment is another area that requires strategic improvement. A clear and structured process for replacing retiring senior faculty must be implemented by the faculty if not actively pursued by the senior PI. This should begin at least four years in advance, with a dialogue between the dean, the department chief, and the senior PI about future directions and priorities. Active and transparent recruitment processes must follow to ensure the continuity and renewal of research leadership.

A further strategic priority of Linköping University is to foster interdisciplinary research across faculties and departments. However, it must be considered that for functional reasons the current presence of very small research groups lacking a critical mass necessary to reach a certain level of excellence is not in line with this strategy. While interdisciplinarity is not a goal in itself, the university's excellent infrastructure in fields such as artificial intelligence and materials science presents valuable opportunities for innovation at the interface of disciplines. These opportunities should be actively pursued. Moreover, cross-disciplinary collaboration within the Faculty of Medicine and Health Sciences should be promoted through the provision of open spaces for informal interaction and through regular events that showcase ongoing research and stimulate collaboration. These initiatives would contribute to the development of a stronger, research-oriented identity within and across the medical disciplines.

During the evaluation, the review panel noted that the current organizational structure of Linköping University does not effectively support its strategic goals. On the contrary, the structure often appears confusing to researchers at all career levels and may even hinder progress toward the university's long-term ambitions. The panel considers this a potentially major barrier to achieving the university's strategic objectives. An effective organization must have clearly defined responsibilities and transparent decision-making processes. At present, these elements are insufficiently developed, particularly regarding cooperation between the university and the hospital. While this is especially detrimental to clinical research, similar concerns were also raised by PhD students in basic sciences, suggesting that the current matrix organization is not well-suited to fully unlocking the existing research potential.

Even at the level of faculty management, there appears to be uncertainty about who holds responsibility for key strategic and operational decisions—for example for decisions in the areas of recruitment, hospital agreements and use of the research environment. These ambiguities contribute to a high degree of frustration among researchers, particularly those who require timely and reliable administrative support.

One illustrative example discussed by the panel concerned the unclear authority for implementing English as a mandatory working language in research environments. This step—viewed by many as essential to fostering an inclusive atmosphere for international researchers—was met with uncertainty as to whether the Vice-Chancellor, the Dean, or the Heads of Department would be responsible for pushing and issuing such a directive.

In contrast to many other countries, newcomers in Northern European countries often encounter challenges in establishing informal personal networks, and social integration can be limited. Therefore, the university should actively work to create an inclusive, welcoming environment for international researchers because otherwise the ambition to increase international collaboration and mobility is unlikely to succeed.

The panel also observed a continuing gender imbalance in senior academic leadership positions, where male professors remain predominant. This is also evident among adjunct faculty. In contrast, gender parity is achieved at the PhD level, where female and male candidates are equally represented. This highlights the need for more active and structured measures to promote gender equity in academic career progression.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The KOO is a mixture of clinical units out of which most are related to surgery. Ten research environments are described in the self-evaluation, and these are closely linked to the clinical specialities and corresponding hospital environments both in Linköping and Norrköping. Permits for nationally centralised treatment (nationellt högspecialiserad vård; NHV) for the following conditions; Severe burn injury, Gender dysphoria, Peripheral facialis paresis and Reconstructive surgery for inflammatory bowel disease have been obtained by clinical units related to KOO. To receive and maintain any of these permits, a unit needs to have nationally competitive clinical and academic outcomes. The NHV status will also open for a higher number of patient referrals leading to possibilities for frontline research and clinical trials. Other research environments with high potential are Metabolic and bariatric surgery, Surgical oncology in a wider context and Disaster medicine involving social sciences.
There is a big variation in the quality of research output, with all research environments having an average publication frequency, and with a limited number of high impact journals and few last authorships. Many publications are multicentre collaborations with a high number of co-authors and Linköping researchers are rarely in leading positions. Regarding external funding it is rather consistent with an average annual funding of 12 MSEK the last four years. Several of the research environments are in areas with good funding opportunities so the amount is surprisingly low.

Recommendations

Overall, most of the research areas are in clinical specialities with high potential to be nationally leading in many and internationally in a few. The unit has been successful in reaching clinical impact but should aim for reaching equivalent impact regarding the research outcome.

The unit described 10 research environments: Skin and Cultured Cells, Inflammatory bowel disease (IBD) and other chronic intestinal disorders, Plastic surgery and gender-affirming surgery, Metabolic and bariatric surgery, Disaster medicine and traumatology, Endocrine, Colorectal cancer, Breast cancer, Liver metastasis, and Preclinical and clinical translational research within fracture healing and joint arthroplasty.

The recommendations of the reviewers are;

1. Reduce the number of environments to create a critical mass. As an example, the Skin and cultured cells environment should be joined with Plastic surgery and gender-affirming surgery. These should then further explore collaborations with units outside of their own. Such a larger research environments should then create an overarching research strategy.

2. The rather small and individual cancer related environments should be merged to one larger with a focus on cancer and surgical oncology specifically. The organisation and OECI accreditation of a Comprehensive Cancer Centre in Linköping should be a means of further integration of the cancer research at this unit with those in more pre-clinical settings.
3. The Disaster medicine and traumatology unit would benefit from deeper interaction with related areas within BKV such as Emergency Medicine and Forensic Medicine. This would create a multifaceted environment looking at acute threats to society and humans from several perspectives. Perhaps even Preclinical and clinical translational research within fracture healing and joint arthroplasty could fit within such as context.
4. Metabolic surgery, IBD surgery and treatment of other chronic intestinal disorders are potentially leading surgical fields, also internationally. These groups could benefit from sharing partially overlapping strategies and infrastructure related to research such as clinical trials platforms.
5. All research environments would benefit from becoming part of a critical mass of researchers. They should dare to think bigger and utilise the potential of interaction with other strong Linköping research environments, eg. imaging, computational biology and AI-platforms.
6. The unit should actively foster the next generation of research leaders and make distinct career plans for future research leaders.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The described 10 research environments depend largely on settings with a single PI and a few PhD students and/or postdocs. As a consequence this leads to a limitation in creativity and innovation. It is mirrored in the publication record where 60% of publications are in the Q2 IF-quantile or lower, and only 11% are at Norwegian level 2. Despite several collaborations the number of shared first and last authorships is less than half (45% of publications) and even slightly decreasing.

Looking at research from the context of a career it was noted that the quality of the PhD program, with training and mandatory courses is high and clearly structured. The PhD students that we met were in general happy with their work and training, although it was pointed out that some felt working in isolation from other researchers in very closely related fields. This highlights the need for larger research environments as indicated previously in this report. It is also popular to become a PhD student, especially for clinicians that can work part-time in research and when the research time is protected.

At the junior faculty level, the strategy to support early-career researchers to develop their originality and independence is not clear and needs to be improved. Linköping would benefit from also structuring the track for career development post dissertation as exemplary as the PhD training. As an example, waiting times for mandatory “docent” courses in English are

unacceptable long and hinder career progression. Moreover, the Linköping specific rule that does not allow for non-docents to be main supervisors for PhDs prevents early-career researchers to obtain merits as PIs and be competitive in a national setting.

Both individual PIs and research environments describe local, regional, national and international networks and collaborations, but it is unclear in how many of the national and international networks Linköping is the leading centre. Bariatric and metabolic surgery is a good example where Linköping researchers are both leading PIs and broad collaborators.

In terms of gender equality there are significant differences between the sexes. There are in total 16 professors at the unit (10 full and 6 adjunct), out of which 19% female and 81% male. This could partly be related to the unit including historically very male dominated disciplines, such as general surgery and orthopaedic surgery. In line with this, the gender distribution is more equal when looking at early-stage researchers. However, the unit should be aware of structures leading to loss of female researchers within their fields. Overall, the sex distribution is 31% female and 69% male among the academic staff.

In terms of equality for professions there is a research track idea in place with associate lectorship and professorship positions that are aligned with a clinical career for physicians (combined positions). This career track is not clear for other health care professionals. It is therefore very hard to establish a research career beyond obtaining a PhD for other health care professionals than physicians. This is largely due to difficulties in combining research with clinical work for other health care professionals. For clinicians there are good possibilities to obtain teaching merits by participating in the medical program teaching. For basic scientists working at the unit the teaching availabilities are more limited.

Recommendations

As indicated above the research culture is hampered by the multiple small groups working in isolation from each other. The research environments are often defined as something lead by one PI. If the critical mass at the research environments had more PIs and junior researchers, this would increase the creativity and innovation capacity.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Both the laboratory and clinical environments are good research milieus from a working perspective, although we did note for some of the former that the researchers worked in isolation from each other. The supportive functions for the researchers vary and are very limited in clinical trials. Biobank initiatives and core facilities are very good and accessible for the researchers at the unit.

Considering that many of the research areas that are covered by this unit there is very limited funding beyond local and regional grants. In areas such as cancer and clinical trials there are

many other funding opportunities available, and the unit should put a strategy in place to increase the number of applications to national and international funding agencies.

Recommendations

To put a strategy in place to

1. To clarify the leadership of the units and university to make it clear at what level decisions are made.
2. To clarify and strengthen the role of adjunct teaching positions in terms of faculty affairs since this unit has many persons in this category and a lack of influence might also lead to a sense of not belonging.
3. To create clear and common goals for research with the hospital leadership at all levels in order for research to be prioritised in the clinical context and the role of the clinician scientist to be valued.
4. Increase external research funding by active support, grant-writing workshops and providing internal feedback on grant applications.
5. To organize networking events for the whole unit but also between researchers at specific career stages to generate learning experiences.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel is however convinced that with appropriate structural and administrative reforms, Linköping University can successfully realize its strategic objectives also in these fields. It is the hope that the recommendations provided in this report will be considered helpful and sufficiently concrete to support timely and effective decision-making and implementation. The panel also offers to serve as a sounding board for the final report to the Swedish government and would be prepared to help to evaluate whether the proposed measures and actions are adequately implemented to achieve the intended outcomes.

For future evaluations, we recommend that clinical units within Medicine and Health Sciences be assessed by a single, obviously larger panel to ensure a comprehensive review of the entire field.

Panel M Report

Evaluated Unit's Name: BKV.CSAN Center for Social and Affective Neuroscience

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel created a set of interview questions based on the focus areas outlined in the report instructions. This set of questions was used across the three dialogs with the unit, appropriately modified according to the seniority and career stage of the participants. The panel members took turns asking questions and following up points of interest. Participants were encouraged to focus on areas of development and improvement, and full anonymity was assured. LiU's 'Vision and strategic plan for 2030' was discussed in all dialogues, i.e., with personnel at all career levels in all three units.

Research areas included in this evaluation: (1) Sensory neuropsychology, (2) Psychiatric neuroscience.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

In evaluating all three units, the panel was impressed by the passion and rigor with which high quality research is being conducted and fostered. We were also impressed by the openness with which all participants (including the Department Head) engaged in dialogue with the panel. Nevertheless, we have identified some common themes/areas of concern that should be considered in terms of development.

The University's 'Vision and strategic plan for 2030' was known by almost everyone participating in our dialogues. However, it was clearly communicated that the content of this document does not influence the thinking, research, or vision of the Unit. **We recommend that the University thinks about how to communicate to its research community how the vision and strategies can be fulfilled**, e.g. how excellence should be defined and evaluated. This is necessary for the University's vision and strategy to be owned by the entire university community.

We recommend that the university considers establishing a tenure-track system (or comparable system with clear career path) for faculty in order to attract and retain the faculty with the best potential. The tenure track system should outline the career path, with information on the different stages, their timelines, and evaluation criteria. Optimally the tenure track positions should include funding. **Regardless of the presence of a tenure track system, the university should clearly outline the academic system and promotion criteria at the relevant level(s)** - Sweden, LiU, faculty, unit, division - to support junior researchers—especially those from abroad—in navigating their career progression.

As in the other two evaluation units within Panel M, the PhD students in preclinical research focused on research animals expressed a dissatisfaction with the compulsory PhD courses. The course content is found to be more relevant to clinical PhD students, e.g., in the ethics course. It is our recommendation that the compulsory courses are reviewed and modified to suit both clinical and preclinical/animal research. Two course variants could be given, or alternatively, both research tracks covered within the course(s).

There was dissatisfaction with decentralised teaching, as it may hinder the ability to combine PhD studies with medical training. For instance, when students are placed in locations far from Linköping, it becomes challenging to pursue parallel doctoral studies at the university.

Discontent was also expressed with the PBL-system of education: tutoring PBL-seminars was considered a waste of expertise. Faculty felt that they were not teaching in the areas or in a way that best used their expertise. They proposed a more structured and transparent approach to align teaching assignments with faculty expertise, ensuring that teaching opportunities are clearly defined and better matched to individual areas of competence. Furthermore, faculty recognized that teaching contributes to salary, yet another reason for having teaching assignments clearly defined and predictable. **We recommend that teaching opportunities and the use of PBL is reviewed and reformed to maximise the opportunities for colleagues to teach in areas of expertise so that students can benefit from expert, research-led teaching.**

The “Student to Docent” program was highlighted as a valuable and appreciated initiative, offering a clear academic career path and serving as an effective tool for recruiting talented PhD students into long-term academic roles.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

CSAN’s research is interdisciplinary and highly relevant. The unit combines clinical and pre-clinical research. Novel findings are reported in journals with broad impact. The work is of high quality and solid, and there are aspects which are novel. There are collaborations with

pharmaceutical and device companies. There is definite potential for clinical impact. Rather than having a 5-year strategy plan, the unit's approach is to pursue curiosity-driven research of excellent quality by creating an enabling and supportive environment and recruiting the best people. CSAN pays close attention to the own research environment and its role as an enabler. This is working well, and all career stages verify this.

It is clear that the unit has high ambitions and strives to publish their research in ways that provide the broadest impact and visibility. This is at times constrained by practicalities in the academic system, such as the need for PhD students to publish a certain number of articles within a defined timeline.

Recommendations

The panel identified the unit's strengths in fostering and supporting early career researchers, allowing new directions of research. We believe the unit would be even stronger and more cohesive with a clearly articulated, forward-looking strategy that outlines a shared vision for the unit's future development. This would in no way negatively impact on the current operational strategies.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

There is a positive research culture, with a sense of coherence within the unit and with all colleagues being part of the culture. The lab meetings are a cornerstone of research culture, as are monthly research seminars and annual retreats, with seminars and retreats giving PhD students, postdocs and faculty opportunities to network with important researchers in the field.

We noticed that CSAN prioritizes recruitment of postdocs over PhD-students, mainly due to lack of long-term funding required to take on PhD students. Surprisingly, it was presented quite consistently that there are few benefits associated with hiring PhD students. We see several problems with a focus on hiring postdocs, particularly for short-term periods (2 years on stipend). Exchanging postdocs after 2 years rather than retaining expertise for a longer period harms a lab's possibility to maintain expertise and to establish new ambitious technology. Short postdoc periods prevent postdocs from conducting the long projects that can build the connections and CV needed to acquire starting grants and a position in the environment, in the long run negatively affecting the university and the health care system. Moreover, as serving as main supervisor for PhD students is a major academic merit, the focus

on postdocs harms junior faculty's competitiveness and possibilities for a successful career in academia.

Doctoral students expressed dissatisfaction with the administrative burden imposed by the ISP system. They did not see any value in the system but rather felt that it only increased administrative complexity.

There was dissatisfaction from some faculty members that there are insufficient opportunities to use their research expertise in teaching. Junior PIs complained about the quite unstructured organization of teaching and lack of predictability regarding their participation in teaching. Predictability is particularly important, taking both the merits and contribution towards salary teaching can provide.

A model was positively highlighted, where medical students could take electives in research labs and opportunities to engage in research. This approach has directly contributed to some students pursuing clinical PhD studies.

Recommendations

The unit should maintain and enhance the positive collaborative interdisciplinary interactions (lab meetings, research retreats etc) that enable the research.

One of the main tasks of universities is to educate PhDs for both academic positions and the needs of society, e.g. drug companies. PhD students at LiU would benefit from a broader selection of relevant courses, e.g., in the form of a university-wide PhD program. A formal MD/PhD program could also be useful to increase the share of MD PhDs who are needed for both academic research and outside academia. A surprising feature is that the government funding model does not seem to take into account the number of PhDs produced. The University should address this by, e.g., lobbying for national funding programs for PhDs. For registered PhD students, a follow-up group (e.g. 2 senior PIs) evaluating and supporting the student's progress would be useful.

The University should consider how to maximise the expertise of faculty by enabling them to teach in the areas of expertise, including across departments and faculties. Interactions with research-excellent faculty inspire students to do research themselves!

The University should review what is required of PhD students in terms of administration and consider either ensuring that students understand the purpose and value of this and/or reduce.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

CSAN appears to have had an applaudable ambition to tackle individual researchers' temporary lapses of funding, e.g., by providing bridge funding. It was also expressed that recruitment and retention of junior faculty with excellent potential have been financially prioritized, which we find to be a very important strategy for continued scientific excellence and attractiveness of the research environment. However, it was expressed that financial strains might prohibit a continuation of this strategy, which would be a real threat to the unit.

Several strongpoints of the unit were pointed out, including the infrastructure for imaging research. The researchers were positive about what the core infrastructure offers. The recruitment of colleagues with research experience and expertise relevant to academia and the unit's local administrators clearly contribute to the unit's strong activities and qualities.

The *Area of Strength* initiative in 'Systems Neurobiology', jointly funded by the university and the region, has played a crucial role in supporting infrastructure, the recruitment of junior researchers - primarily postdoctoral fellows – as well as in bringing the scientists together (for example through annual retreats), which is appreciated at all career levels. We were informed that this initiative is currently under threat, which would have a detrimental impact across all three units we evaluated.

In contrast, the conditions for animal research are brought up as a problem by all career levels. The facilities are modern and adequate but not adapted to the users' actual needs, with crowding in parts of the facilities. The facilities are stated to be very expensive to use and the electronic booking/user systems suboptimal, and animal work thus brings both financial and administrative burden for the users.

Junior faculty states that the consolidator stage poses serious problems and concerns regarding funding and academic future. The conditions for junior faculty appear to be incohesive across the department, with unclarities in how 'activity' translate to salary, on individual and group level. The junior faculty feel supported by the unit, but the unit does not have the practical means and finances to help. Thus, the problems appear to be rooted outside of the unit and at a level that needs to be tackled at the departmental, faculty, and university level.

Some support functions are reported to not work as well as desired, e.g., IT services.

Recommendations

Environments in the unit generating research with broad impact and visibility are strongly dependent on animal research - CSAN states to occupy a third of the animal house. To ensure continued high-quality research, the university needs to ensure that the animal house works optimally, which is currently not the case. The causes for the suboptimal routines and space allocations in the animal house should be established, and the possibilities for cost effectivizations investigated. A well-functional animal house is also crucial for recruitment of

junior faculty continuing and expanding the research. Investment will be needed to develop this facility and ensure it is able to support world-leading research.

There is a need to develop a strategy around **succession planning** – at all levels, if the University wishes to retain the areas of research currently within CSAN. The University also needs to develop a **strategy to retain junior faculty and postdocs**, who are often forced to leave due to the systematic use of short-term stipends, such as two-year postdoc positions without long-term prospects.

The University and the Region should continue the *Area of Strength* initiative; alternatively, a comparable mechanism should be established to ensure sustained support for this excellent research environment.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

At all levels (senior PIs, junior PIs, postdocs, PhD students), there was consistency in views about the evaluation unit. This is an excellent unit with many strengths. The unit is cohesive, with colleagues at all career levels feeling supported and showing involvement and awareness of the unit's strengths and challenges/weaknesses.

Panel M Report

Evaluated Unit's Name: BKV.NEURO Neurobiology

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel created a set of interview questions based on the focus areas outlined in the report instructions. This set of questions was used across the three dialogs with the unit, appropriately modified according to the seniority and career stage of the participants. The panel members took turns asking questions and following up points of interest. Participants were encouraged to focus on areas of development and improvement, and full anonymity was assured. LiU's 'Vision and strategic plan for 2030' was discussed in all dialogues, i.e., with personnel at all career levels in all three units.

Research areas included in this evaluation: (1) Clinical Neurosciences, (2) Human Neuroscience, (3) Neurobiophysics, (4) Neurodegeneration, and (5) Neuroinflammation.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

In evaluating all three Evaluation units, the panel was impressed by the passion and rigor with which high quality research is being conducted and fostered. We were also impressed by the openness with which all participants (including the Department Head) engaged in dialogue with the panel. However, we have identified some common themes/areas of concern that should be considered in terms of development.

The university's 'Vision and strategic plan for 2030' was known by almost everyone participating in our dialogues. However, it was clearly communicated that the content of this document does not influence the thinking, research, or vision of the unit. **We recommend that the university thinks about how to communicate to its research community how the vision and strategies can be fulfilled**, e.g., how excellence should be defined and evaluated. This is necessary for the university's vision and strategy to be owned by the entire university community.

As in the other evaluated units, the funding of recruited junior faculty is precarious, with risks of disrupted career trajectories and failed retention of recruited faculty. While this is a commonality at Swedish universities, the conditions at Linköping university appear particularly uncertain and lack clear long-term perspectives for academic development and retention.

We recommend that the university considers establishing a tenure-track system for faculty in order to attract and retain the faculty with the best potential. The tenure track system should outline the career path, with information on the different stages, their timelines, and evaluation criteria. Optimally the tenure track positions should include funding. **Regardless of the presence of a tenure track system, the university should clearly outline the academic system and promotion criteria at the relevant level(s) -** Sweden, LiU, faculty, unit, division - to support junior researchers—especially those from abroad—in navigating their career progression.

Principal Investigators (PIs) identified significant challenges in the university's administrative system for tracking research funding. The quarterly financial reports lack the necessary level of detail to effectively monitor expenditure. Additionally, occasional cost misallocations go unnoticed due to the system's limitations. PIs expressed a preference for a more transparent and user-friendly system, akin to a private banking platform, where they could directly track expenses and verify the use of research funds in real time. The evaluation unit notes that a system resembling what the PIs are asking for already exists at Karolinska Institutet—called *Research Web*—and may serve as a useful model to consider.

It appears commonality that clinical PhD students are expected to pursue their doctoral studies at half-time pace (50%) over eight years. However, as a rule, the students are only allocated 25% of funded research time. The remaining 25% of research is expected to be conducted unfunded, in the student's own free time, creating a challenge in balancing clinical, research, and personal responsibilities. This also presents an equal opportunities issue which should be addressed by the region and LiU.

As in the other two evaluation units within Panel M, the PhD students in preclinical research focused on research animals expressed a dissatisfaction with the compulsory PhD courses. The course content is found to be more relevant to clinical PhD students, e.g., in the ethics course. It is our recommendation that the compulsory courses are reviewed and modified to suit both clinical and preclinical/animal research. Two course variants could be given, or alternatively, both research tracks covered within the course(s).

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The unit covers a wide range of research topics, from basic science to applied/translational research. Novel findings are reported in journals with broad impact. The work is of high quality and solid, and there are aspects which are novel and of potential clinical value. There are links to industry. The unit makes strong attempts to have impact outside academia with outreach activities, for example working with autistic communities and writing for a broad audience.

The research environment has clear plans for future research that capitalizes on current strengths in personnel and infrastructure. However, as identified by the unit, the number of citations and the fraction of top-10% cited articles are lower than for the Faculty of Medicine and Health Sciences and LiU as a whole. The unit has no plans to take any specific action to increase the number of citations or field-normalized citations. Both the self-evaluation and the discussion described a 'focus on performing the best possible science'. However, the best possible science lacks a constructive definition, and it is unclear how the best possible science would be achieved and assessed within the unit. It is also unclear how a lack of ambition to improve the citations i.e., the recognition and impact of the conducted research is compatible with performing the best possible science.

Recommendations

We recommend that the unit develops a more explicit strategy for research quality and impact, including concrete goals related to scientific visibility and citation performance. While a focus on "performing the best possible science" is commendable, we encourage the Unit to define what this means in practice—clarifying the standards, methods, and benchmarks by which scientific excellence is assessed internally. It should be noted that this concern does not apply to all research groups; some are producing groundbreaking, high impact work that garners significant attention. However, at the unit level, we suggest that the unit consider measures to enhance the dissemination and visibility of its research outputs, including identifying high-impact publication outlets, promoting open access, and encouraging strategic collaborations. These steps could help align the unit's ambition for excellence with measurable indicators of research impact. Furthermore, publications and their impact are most often key evaluation criteria for funding and positions and ignorance of this can negatively impact junior faculty and colleagues particularly.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Junior faculty and PhD students/post-docs feel well supported by their supervisors and/or PIs and by the research teams around them. Active research cultures were described involving

regular lab meetings and journal clubs (with different frequencies in the different groups). Synergies and collaborations with several other groups (external to the unit) are appreciated, e.g., with CSAN, and the technical faculty.

The unit retreats were praised for their value – bringing the community together and with the invitation of international academics. All career levels valued this initiative.

Junior faculty expressed that advice has been given to focus on employing postdocs rather than PhD students, and to exploit the possibility to pay postdocs with a non-Swedish PhD degree two years of stipend and then exchange this postdoc for a new postdoc. If this is a generally applied strategy, we find that this is not a productive strategy for supporting excellence in research. It also raises concerns about its impact on the university's long-term research capacity, the quality, and continuity of the scientific work, and the career development of the individuals involved.

PhD students were appreciative of the funding available to take courses outside of LiU, including abroad. Further, PhD students appreciated having the opportunity to contribute to PBL teaching.

Colleagues are positive about the principles and value of Open Science, and are embracing this, as relevant to their disciplinary area.

Recommendations

The unit should consider how to maximise opportunities for colleagues to engage in research collaboration beyond the individual research group level and as part of the broader unit. While annual retreats partly address this need, more frequent and structured opportunities—such as regular meetings or shared physical spaces—could further enhance collaboration. In addition, active inclusion and concrete support should be provided to the LiU Junior Faculty community to help organise initiatives such as collaborative projects, networking events, peer support activities, and information sessions, fostering a more connected and supportive research environment.

PhD students would benefit from a broader selection of relevant courses, e.g., in the form of a university-wide PhD program.

Skilled technical staff are critical for supporting research within the unit and therefore clear career paths, and information regarding these, need to be formulated for this staff group, particularly in this unit. Otherwise, this important staff group will look for other opportunities. Information is also needed for colleagues joining internationally about the Swedish system, to support them navigating this and career planning.

Stronger intellectual and educational coherence within the research community could be achieved by establishing a neuroscience graduate program that brings together PhD students from different research environments. Such a program would help foster a shared academic identity, facilitate collaboration, and create a more unified training structure. It could also be

linked to existing international master's programs to strengthen continuity and international visibility. Principal investigators of foreign origin could play a key role in teaching and organizing activities, further enriching the program's diversity and global outlook.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

There are numerous indications that the established infrastructure is working very well and is highly appreciated within the unit. The Faculty of Medicine and Health Sciences appears to currently hold the responsibility for infrastructure, but the senior faculty expresses a need for a central LiU infrastructure board, enabling strategic investments in larger and more costly infrastructure.

The *Area of Strength* initiative in 'Systems Neurobiology', jointly funded by the university and the region, has played a crucial role in supporting infrastructure, the recruitment of junior researchers - primarily postdoctoral fellows – as well as in bringing the scientists together (for example through annual retreats), which is appreciated at all career levels. We were informed that this initiative is currently under threat, which would have a detrimental impact across all three units we evaluated.

There was some feeling that the teaching load was allocated in a way that was not necessarily fair (e.g., arguably a higher load on female staff) and that opportunities for teaching were not always made available transparently and fairly.

Recommendations

The university needs to engage in dialogue with users of the animal house to optimise the use of space, efficiency and reduce the administrative load. This will maximise the value of the animal house as part of the university's infrastructure.

The university and Region should endeavor to maintain the funding associated with the Area of Strength 'Systems Neurobiology'. It has been a key factor in maintaining infrastructure and recruitment of postdocs, which under the circumstances of few PhD students is essential. In case it will be discontinued, alternative systems would be crucial.

The university should consider setting up a doctoral program in Neuroscience to maintain cohesion and support PhD students. Such a doctoral program might also provide an alternative mechanism for supporting the activities that are currently supported by the Area of Strength, e.g., annual retreats.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Senior faculty appear frustrated over that decisions and processes that involve the Faculty and central university are slow and incomplete, even after decisions have been made.

The unit should carefully consider the data package Personnel, particularly the colleagues' gender at different career stages (high ratio of males:females at later career stages and low ratio of males:females at early career stages). The unit should consider whether there are actions that should be taken to address this inequality and what these would be.

A wish to optimally organize the rebuilt cell biology house was strongly expressed, with investigation on how to truly support increased interactions and a possible generation of a Life Science center. Moving labs from Valla could also be investigated. To not put thorough effort into investigating how to best organize the building would be a lost opportunity for LiU.

Evaluated Unit's Name: BKV.SOK Sensory Organs and Communication

Panel M Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel created a set of interview questions based on the focus areas outlined in the report instructions. This set of questions was used across the three dialogs with the unit, appropriately modified according to the seniority and career stage of the participants. The panel members took turns asking questions and following up points of interest. Participants were encouraged to focus on areas of development and improvement, and full anonymity was assured. LiU's 'Vision and strategic plan for 2030' was discussed in all dialogues, i.e., with personnel at all career levels in all three units.

Research areas included in this evaluation: (1) Applied auditory research, (2) Ophthalmic research, (3) Speech & language pathology.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

In evaluating all three units, the panel was impressed by the passion and rigor with which high quality research is being conducted and fostered. We were also impressed by the openness with which all participants (including the Department Head) engaged in dialogue with the panel. However, we have identified some common themes/areas of concern that should be considered in terms of development.

The university's 'Vision and strategic plan for 2030' was known by almost everyone participating in our dialogues. However, it was clearly communicated that the content of this document does not influence the thinking, research, or vision of the unit. **We recommend that the university thinks about how to communicate to its research community how the vision and strategies can be fulfilled**, e.g., how excellence should be defined and evaluated. This is necessary for the university's vision and strategy to be owned by the entire university community.

As in the other two evaluation units within Panel M, the PhD students in preclinical research focused on research animals expressed a dissatisfaction with the compulsory PhD courses.

The course content is found to be more relevant to clinical PhD students, e.g., in the ethics course. It is our recommendation that the compulsory courses are reviewed and modified to suit both clinical and preclinical/animal research. Two course variants could be given, or alternatively, both research tracks covered within the course(s).

Similar to the other two units evaluated by this panel, this evaluation unit expressed a shifted focus from PhD students to postdocs, the main reason being the financial demands. It emerges that LiU and/or the faculty does not prioritize funding for PhD students, posing a serious risk of affecting academic research and consequently the university's funding. It is also a danger to the Swedish society at large. It should be noted that senior faculty stated that even partial funding of PhD studies would make them hire PhD students.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

For two of the research environments (applied auditory research, ophthalmic research), there seems to be relevant, novel and innovative research across basic, translational, modelling and clinical/applied research. For the third (speech & language pathology) the research is relevant to different clinical groups, but overall the quality of the research in this particular research environment does not yet appear to be internationally competitive.. This may relate to teaching commitments and associated work: speech & language pathology has lost a couple of academic staff members recently, and they report finding it challenging to balance research with heavy teaching demands.

Research is informed by clinical practice and questions, that in turn informs practice, which is a strength for the unit. However, there is no research strategy for the unit as a whole. Two of the research environments (applied auditory research, ophthalmic research) have a strong vision and concrete plans for future research, but the plans for the speech & language pathology research environment seem underspecified and not yet underpinned by a strong vision.

Recommendations

The high competence and research needs of young scientists, particularly in the ophthalmic research environment, would greatly benefit from significantly broader contacts with other scientists in related divisions. Also in the other research groups, enhanced contacts with other young scientists would be very beneficial, and efforts should be made to create such possibilities. This and course needs could be achieved, e.g., by establishing a neuroscience graduate program for all graduates in different environments. It could also be linked to the international master programs which already exist. PIs of international origin could carry a major part of teaching and act as event organizers.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

There is variability in PhD students' views with respect to how well-supported they are by their supervisory team. They appreciate having the opportunity to attend national and international conferences.

Publication strategies in research environments were rather different, and understanding of Open Science practices was not strong among PhD students in the speech & language pathology research environment. In contrast, state-of-the-art publication procedures were apparent in the ophthalmic research environment. Speech & language pathology is targeting a range of publication outlets including materials for students, for clinicians and in the academic domain, which is appropriate for this discipline.

Junior faculty and post-docs reflected that it was positive that Swedish language education was offered to researchers joining internationally and this should be continued. Conversely, it was reported that, for a predominantly international research community, some language practices (e.g., faculty meetings and communications in Swedish) can be a barrier. This was also a barrier to having the opportunity for teaching experience. In all other respects, no issues were identified with respect to equal opportunities.

Recommendations

Consideration needs to be given to inclusion for international researchers (particularly regarding the Swedish language) to ensure they can make their maximum contribution.

We may not have sight of this, but we are not aware of a follow-up system for PhD students beyond the supervisory team and the mandatory halftime check. We recommend the unit (or university) consider some kind of system (e.g., an annual follow-up/panel with two academics [not the supervisory team] or a mentor). We are concerned about whether students currently have a mechanism for raising any concerns they might have.

PhD students would benefit from a broader selection of relevant courses, e.g., in the form of a university-wide PhD program.

The unit should give attention to further development of networks, and ways of fostering collaboration, within the unit, between basic science and clinical, and into other departments. This would be particularly important for speech & language pathology, which appears rather isolated from other research environments in this unit.

We also recommend that the speech & language pathology group consider how to maximise the academic impact of their work, generating a publication strategy for the group rather than at the individual level, and that this is shared with PhD students.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

In terms of organisation, this unit appears to be an administrative unit, with the research groupings based in different and diverse locations. This appears to be working on the whole, but it is likely to mean there are missed opportunities (for collaboration, interdisciplinary working, and peer support).

It was positive to learn that, in the ophthalmology research environment, there is a strategic plan for the group/for the research strength, with clear plans around development of the next generation of personnel to ensure the research strength evolves.

To note, in the finance report, we observe a significant drop in education income. In the self-evaluations for BKV.CSAN and BKV.NEURO, this was highlighted as a change in accounting practice and we assume this is the case here too, but we do not know that.

Infrastructure (a combination of own infrastructure, use of national facilities and working with international collaborators) appears to be working well for the unit.

Bioinformatics was critical to some of the research, but the limited resource in this area means that it can be months of delay. The national facility is used but there was a concern regarding the delay.

Recommendations

We recommend that the unit considers how to maximise the opportunities that are presented by being in one unit, exploring synergies, learning from and with each other (for example, methodologies, clinical application, generating novel interdisciplinary research questions). This would provide the benefits of collaboration, networking and peer support, particularly for earlier career individuals (graduates, postdocs).

We recommend that the Department/university provides clarity on higher-level decision making regarding the future for the speech & language pathology program. This will enable staff to achieve a more productive balance between research and teaching and will provide greater certainty to enable them to articulate a vision for their research.

Across the unit, junior faculty and post-docs indicated that they would appreciate dedicated information about funding opportunities relevant to them, rather than receiving weekly communications that are very long and from which relevant information needs to be

extracted. This suggestion could be implemented relatively straightforwardly at Department, Faculty and/or university level.

We recommend that the learning from groups is shared, for example, around succession planning, to avoid a research strength resting on an individual PI.

Infrastructure needs should be continually reviewed as they evolve so that strategic decisions can be made around investment. Support to bioinformatics to be considered.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The three research environments do not appear to be interconnected or functioning as a coherent unit, and their interactions/collaborations all appear to be outside the unit. The research environments applied auditory research and ophthalmic research expressed satisfaction with the individual connections they have built with the relevant clinic. Speech and language pathology has also built valuable connections with clinicians and patient groups. Regardless, the limited interactions within the unit represent a lost opportunity for synergy, and establishing fruitful independent connections outside the unit can be challenging for recruited junior faculty, weakening the unit's potential and success.

The applied auditory research environment holds strong basic research with extensive potential. It is the Panel's firm conviction that increasing the contact points and interactions with other strong basic research environments would further strengthen the potential and quality of the research. This wish was also clearly expressed by members of the environment.

Given the seeming independence of these three research environments from each other, the data set provided (at division level) for the panel to consider is not meaningful for this exercise. The division and the department need to discuss whether the status quo is appropriate in the longer term, that is three independent units which seem to have been combined solely for administrative purposes within one division.

Panel N Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Report prepared by Panel N. Panel chairperson was Clinical Professor Alison Richardson, nurse at University of Southampton, with joint position with University Hospital Southampton NHS Foundation Trust, England. Areas of expertise include nurse-led supportive care interventions for patients and family caregivers to address symptom control during cancer treatment, life after cancer and at the end of life. There were 4 panel members namely:

- Professor Tore Bonsaksen, occupational therapist at University of Inland Norway, Norway. Expertise in mental health and occupational therapy
- Professor Philip Moons, nurse, at the University of Leuven, Belgium and University of Gothenburg. Expertise in cardiovascular nursing and transition of care.
- Professor Emeritus Mona Ringdal, nurse, at University of Gothenburg, Sweden. Expertise in critical care nursing and patient safety.
- Professor Ewa Roos, physiotherapist, at University of Southern Denmark, Denmark. Expertise in musculoskeletal health.

Units of evaluation included occupational therapy, physiotherapy, and nursing.

The panel convened virtually on two occasions, prior to the on-site visit to Linkoping University. At the first virtual meeting general introductions were made. During the second virtual meeting panel members discussed ways of organising the work.

The panel worked as follows:

1) Each unit had a lead assessor who led during interviews, informed by pre interview panel discussions amongst panel members. This person took responsibility, with the chairperson, for preparing a first draft
2) Draft was circulated to panel members for comment and contributions
3) A second draft was produced by the panel chair incorporating comments from the panel.
4) The Chairperson sought approval from the panel to submit to the Research Co-ordinator to check for accuracy.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. Attractiveness of Linköping: High quality staff are essential to achieve high quality research. We **recommend** strategies to increase the attractiveness of LiU to high caliber academics are introduced e.g. relocation packages and research backpacks of significance. In data received collaboration with Region Östergötland was somewhat invisible (e.g external PhD students) making this more visible will increase attractiveness.
2. Time for research: Compared to other universities the allocated time for research for employment categories (associate professor/full professor) is low. This is affecting recruitment and retention. We **recommend** Department/Division/Unit ensure staff with a research allocation use this time productively and where there is under performance there is a process to address this.
3. Recruitment process: This was reported as lengthy in many cases and resulted in losing promising candidates during the process. We **recommend** the LiU/Faculty reconsider the process for recruitment, to speed up the process, and include more involvement of the Department/Division/Unit in the hiring process, especially the selection of preferred candidate.
4. Career development: There is an ad hoc approach to career development for PhD students, early and mid-career researchers. Whilst some PhD students felt they might not be at a point to make career plans as early in their studies, they all reported they would appreciate a more structured approach. Where conversations did occur, this was often too late to have an impact on onward career progression. There was little awareness of the Junior Faculty at LiU, nor did people have a mentor. We **recommend** LiU introduce a mentorship scheme and increase the visibility of Junior Faculty. Divisions/Units should ensure there is a more systematic process to address career planning.
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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division of Nursing and Reproductive Health demonstrates notable strengths in specific research areas, particularly in cardiology, where a strong research group has achieved international visibility and clinical relevance, such as through nurse-led heart failure clinics and studies on self-care. This area exemplifies how the accumulation of critical mass and time dedicated to research leads to high-impact outputs. Similar momentum is being built in paediatric nursing, where a returning scholar has successfully established and grown a research group.

In contrast, other fields within the department, such as midwifery, are still developing their research profiles. The recent appointment of a docent level academic from Stockholm with previous affiliation to the Karolinska Institute and some degree of start-up funding and protected time for research indicates ambition to grow midwifery-related research, but it will take some time to develop, and collaborations built.

From a national and international positioning perspective, certain groups—particularly those affiliated with EU projects—are performing competitively. However, the Division lacks a cohesive and strategic research agenda, and this absence of overarching direction may compromise the Division's ability to maximize relevance and novelty across the board. Research output is uneven, with high-impact publications emerging mostly from the cardiovascular group. Other areas publish in lower-impact channels, raising concerns about consistent research quality across the Division.

In terms of societal impact, certain projects like those in cardiology have clear ties to clinical implementation. However, there is a general perception that impact is undervalued in Sweden, and a strategic focus on articulating and measuring societal relevance is still emerging. Visibility outside academia remains an area for development, particularly in aligning research agendas with healthcare system needs and community engagement.

The future vision and strategy of the Division appear fragmented. While there is appreciation for freedom to pursue individual research interests, this has resulted in siloed groups and a lack of internal coherence. There is minimal effort toward coordinated long-term planning or thematic alignment of research priorities. Some faculty express a desire for more structured collaborations and strategic guidance.

Recommendations

• Develop Division-wide strategic research agenda with thematic priorities aligned to both academic strengths and societal needs in the region and beyond.
• Facilitate internal collaboration between research groups to build interdisciplinary and cross-cutting research clusters. The newer/weaker/smaller groups can learn from the stronger/well-established groups.
• Introduce performance-based incentives for research quality and impact, ensuring time and resources align with research outcomes.
• Invest in emerging areas by providing start-up funding, mentoring, and integration with established research groups, but with clear expectations regarding performance and research output.
• Implement an impact-tracking system to better evaluate and communicate the societal impact of research.
• Regularly review publication metrics and impact to guide strategic decisions and maintain competitiveness.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The Division of Nursing and Reproductive Health exhibits a democratic and inclusive culture, particularly in how research time is allocated. Researchers with PhDs receive research time without performance requirements, reinforcing equality. However, this also weakens performance incentives and strategic prioritization. Junior researchers, while appreciative of their autonomy, report a lack of formal career development structures, including independent mentoring, clear tenure tracks, or structured feedback systems.

Publication strategies vary by group. High-performing teams, such as those in cardiology, target Q1 journals and understand the publishing landscape. Others lack this strategic focus, and many junior researchers find it challenging to publish in high-impact journals. Tools such as ‘Journal finder’ are used sporadically, and discussions about publication strategy not institutionalized.

Recruitment practices show both strengths and constraints. There is a deliberate policy of hiring nurses for research positions, which supports educational alignment but may limit access to broader research talent. Recruitment of new professors is viewed as a priority, with an emphasis on external candidates with strong research profiles. Since PhD students tend to be older (average age 43), the department may be vulnerable in regard to

succession planning. This was amplified by the fact that, previously, PhD prepared nurses and midwives tended to go back to their prior roles in clinic or as teacher, instead of pursuing a research career. Remuneration plays a role here as well, as people working for the healthcare region generally have higher salaries and more research time than academics at the university.

The PhD experience is mixed. While students appreciate broad methodological training and peer support, they report inconsistent availability of supervisors and lack of empowering feedback. Career planning conversations often occur too late, and support for securing postdoctoral opportunities fragmented.

Collaborations are stronger externally than internally. Research groups often align with hospital units or other universities (e.g., Uppsala, Stockholm), but internal seminars and cross-group activities are poorly attended by academic staff. The research culture is thus fragmented, and the Division functions more as an administrative unit than a cohesive academic environment. The fact that the Division is located at two campuses doesn't help.

Recommendations

• Establish a structured mentoring program for junior researchers and postdocs to support career planning and research independence.
• Create publication workshops and internal peer review groups to enhance publication strategy and quality.
• Develop a formalized research career pathway, including promotion criteria, timelines, and expectations.
• Incentivize cross-group collaborations e.g. through seed funding, joint seminars, and interdisciplinary projects.
• Improve supervisor availability standards, possibly through workload balancing or setting expectations on supervisor engagement. This is even more important for supervisors not in the core professors' teams in the Division.
• Introduce early post-doctoral career support packages, such as "research backpacks" that provide funding and travel support.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The organizational structure of the Division of Nursing and Reproductive Health provides autonomy but lacks strategic coordination. The Division is described more as an

administrative umbrella than a cohesive research environment, with a stronger identity emerging from subject-specific groups like cardiology or pediatric nursing. This structure undermines collective strategy and limits opportunities for synergy.

Staffing is unevenly distributed. While the Division boasts a solid foundation of nurse researchers, seniority levels vary across research areas. The ratio of supervisors to PhD students is a concern in some cases, with availability issues exacerbated by the absence of co-located supervisors. There is no systematic mechanism to monitor or manage this balance.

In terms of research vs. teaching, most postdocs and junior faculty split time between both roles. While some appreciate this diversity, others indicate that clear career planning is needed to determine focus. There is no consistent framework guiding these allocations.

Funding is a critical issue. The Division has been successful in securing national grants , and particularly by the strong research groups. However, EU funding remains underexploited, and few researchers report confidence in navigating its complexities. The LiU grants office is highly regarded for EU grants but offers limited support for national applications.

Research infrastructure and support functions are partially developed. While the innovation office is rated positively, its services are underutilized. Support for legal and data transfer agreements is improving, but gaps remain—particularly for PhD students navigating compliance with regulations. Researchers note that centralized support is inadequate for the increasing complexity of international collaborations and clinical trials.

The university's support for collaboration with region/hospitals is insufficient, with central teams lacking the capacity to facilitate clinical research. While researchers are willing to fund these services, the lack of organizational bandwidth is a major barrier to translational research.

Recommendations

• Restructure internal organization to promote strategic coordination across research areas and reduce fragmentation.
• Monitor supervisor-to-student ratios and establish guidelines to ensure effective mentorship and workload distribution.
• Create clearer role definitions for teaching vs. research duties, with career planning tied to these tracks.
• Expand grants office services to better support national applications and mentor early-career researchers in grant writing.
• Provide centralized EU compliance support for research contracts, data sharing, and reporting requirements.

• Invest in research infrastructure liaison services to facilitate collaboration with hospitals and external partners.
• Explore additional or alternative institutional support mechanisms such as internal seed grants or pilot funding to help groups reach external funding readiness. Rethinking the distribution of available research money to performance-based, or collaborative efforts, rather than individual professional development.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The leadership and governance is more focused on operational issues and controlling processes, than on strategic leadership with long-term planning and research vision. This is amplified by the complex organizational structure, with multiple layers of decision-making and scattered responsibilities and no identifiable **overall** leader for research for the Division.

The Division lacks a strong internal identity as a research unit. Most researchers identify more with external networks or clinical specialties than with the Division itself. This limits shared ownership and pride in achievements and reduces opportunities for internal synergy.

Opportunities to leverage the Division's clinical integration for innovation and societal outreach are underutilized. Fostering a stronger collaboration with healthcare providers and stakeholders by the less established groups could enhance translational research and visibility.

Panel N Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

Report prepared by Panel N. Panel chairperson was Clinical Professor Alison Richardson, nurse at University of Southampton, with joint position with University Hospital Southampton NHS Foundation Trust, England. Areas of expertise include nurse-led supportive care interventions for patients and family caregivers to address symptom control during cancer treatment, life after cancer and at the end of life. There were 4 panel members namely:

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Units of evaluation included occupational therapy, physiotherapy, and nursing.

The panel convened virtually on two occasions, prior to the on-site visit to Linkoping University. At the first virtual meeting general introductions were made. During the second virtual meeting panel members discussed ways of organising the work.

The panel worked as follows:

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General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Physiotherapy unit is nationally competitive with international leaders in musculoskeletal research, particularly in the areas of sports injury prevention and musculoskeletal health. What makes the unit stand out is their ability to attract large amounts of external funding and conduct impactful clinical research despite a heavy teaching load.

Physiotherapy is an education heavy unit (all academic staff involved with teaching in bachelor and master programs) with between 5-25% time for research within positions funded via faculty (direct government grants). The majority of research funding in the unit comes from external grants, between 55-65% of total research income during 2020-2023. Researchers in Physiotherapy have been successful in attracting external grants from major national funders (prioritized excellent grants), 5 PIs have had repeated grants from the Swedish Research Council, and individual PIs hold grants from the Swedish Research Council for Health, Working Life and Welfare.

The quality of the research output is excellent and includes reports of RCTs published in the top journals in the field. Likewise, impact outside academia is excellent, and examples include implementation of sport injury prevention programs in elite and recreational level sports clubs, and for others in cooperation with Friskis & Svettis. Best practice models of back pain care have been implemented in clinical practice in Sweden and Finland showing improved quality of care. These are integrated in national systems for administration and following up of future outcomes of the models of care.

The unit is innovative with regards to getting funding for, and leading a national network in, musculoskeletal research – an initiative likely to strengthen LiU's role as a national leader in this area.

The seniors meet twice every semester for strategic discussions about research topics, grants etc. The strong research groups, who have already established important international networks, discuss the possibility of going for larger (EU) grants in the future, something that could serve as a platform to increase coherence amongst the quite fragmented research of the many smaller groups working in prevention and treatment of injuries and symptoms related to the whole musculoskeletal field (such as neck, back, shoulder, knee, osteoarthritis, pain).

Recommendations

- Keep your focus on the strong musculoskeletal research areas to increase the likelihood of being successful at a European/international funding level.
- Explore if finding synergies and aligning your smaller research groups with the larger groups within the musculoskeletal field could further strengthen your profile.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The unit of Physiotherapy understands the value of good publication strategy but has some room for improvement in choice of journals and increasing international collaborations. They welcome the university recommendation to lower the number of required publications in a PhD which potentially could allow for more impactful secondary publications from their many RCTs.

To balance the needs serving the bachelor- and master programs in the broad subject of Physiotherapy, researcher positions in areas other than musculoskeletal health have been advertised. Unfortunately, there were no senior applicants, and these positions are therefore held by junior researchers who seem to be struggling to establish themselves in their respective research areas. Resources at unit level have been used to allocate more research time to allow more time for grant writing, setting up collaborations etc. Despite these efforts, some junior researchers express a lack of leadership from the unit of Physiotherapy in terms of research strategy and career planning, which seems to be most problematic for those without a strong collaboration with an external research group in their field of interest, typically positioned in Region Östergötland.

PhD-students, with many being externally employed by Region Östergötland and combining clinical work with half-time PhD studies, express satisfaction with this arrangement and foresee continuing their employment in the Region after their PhD-defense. These were not visible in the data we received nor on the University website. It seems the Region is more generous in terms of time and conditions for research compared to LiU which may impact the ability to foster mid-career researchers and keep faculty at LiU. Ultimately, this "competition" for health researchers between the Region and LiU may compromise the unit's potential to service education in the broad subject of Physiotherapy and stay relevant as the hub for research.

Recommendations

- Consider long-term future recruitment strategies and investing in junior researchers and PhD students to maintain /recruit faculty. Such investments include (but are not limited to) career planning, support with identifying areas of research aligning with the unit's research strategy, and grant writing skills.
- Joint appointments (LiU and Region Östergötland) could help attract faculty and balance the successful focus on the musculoskeletal area against the need for research in other areas (examples include cardiovascular and women's health) important to service the broad spectrum of education in Physiotherapy.
- Consider ways to improve internationalization. Joint degrees from two universities, with primary supervisor from LiU and where the PhD student spends 6 months with a co-supervisor at a university abroad (or the other way around), could help increase and visualize the many benefits from internationalization in a cost-effective way. Short goal-based visits to (and from) international researchers could enable international exposure, foster new ideas and new collaborations for junior researchers.

Conditions for Research

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Overall, the approach in the unit for Physiotherapy is to approach problems as challenges. As their capacity for problem solving seems high, not many concerns were observed with regards to conditions for research. One barrier expressed related to collaboration with Region Östergötland. It was perceived that the collaboration would benefit from more overarching agreements between LiU and the Region to facilitate access to patients and minimize administration of existing collaborations including collaboration agreements for individual projects.

Recommendations

- Consider if the research output from studies applying the motion analysis system (which exists but requires a dedicated technician for use and analyses of the raw output) is worth the investment in a dedicated technician.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The unit for Physiotherapy has the drive, focus, professionalism and critical mass needed to build on their already excellent research to become successful, with international funders. They are already well on their way to positioning themselves and LiU as a national leader in the musculoskeletal area, an area responsible for direct and indirect societal costs

corresponding to about 2% of the GDP in most western countries. The musculoskeletal area is globally under-researched, but its importance is increasingly recognized, creating a huge potential for obtaining large national and international funds for well positioned research groups.

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The occupational therapy unit is the smallest in the Division, with a total of 18 employees. Their research is organized into four different research profiles or groups, which are well aligned with the professional education program and with recent and emerging research priorities in society. One group target pedagogical approaches and skills training in the education program, which is also considered a relevant research initiative. Three of the four groups link with the LiU strategic area of e-Health, while the fourth links with the strategic area of interprofessional education and collaborative practice. Making the links to the LiU strategic areas clearer, and possibly stronger, may strengthen the unit's position in the LiU internal processes related to distribution of internal funds and resources. The unit is deservedly proud of its research activity and accomplishments, and in our assessment has progressed well since its inception.

Practically all of the research output from the unit is presented as research articles (58 between 2020 and 2022). While the output volume is good, only a small fraction of the articles published are in high-ranking journals. The unit may increase the reach and impact of their publications if they obtain a more productive balance between serving their own interests as an ambitious research unit and serving the occupational therapy community. Looking after the unit's academic self-interests may be done by ensuring increased quality and high potential impact of each submitted article, with less focus on publishing in profession-specific journals and on increasing the number of articles submitted for publication. At all levels in the unit, from PhD students to professor, the publishing credo appears to have evolved from "get published" to "aim high and impact on society", which the panel wholeheartedly support.

The research unit has had a marked impact outside the academic arena, notably by participation in expert panels and national guideline development, and the implementation of assessment tools to improve work environments and rehabilitation processes. However, such broader impacts of the unit's research are not tracked and therefore potentially not fully appreciated by LiU. We encourage the unit to strive for and document such broader impacts of their research, and to highlight them in their future grant applications.

The unit's strategies include intervention research related to both medical and vocational rehabilitation, and on the implementation of interventions in a variety of populations served by occupational therapists. The panel supports these strategies, as well as the use of multiple and combined methodologies and continued work to engage with diverse research partners and stakeholders in the practice field. However, the unit may reconsider the strategy related to 'basic science' research in

occupational therapy, given society's need for interprofessional perspectives and methods to solve its problems. In the context of research, an inward-looking focus on the occupational therapy profession itself and its theoretical perspectives may be counterproductive for its growth and prosperity.

Recommendations

- Set more ambitious goals for the unit.
- Worry less about profession-specific research questions and maintain focus on pertinent problems for people, health care and broader society where your research can have an impact.
- Make deliberate decisions on which research questions you are well positioned to investigate, and the kinds of projects where you will have the best chances to succeed with grant applications and high-level publications. Know what your unique selling points are and maintain focus on these.
- Plan for moving on to clinical research (RCTs) to examine effects of interventions that you develop.
- Pursue collaboration with people and organizations that can help you move in the direction of clinical research and implementation – healthcare services and administration, patients and their organizations, academics and their organizations.
- Ensure that local and national authorities, who may not read research articles, are made aware of and given access to your research results by providing more accessible reports to these groups.
- Develop a communication plan.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Despite its small size, researchers in the unit have been successful in obtaining excellent research grants. Success factors appear to be the ability to remain thematically focused and ensure that new applications build from the results of earlier projects and that established and new collaborative partners are well nurtured. However, their ambition is to have more projects owned by the unit, rather than acting as collaborators. Currently, the unit's researchers are mainly involved as partners in projects led by other universities. This is tricky because as time goes into

these projects led by others, less time is available for writing their own proposals. While the panel appreciates the need for a step-by-step approach to research development in any unit, with collaborative partner roles representing the first steps, we support the ambition of taking on the lead role in future projects. This would logically translate into more PhD students and postdocs taking the research at the unit further, while also attracting more external researchers. Succeeding with this ambition would depend on consistently prioritizing project development among the unit's researchers and not spreading out its resources over many different projects.

The surrounding municipalities and the county council have a strong interest in the unit's work, especially since the perspective of the end-user is explicitly considered in the research plans. The group has got many contacts with and exposure to the clinical context, and this has been important for their success in obtaining funding for interprofessional applications. With a view to research calls, the unit's success rate in responding to general calls has been lower compared to what it has been with dedicated calls. Therefore, it will be important to keep an eye on special calls, and to work with funders launching such calls.

Given that the unit has been establishing itself collaboration within the unit appears to be both easy and necessary. Over the last few years, the group of senior researchers has expanded rapidly. While this is indicative of the unit's positive development, it also indicates that this group of senior researchers are relatively new. The panel appreciates that junior researchers are given opportunities to participate in projects initiated by those with more seniority, but it appears that mentoring and others means of deliberately helping the career planning of junior researchers are not always systematized and productive The panel emphasizes that seniors assisting juniors in their development is also necessary for securing the long-term development of the research environment at the collective level.

The one full professor in the unit is deputy head of Department, hence she has little time for research. Having people serving in leadership roles can represent opportunities, e.g. for bringing researchers together across units in the organization. However, the panel notes that people serving in leadership roles are not replaced in the research unit. Moreover, the use of sabbatical is not common, although very much needed in order for people to re-engage with the professional and research community after completing a term of office in significant leadership roles. Securing good leadership without it negatively affecting the opportunities and continuity of the research units appears to be a challenge across the organization.

There is some international collaboration in article production (33% of articles), but to a lower degree than desired. Given the higher citation metrics for articles that have international co-authors, having international co-authors on more publications is a logical strategic decision that the panel supports. However, developing projects and writing grant applications with international partners (e.g., EU projects) would very much strengthen the unit in this respect. One of the unit's postdocs has visited thethe UK for some weeks funded by Erasmus. But there are no international students or collaborators in any capacity currently at the unit. The unit has previous experience with having a guest professor but has no current plans. While the panel appreciates that funding may be a major hindrance, we encourage the unit to look for diverse ways of increasing their international appeal and engagement.

PhD students enjoy a good atmosphere at the unit and appreciate the interdisciplinary focus of the learning opportunities provided in the PhD education program. However, LiU-employed PhD students would prefer to have a clearer view of possible career pathways in front of them. Some would prefer having a joint position, including clinical, teaching and research work combined, but such positions are currently open only for medical doctors. There is a risk of the university not retaining those who recently completed a PhD and losing them entirely to practice.

Recommendations

- Develop grant proposals where the unit takes a leadership role.
- Maintain focus on the strategic areas for the unit, and avoid spreading out the resources over a range of smaller projects.
- Develop and maintain good relationships with the practice field, have open discussions with all stakeholders about how projects can be shaped to attend to their interests.
- Establish a system for mentoring junior researchers, also in the interest of succession planning.
- Increase international collaboration, on articles, grant applications, exchange opportunities and guest researchers.
- Advocate for possibilities for joint positions for new PhD candidates
- Establish a policy for sabbaticals, specifically when term of office in leadership positions finish

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The panel senses mixed feelings about the unit's location in Norrköping. Assets are the networks within this campus and the appealing physical and social environments, including the opportunities linked with the Clinicum as a potential activity lab to be used in research. However, most of the research infrastructure is based in Linköping, and support is stronger for the medical departments. There are support functions related to statistics, trial development, data management, protocols, etc. located in the region (e.g., Forum Östergötland), but they are not well used due to their cost and questionable tailoring to the specific needs of the occupational therapy unit. It can be difficult to identify which support functions are available where. People tend to rely on their own personal contacts for locating relevant support functions, which can seriously hamper the research development of the unit.

More support from the communications office is desired. Changes to the unit's websites can take a significant amount of time, and communications support should also include other ways of engaging with the media and the public (e.g., press releases) to assist with dissemination. Similarly, better legal support is needed for

e.g. international contracts and agreements. Some of the problems in accessing these services may relate to the physical distance and lack of informal social relations between the researchers in the unit (Norrköping) and the services that are mainly located in Linköping.

Recommendations

- The unit will benefit from better access to tailored support functions, including support related to statistics, legal issues, and research communication.
- The Division should explore developing competitive seed funding calls to support the development of new research activity and help researchers initiate project development pending external funding.
- Explore whether currently available facilities, such as the Clinicum, can be an asset in future research projects.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The occupational therapy unit is still in the process of establishing itself nationally and internationally but has impactful research ongoing in important strategic areas. They have developed rapidly over the last few years with staff being promoted to senior positions and an increasing number of projects receiving external grants. To promote the unit's further development and success, the panel's overall recommendations are that the unit works with the Division improve mentoring and career pathways for junior researchers. Moreover, the unit should maintain a focus of research that has a problem-solving impact in society, increase international collaboration at all stages of research (from project planning to publications), and drive ambitions for grant applications, as well as publications, to a higher level.

Panel O Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of five members from a variety of academic and professional backgrounds, each bringing unique expertise to the evaluation process. Per Morten Sandset, Vice Rector and Professor at the University of Oslo, Norway, specializing in thrombosis and hemostasis research. Alistair Young, Professor of Cardiovascular Data Analytics and Artificial Intelligence at King's College London, UK, focuses on cardiac imaging and AI. Leif Østergaard, Professor at Aarhus University, Denmark, is renowned for his contributions to neuroscience and medical imaging. Simon Griffin, Professor of General Practice at the University of Cambridge, UK, focuses on public health and chronic disease prevention. Jan Borén, Professor at the University of Gothenburg, Sweden, is an expert in lipid metabolism and cardiovascular disease and chaired the panel.

The panel met for a joint briefing on 14 or 15 February and held a separate Zoom meeting on 17 February. Prior to the site visit to Linköping, the panel reviewed the documentation, made preliminary assessments and formulated interview questions. On the first day of the visit, the panel discussed the four units to be evaluated and appointed a first reader to coordinate the interviews for each unit. Over two days, the panel conducted interviews with two units each day. The last day was devoted to discussions and the preparation of reports based on the findings. On 31 March, the panel discussed the draft reports and made final edits to the text.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Enhancing Research and Internationalization at LiU

The Panel acknowledges the limited state funding for Linköping University (LiU) and the ALF grants for the Region Östergötland, and emphasises the need for cooperation and a shared vision for the use of resources. In order to maximise impact, the Panel recommends prioritising support for state-of-the-art infrastructure such as the Center for Medical Image Science and Visualisation (CMIV), which is crucial for many research groups in both the Region Östergötland and LiU and nationally. Support for prioritised infrastructure should include both adequate staffing and specialised expertise to ensure wide accessibility and continued development of cutting-edge research techniques. The panel also recommends prioritising the next generation of researchers and supporting internationalisation. In order to raise LiU's international profile, the Panel suggests the implementation of a visiting professorship programme (20% positions) to expand international networks and enrich the academic environment. By focusing on these recommendations, LiU and the Region Östergötland can strengthen their research capabilities, and raise their international standing in the academic community.

Enhancing Interdisciplinary Collaboration in Research

While all units emphasise a strong tradition of inter/trans-disciplinary collaboration, the panel considers that this is most clearly demonstrated in the case of CMIV. There is significant potential synergy to be gained by fostering true interdisciplinary collaboration, not only between clinical and basic science researchers, but also by involving experts in technology, artificial intelligence and the social sciences. This broader approach to collaboration could lead to more innovative research outcomes, cross-fertilisation of ideas and a more holistic understanding of complex scientific challenges. By actively encouraging and facilitating these diverse partnerships, LiU can create a more dynamic and productive research environment, better equipped to address the multifaceted problems of today's rapidly evolving scientific landscape.

Optimizing Organizational Frameworks for Research Excellence

The Panel feels that the current organisational structure of the university, faculties and departments does not optimally support research. Researchers in the evaluated units often feel a lack of cohesion within their groups and the division is not perceived to be based on research focus and collaboration. For some Units of Evaluation researchers with different interests, methods and geographical locations who had not previously collaborated (or in some cases not even met) were grouped together. Nevertheless, effective collaborations have developed largely through the efforts of individuals. The panel also notes a significant lack of strategic work at the evaluated level. LiU should conduct an unbiased review of alternative organizational structures, emphasizing research priorities and collaborative efforts. The current structure is seen as more conducive to teaching than to research. The role of the current faculty and its functional units in research is questioned and whether this level is necessary. Departments are perceived as too large to be actively involved in developing and revising research strategies. . A relatively small University such as Linköping could potentially be more agile, flexible and responsive than its larger competitors. This does not appear to be the case.

To improve this situation, the university should consider restructuring its organisational framework to better align with research strategies and more effectively foster collaboration. This could include the creation of smaller, more focused research units or centres that bring together researchers with similar and complementary strategies and expertise. This could also include development of core infrastructure and expertise in, for example, study/trial coordination, data management and statistics to support research groups. Funding for access to such infrastructure could be incorporated into all research grant applications. The Panel also recommends that the university should implement a more robust strategic planning process at all levels to ensure that research goals are clearly defined and supported. By prioritising research-focused organisational structures and encouraging interdisciplinary collaboration, the University can create an environment more conducive to high quality research and innovation.

Enhancing Administrative Support to Foster Academic Excellence

The Panel has identified a significant lack of administrative support, resulting in researchers and teachers spending considerable time on administrative tasks rather than focusing on their core tasks. Improving administrative support systems is essential to address this issue. Many researchers and teachers report uncertainty about where to turn for various matters, highlighting the need for a streamlined 'single point of entry' approach embedded or specific to each research unit. This would simplify communication and collaboration within the organisation, ultimately improving efficiency and allowing academic staff to devote more time to research and teaching.

Enhancing Collaboration between Region Östergötland and LiU

Collaboration between the Region Östergötland and LiU needs to be significantly improved in order to eliminate existing inefficiencies and create a seamless partnership that efficiently promotes research and educational activities. Currently, researchers navigate two parallel

systems that often operate independently or in conflict with each other, leading to delays and unnecessary duplication of effort. We understand that obtaining the legal, governance and ethical agreements prior to the onset of a study could take up to two years. To improve this situation, a clear objective should be established to integrate robust research support and streamline administrative processes. Access to critical infrastructure, such as IT systems, software licences, remote conferencing facilities, staff appointments and patient records, should be based on the nature of the work rather than employment status. This is particularly important for clinical doctoral students, who currently do not receive the same level of support as their full-time counterparts, including access to computer programmes available to university-employed doctoral students. Also, overly restrictive interpretation of GDPR legislation is constraining timely initiation and completion overly restrictive of research projects. By addressing these challenges, both institutions can create an environment conducive to academic excellence and innovation, ultimately benefiting the wider community they serve.

The distribution of Regional research funds exhibits inertia, appears to be based more on bibliometric analysis than potential for population health improvement and may contribute to maintaining or increasing health inequalities nationally. How the Regional funds are distributed within Regions also seems to be similar, year on year, but there is considerable unexplained heterogeneity between Regions. The heterogeneity seems to be accepted with no assessment of whether one model delivers better quality research and health impact than another.

Time Allocation for Clinical PhD Students

Clinical PhD students currently face a challenging situation in which many are allocated only 25% of their paid working time for research, and are expected to devote a further 25% of their personal time. This arrangement, which effectively requires students to work 125% of a full-time schedule, is unsustainable and undermines the attractiveness of research careers for clinicians. To address these issues, it is strongly recommended that doctoral students be offered a more balanced and attractive research training framework. Specifically, a minimum of 50% dedicated research time over the eight-year period should be guaranteed to promote a productive environment conducive to high quality clinical research. This recommendation is in line with common practice in comparable countries, where clinical doctoral students can expect to be fully employed for 3 years with only 20% clinical responsibilities in a supernumerary role, providing a more sustainable and attractive model for aspiring clinical researchers.

The Importance of Gender and Diversity Perspectives and Patient/Participant Involvement

The Panel highlights a critical gap in the active inclusion of gender and diversity perspectives and patient involvement in research - elements that are essential to advancing scientific knowledge and improving health outcomes in diverse populations. Integrating gender perspectives ensures that studies take into account both biological and social aspects, such as sex, gender and ethnicity, leading to more comprehensive and applicable results. This approach can reveal important differences in disease manifestation, treatment effectiveness and healthcare experiences between different demographic groups. At the same time, patient and public involvement (PPI) improves the relevance and quality of studies by incorporating the unique insights, values and expertise of those directly affected by research findings. By involving patients and the public as partners in research, studies can more effectively address real-world needs, refine research design, and increase the likelihood of translating findings into practice. Importantly, these considerations are essential not only in the conduct of research, but also in strategic planning and teaching within academic and health care institutions, ensuring an approach to knowledge generation and dissemination that reflects the diverse needs of society.

Evaluated Unit's Name: **HMV.DISP.IMD Internal Medicine**

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Unit of Internal Medicine (UIM) comprises a somewhat heterogenous clustering of small to medium sized units conducting mostly clinical, but also some preclinical work, in coagulation, endocrinology and diabetes, gastroenterology and hepatology, nephrology, and respiratory diseases and allergy. Some characteristics identified by the panel:

Strengths

- Well established research group in hepatology with increasing activity, funding, and output, and a research group in nephrology doing both experimental and clinical research
- Established collaboration with SciLifeLab with 3 group leaders at LiU – but concern that LiU researchers are not sufficiently involved in the execution of the projects

Weaknesses

- Little collaborative research within the unit and strong opposition to reorganization by one senior scientist - young researchers being more positive and see the potential for future collaborations
- Not doing large randomized clinical trials and questionable user involvement
- Share of publications in Q1 journals is almost par compared to LiU average (46 vs 48%), but publications in level 2 journals are lower that LiU average (12% vs 21%), whereas co-publications with industry is higher than LiU average

Recommendations

- Develop a unified cross-disciplinary plan for support functions, and for development and utilization of clinical and experimental infrastructures
- Aim for larger randomized clinical trials
- Establish a publication strategy with focus on quality rather than quantity
- Develop a unified strategy for maintaining and increasing external funding, including more applications for VR and EU grants

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

There is limited collaboration within the unit and thus questionable added value of being clustered together. One scientist was critical to the current organization and stated that affiliation with the other faculty department (BKV) would have been a more beneficial, whereas other senior scientists and the younger scientists were more enthusiastic and expressed the potential added value of working together.

Strengths:

- Active participation in the CircM strategic research area, promoting quality culture through seminars and retreats
- CMIV collaboration provides access to important infrastructure
- High rate of open access publications (81% compared to LiU average of 76%)

Weaknesses:

- Many support functions are limited or missing; e.g., coordinator functions, laboratory technician (experimental nephrology), statistical support and bioinformatics
- Young and mid-carrier researchers report having difficulty establishing larger funding grants as PI, and concern that eligibility for ALF grants in this region will be limited to individuals with a track record of having national or international grant income, which will reduce the opportunities for mid-career researchers
- Spread of researchers across multiple locations, hindering collegial interactions
- Limited or no interactions among the PhD students
- Clinical PhD students with only 25% time allocated to research with expectations of 25% research in spare time is probably not consistent with labour laws anno 2025

Recommendations

- Consider reorganizing the structure of the unit to promote more collegial interactions and idea exchange, and utilizing key resources, e.g., by joint facilities for PhD students and younger researchers
- Implement strategies to increase senior researcher participation in seminars and research discussions
- Support emerging researchers in establishing independent research, e.g., planning for senior author papers and being PI on larger grants
- Develop a mentoring program to help junior researchers establish and strengthen research collaborations
- Work towards diversity in senior staff positions
- Clinical PhD students should have at least 50% ringfenced research time allocated
- Stimulate/incentivize postdoctoral positions
- Stimulate/incentivize research visits outside Sweden

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Research is performed in the interface between the clinic and laboratory facilities, and is dependent on access to clinical data and health registries as well as laboratory facilities. The unit has access to advanced infrastructure both at LiU through CMIV or nationally through SciLifeLab

Strengths:

- Local laboratory facilities in proximity to clinical facilities

- Access to advanced infrastructure through CMIV and SciLifeLab
- Access to clinical data and registries

Weaknesses:

- Significant barriers between LiU and RÖ with duplicate systems, e.g., procurement system, IT accounts, and support structures
- Limited access to clinical systems, e.g., LiU employees cannot attend clinical meetings or have access to medical record data, mostly due to legal issues
- Limited operational support for research studies, e.g., Forum Östergötland only gives advice on design rather than operational support
- Difficulties with temporary employment, e.g., for coordinators or technicians
- Administrative burden on senior researchers, reducing time for research

Recommendations

- Establishment of a Clinical Trials Unit across the units and beyond Forum Östergötland
- Establish a position for research study support which several groups can contribute to, across the unit
- Give LiU employees access to clinical data/records and clinical meetings, e.g., by small RÖ appoints or other means
- Develop strategies to attract more qualified PhD and postdoc applicants, potentially through international outreach and marketing points of unique advantage
- Streamline administrative processes and improve support services to allow senior researchers more time for research
- Enhance collaboration with RÖ to improve access to clinical research infrastructure and staff
- Enhance administrative support within the unit, with a key admin person identified for unit support
- Enable (bio)-statistical support for Unit researchers

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel would like to express that this was a positive experience and the organisation and support both before and during the site visit was excellent. We hope that our recommendations and assessments will further strengthen LiU. Finally, we appreciate the openness and commitment shown throughout the visit, which allowed for a comprehensive assessment and constructive dialogue.

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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Unit of Cardiovascular Sciences conducts multidisciplinary research focused on preclinical and clinical cardiovascular research, including areas such as cardiology, physiology, cardiothoracic surgery, and vascular surgery. The unit has been engaging in deciding future directions and strategies for developing research in order to enhance key advantages. This included recruitment of a senior researcher in Magnetic Resonance Imaging physics, and a senior researcher in experimental studies. However, there needs to be discussion of how to best enhance existing strengths, rather than to broaden the scope of the unit (which is already very wide).

Strengths:

- Strong interdisciplinary and collaborative research environment, particularly in translational research, with open exchange between research groups, nationally and internationally.
- Leadership in pioneering techniques and interdisciplinary and translational research.
- Successful registry-based studies resulting in high-impact publications
- Excellent access and use of imaging facilities in CMIV.

Weaknesses:

- The unit is very strong in cardiovascular imaging but lacks expertise and support in magnetic resonance imaging physics. Other areas for growth have been discussed internally but an overall strategic direction is lacking.
- Relatively lower percentage (42%) of publications in Q1 journals compared to LiU average (48%)

Recommendations

- Develop a five year plan for strategic directions and appointments, to enhance key strengths in translational research rather than broadening the scope of activities.
- Recruit senior researchers to strengthen key areas of unique advantage, eg in applied MR physics.
- Use this plan to increase efforts to publish in higher-ranked journals to improve overall research impact
- Develop a unified strategy for maintaining and increasing external funding, including more applications for EU grants, in accordance with this five year plan.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic

networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The unit demonstrates a collaborative culture with interdisciplinary work between clinical and preclinical researchers.

Strengths:

- Active participation in CircM strategic research area, promoting quality culture through seminars and retreats
- Internal research support functions including a 50% research coordinator and a research council within the Division.
- High rate of open access publications (87% compared to LiU average of 76%)

Weaknesses:

- Emerging researchers report having difficulty establishing larger funding grants as PI.
- Limited opportunities for senior researchers to participate in seminars and research discussions
- Spread of researchers across multiple locations, hindering collegial interactions
- PhD students find access to information about administration difficult to access
- PhD students find mandatory courses inflexible (either too basic or too theoretical).
- Clinical PhD students are expected to work >100%, and have limited time ring-fenced for research.
- Diversity of staff is different between PhD, emerging researchers, and senior faculty.
- Concern that eligibility for ALF grants in this region will be limited to individuals with a track record of having national or international grant income which will reduce the opportunities for mid-career researchers.

Recommendations

- Support emerging researchers in establishing independent research. For example planning for senior author papers and being PI on larger grants.
- Implement strategies to increase senior researcher participation in seminars and research discussions
- Consider reorganizing the structure of the unit to promote more collegial interactions and idea exchange, utilizing key resources.
- Develop a mentoring program to help junior researchers establish and strengthen research collaborations
- Develop resources for PhD students to access key information
- Advocate for more flexibility in mandatory PhD courses.
- Work towards diversity in senior staff positions.
- Clinical PhD students should have at least 50% ringfenced research time allocated.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The Unit has access to excellent research infrastructure. However, funding models for these resources (CMIV and zebrafish facility) are different from most of the research facilities in the University.

Strengths:

- Access to advanced infrastructure through CMIV
- Strong connections to quality registries and SCAPIS, facilitating big data studies

Weaknesses:

- CMIV is funded mainly through user charges, and overheads or core funding does not support the core facility.
- There are significant barriers between Region Östergötland (RÖ) and University support structures for researchers. For example, University employees cannot attend clinical meetings or have access to medical data.
- There is very limited operational support for research studies. Forum Östergötland only gives advice on design rather than operational support.
- Researchers say it difficult to establish research coordinator roles on University grants to support studies. These are needed for study operation, particularly with trials.
- Administrative burden on senior researchers, reducing time for research.

Recommendations

- CMIV should be supported through overheads as a core University facility.
- Support development of a Clinical Trials Unit beyond Forum Östergötland.
- Establish a position for research study support which several groups can contribute to, across the unit.
- Give University employees small Region Östergötland appointments to enable access to data and clinical meetings.
- Develop strategies to attract more qualified PhD and postdoc applicants, potentially through international outreach and marketing points of unique advantage.
- Streamline administrative processes and improve support services to allow senior researchers more time for research
- Enhance collaboration with Region Östergötland (RÖ) to improve access to clinical research infrastructure and staff.
- Work with university leadership to address the issue of taxable membership fees for professional organizations
- Enhance administrative support within the unit, with a key admin person identified for unit support.
- Enable statistical support for Unit researchers.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Overall, the Unit of Cardiovascular Sciences demonstrates strong potential in clinically relevant research areas. To enhance its research quality and impact, the unit should focus on strengthening key areas of unique advantage, particularly in translational research, fostering more international collaborations, and addressing the administrative and funding challenges that currently hinder optimal research performance.

- The unit's research aligns well with clinical practice, but there is a need for more strategic discussion and alignment to complement clinical studies.
- The current organizational structure of the medical faculty departments may be hindering optimal resource allocation and decision-making.
- There appears to be a disconnect between the unit's needs and the support provided by the university, particularly in areas like administrative support and study operational support.

The panel would like to express that this was a positive experience and the organisation and support both before and during the site visit was excellent. We hope that our recommendations and assessments will further strengthen LiU. Finally, we appreciate the openness and commitment shown throughout the visit, which allowed for a comprehensive assessment and constructive dialogue.

Panel O Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of five members from a variety of academic and professional backgrounds, each bringing unique expertise to the evaluation process. Per Morten Sandset, Vice Rector and Professor at the University of Oslo, Norway, specializing in thrombosis and hemostasis research. Alistair Young, Professor of Cardiovascular Data Analytics and Artificial Intelligence at King's College London, UK, focuses on cardiac imaging and AI. Leif Østergaard, Professor at Aarhus University, Denmark, is renowned for his contributions to neuroscience and medical imaging. Simon Griffin, Professor of General Practice at the University of Cambridge, UK, focuses on public health and chronic disease prevention. Jan Borén, Professor at the University of Gothenburg, Sweden, is an expert in lipid metabolism and cardiovascular disease and chaired the panel.

The panel met for a joint briefing on 14 or 15 February and held a separate Zoom meeting on 17 February. Prior to the site visit to Linköping, the panel reviewed the documentation, made preliminary assessments and formulated interview questions. On the first day of the visit, the panel discussed the four units to be evaluated and appointed a first reader to coordinate the interviews for each unit. Over two days, the panel conducted interviews with two units each day. The last day was devoted to discussions and the preparation of reports based on the findings. On 31 March, the panel discussed the draft reports and made final edits to the text.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Enhancing Research and Internationalization at LiU

The Panel acknowledges the limited state funding for Linköping University (LiU) and the ALF grants for the Region Östergötland, and emphasises the need for cooperation and a shared vision for the use of resources. In order to maximise impact, the Panel recommends prioritising support for state-of-the-art infrastructure such as the Center for Medical Image Science and Visualisation (CMIV), which is crucial for many research groups in both the Region Östergötland and LiU and nationally. Support for prioritised infrastructure should include both adequate staffing and specialised expertise to ensure wide accessibility and continued development of cutting-edge research techniques. The panel also recommends prioritising the next generation of researchers and supporting internationalisation. In order to raise LiU's international profile, the Panel suggests the implementation of a visiting professorship programme (20% positions) to expand international networks and enrich the academic environment. By focusing on these recommendations, LiU and the Region Östergötland can strengthen their research capabilities, and raise their international standing in the academic community.

Enhancing Interdisciplinary Collaboration in Research

While all units emphasise a strong tradition of inter/trans-disciplinary collaboration, the panel considers that this is most clearly demonstrated in the case of CMIV. There is significant potential synergy to be gained by fostering true interdisciplinary collaboration, not only between clinical and basic science researchers, but also by involving experts in technology, artificial intelligence and the social sciences. This broader approach to collaboration could lead to more innovative research outcomes, cross-fertilisation of ideas and a more holistic understanding of complex scientific challenges. By actively encouraging and facilitating these diverse partnerships, LiU can create a more dynamic and productive research environment, better equipped to address the multifaceted problems of today's rapidly evolving scientific landscape.

Optimizing Organizational Frameworks for Research Excellence

The Panel feels that the current organisational structure of the university, faculties and departments does not optimally support research. Researchers in the evaluated units often feel a lack of cohesion within their groups and the division is not perceived to be based on research focus and collaboration. For some Units of Evaluation researchers with different interests, methods and geographical locations who had not previously collaborated (or in some cases not even met) were grouped together. Nevertheless, effective collaborations have developed largely through the efforts of individuals. The panel also notes a significant lack of strategic work at the evaluated level. LiU should conduct an unbiased review of alternative organizational structures, emphasizing research priorities and collaborative efforts. The current structure is seen as more conducive to teaching than to research. The role of the current faculty and its functional units in research is questioned and whether this level is necessary. Departments are perceived as too large to be actively involved in developing and revising research strategies. . A relatively small University such as Linköping could potentially be more agile, flexible and responsive than its larger competitors. This does not appear to be the case.

To improve this situation, the university should consider restructuring its organisational framework to better align with research strategies and more effectively foster collaboration. This could include the creation of smaller, more focused research units or centres that bring together researchers with similar and complementary strategies and expertise. This could also include development of core infrastructure and expertise in, for example, study/trial coordination, data management and statistics to support research groups. Funding for access to such infrastructure could be incorporated into all research grant applications. The Panel also recommends that the university should implement a more robust strategic planning process at all levels to ensure that research goals are clearly defined and supported. By prioritising research-focused organisational structures and encouraging interdisciplinary collaboration, the University can create an environment more conducive to high quality research and innovation.

Enhancing Administrative Support to Foster Academic Excellence

The Panel has identified a significant lack of administrative support, resulting in researchers and teachers spending considerable time on administrative tasks rather than focusing on their core tasks. Improving administrative support systems is essential to address this issue. Many researchers and teachers report uncertainty about where to turn for various matters, highlighting the need for a streamlined 'single point of entry' approach embedded or specific to each research unit. This would simplify communication and collaboration within the organisation, ultimately improving efficiency and allowing academic staff to devote more time to research and teaching.

Enhancing Collaboration between Region Östergötland and LiU

Collaboration between the Region Östergötland and LiU needs to be significantly improved in order to eliminate existing inefficiencies and create a seamless partnership that efficiently promotes

research and educational activities. Currently, researchers navigate two parallel systems that often operate independently or in conflict with each other, leading to delays and unnecessary duplication of effort. We understand that obtaining the legal, governance and ethical agreements prior to the onset of a study could take up to two years. To improve this situation, a clear objective should be established to integrate robust research support and streamline administrative processes. Access to critical infrastructure, such as IT systems, software licences, remote conferencing facilities, staff appointments and patient records, should be based on the nature of the work rather than employment status. This is particularly important for clinical doctoral students, who currently do not receive the same level of support as their full-time counterparts, including access to computer programmes available to university-employed doctoral students. Also, overly restrictive interpretation of GDPR legislation is constraining timely initiation and completion overly restrictive of research projects. By addressing these challenges, both institutions can create an environment conducive to academic excellence and innovation, ultimately benefiting the wider community they serve.

The distribution of Regional research funds exhibits inertia, appears to be based more on bibliometric analysis than potential for population health improvement and may contribute to maintaining or increasing health inequalities nationally. How the Regional funds are distributed within Regions also seems to be similar, year on year, but there is considerable unexplained heterogeneity between Regions. The heterogeneity seems to be accepted with no assessment of whether one model delivers better quality research and health impact than another.

Time Allocation for Clinical PhD Students

Clinical PhD students currently face a challenging situation in which many are allocated only 25% of their paid working time for research, and are expected to devote a further 25% of their personal time. This arrangement, which effectively requires students to work 125% of a full-time schedule, is unsustainable and undermines the attractiveness of research careers for clinicians. To address these issues, it is strongly recommended that doctoral students be offered a more balanced and attractive research training framework. Specifically, a minimum of 50% dedicated research time over the eight-year period should be guaranteed to promote a productive environment conducive to high quality clinical research. This recommendation is in line with common practice in comparable countries, where clinical doctoral students can expect to be fully employed for 3 years with only 20% clinical responsibilities in a supernumerary role, providing a more sustainable and attractive model for aspiring clinical researchers.

The Importance of Gender and Diversity Perspectives and Patient/Participant Involvement

The Panel highlights a critical gap in the active inclusion of gender and diversity perspectives and patient involvement in research - elements that are essential to advancing scientific knowledge and improving health outcomes in diverse populations. Integrating gender perspectives ensures that studies take into account both biological and social aspects, such as sex, gender and ethnicity, leading to more comprehensive and applicable results. This approach can reveal important differences in disease manifestation, treatment effectiveness and healthcare experiences between different demographic groups. At the same time, patient and public involvement (PPI) improves the relevance and quality of studies by incorporating the unique insights, values and expertise of those directly affected by research findings. By involving patients and the public as partners in research, studies can more effectively address real-world needs, refine research design, and increase the likelihood of translating findings into practice. Importantly, these considerations are essential not only in the conduct of research, but also in strategic planning and teaching within academic and health care institutions, ensuring an approach to knowledge generation and dissemination that reflects the diverse needs of society.

Research and the Research Quality

The Linköping University (LiU) Unit of Radiological Sciences (RAD) research areas include clinical radiology and imaging (MRI, CT), radiation physics (including radiation protection), environmental radioactivity, and image science. In addition to the Department of Radiology at the University Hospital in Linköping, RAD collaborates closely with The Center for Medical Image Science and Visualization (CMIV), which was established by LiU, the Östergötland Region (RÖ), and private company Sectra AB to drive novel research in medical imaging, host cutting-edge imaging infrastructure – and unite academia, healthcare, and industry under one roof.

Relevance and Novelty of Research Topics

The visionary investment in CMIV has helped the evaluation unit to start realizing the potential of interdisciplinary research collaborations in advancing radiological sciences by bridging medicine, engineering, biology, physics, and computer science, including

- Pioneering advances in radiology, including multiparametric, quantitative MRI techniques, low-dose cardiac CT, dual-energy CT scanning techniques, and pioneering photon-counting CT technology.
- Exploiting technological advances in strong, clinical research collaborations across several organ systems (brain, heart, liver) with local specialists.
- Positioning itself at the forefront of emerging research areas, including the applications of AI and Federated Learning to imaging data (radiology, pathology), -omics data, and other health data towards personalized medicine.

The focus of the Health Physics and Environmental Radioactive research group is unusual among radiological research institutions but characterized by world-leading research that attracts significant funding.

Taken together, the evaluations unit's access to state-of-the-art technology and (functional) imaging approach to study human disease are highly relevant and indeed essential to stay relevant and competitive in radiological research and clinically oriented technical and biomedical research more broadly.

Quality and impact of Research Output

The unit is characterized by

- Strong research output in volume and impact. Unit scientists publish regularly in leading journals within radiology, medical physics, and related fields and their involvement in major studies (e.g. contributions to the SCAPIS cardiac imaging project and others) has resulted in high-profile publications.
- Tight integration between academic research and clinical application. Imaging innovations have moved directly into healthcare practice locally and internationally thanks to the units interdisciplinary and technology driven research and industrial partnerships.
- Contributions to policy-making and societal initiatives. For example, the environmental radiation research team plays an important advisory role in Sweden's national radiation safety efforts.

Strategies, Priorities, and Future Research Plans

Advancing Data-Driven Imaging and AI: Building on the unit's strengths in advanced imaging and exploiting data-driven research and artificial intelligence, the team will

- validate AI tools for radiology, including algorithms for image analysis, diagnostic decision support, and workflow optimization.
- employ multimodal/dimensional data integration to combine radiology images with pathology slides, genetic data, and electronic health records to enable precision diagnostics.

Essential to this ambition are the AIDA data hub, high-performance computing resources (e.g. the Berzelius supercomputer) and the implementation of Federated Learning platforms. The latter is critical for GDPR-compliant training of AI models on large patient databases with international collaborators - and thus to overcome the limited generalizability of AI-models thus far.

Strengthening Research Infrastructure: The self-evaluation highlights the need for significant investments to maintain CMIVs attractiveness and performance as a leading national/international imaging center. Concretely, this means

- hiring more technical staff to assist researchers, including MRI/CT technologists, MR engineers and data analysts.
- Upgrading equipment to stay at the cutting edge and accommodate ambitious projects in the future.

Recruitment and Talent Development: the unit has identified a need for

- a full professor in MRI physics to provide leadership and advanced mentorship in that domain.
- joint appointment (with the hospital) of a senior lecturer/professor in radiography to strengthen radiography as an academic field and support advanced training and research in imaging technology and patient care.

Enhancing Clinical-Academic Integration: Shared clinical-research positions and the 'student-to-docent' initiative is mentioned as having improved this integration and strong clinical research. It is also clear that clinical work load and the need to prioritize patient care threatens this integration: The need to prioritize research over free-time and family-time to achieve the goal of 75% clinical work and 50% research time over 8 years clearly makes research careers unattractive for many MDs.

Recommendations

To further increase the quality and impact of its research, evaluation unit could

- exploit its multidisciplinary profile to a greater extent by making sure that researchers from different disciplines collaborate more closely when writing grant applications and manuscripts in order to simultaneously address (i) critical biological/clinical questions with major health implications, (ii) cutting-edge imaging methods, and (iii) advanced analytics, multimodal data integration and -visualization, whether they target a technical or biological audience.
- leverage its unique infrastructure to spearhead and engage in more clinical trials and multi-center studies, which are typically well-cited.

Research Culture

Recruitment, Opportunities for Early-Career Researchers to Develop Their Originality and Independence

Strengths:

- Good PhD and Postdoc Pipeline: The units recruit and train early-career researchers, including doctoral students, postdocs, and junior faculty. There is a balance between internal recruitment (from LiU) and external hires to bring fresh perspectives.
- Mentorship and Research Schools: CMIV runs a research school that supports PhD students with structured mentorship, workshops, and research retreats, fostering both academic independence and interdisciplinary collaboration.
- Postdocs and junior faculty can apply for early-career grants and participate in leadership training to develop independence.

Weaknesses

- Medical doctors start their research careers late and their clinical workload is not conducive to a research career.
- Some early-career researchers write grant applications that are submitted by more senior researchers for be competitive (applicants' CV). This limits their development as independent researchers.

Quality of the PhD Training

Strengths:

- Structured Training and Research Schools: PhD students participate in the CMIV Research School, where they receive methodological training, interdisciplinary exposure, and mentoring from senior researchers.
- Translational and Applied Research: Training emphasizes bridging fundamental research with clinical applications, ensuring that PhD students contribute to innovations in imaging, AI, and radiology that can be applied in healthcare settings

Weaknesses:

- Insufficient training in statistics for medical PhD students introduces a reliance on external statistical expertise. Science PhD students, meanwhile, must follow compulsory statistics course although they already received higher level training

Research in Relation to Teaching

Challenges:

- Evaluations unit researchers take part in the education of both medical and science/engineering, but not in a way that confers their unique multidisciplinary research approach to students. Thus, students from technical or biological studies, for example, may be exposed to examples from medical science, but not to the language and concepts of medical professionals.
- Educational activities seems to provide little revenue to the evaluation unit – and hence to the maintenance of its staff.

Opportunities

- LiU's unique tradition for problem-based learning and interdisciplinary research, and the multidisciplinary research environment emanating from CMIV could be utilized in a new degree program that specifically prepares students for careers within the healthcare sector, including biomedical research and the healthcare technology industry. These candidates should be able integrate the concepts, languages, and methods used by professionals as they study the normal body and diagnose diseases - and act as catalysts for the generation and exchange of knowledge in the complex, multidisciplinary research and development processes that characterize this rapidly evolving sector.

Recommendations

The evaluation unit and its collaborating units (cardiology, hepatology, neuro, and science/technical units) could consider to harness their interdisciplinary approach to biomedical research in a 'question-based' degree program where knowledge about the human body (genetics, molecular and cell biology, physiology, anatomy); the physical/chemical principles (e.g. magnetic resonance, photon interactions with tissue) of the methods they use to address biology at those levels of description; and analytical methods (programming, visualization, data mining) are internalized by students as they become necessary for them to answer questions like 'how do kidney work?', 'why do hearts fail?' – and hence be driven by their curiosity.

Students should first focus on what constitutes knowledge, a scientific argument, and so forth, and on the statistics needed to talk about the type and strength of scientific evidence. Then, lectures are given by researchers who explain

- the background for their research question,
- the methods they use and their benefits and shortcomings of these
- their most recent results and then answer questions and discuss the results with students – much as in an academic talk.

While students are tasked with reading traditional textbooks, this unique research-based education format should train them, to ask 'how is this known?', 'what is still unknown?' as they learn - rather than regurgitate textbooks. The students should be integrated into the research process at the research units involved from an early stage.

Conditions for Research

Organization

Strengths:

- CMIVs Board of Directors represent academia, healthcare, and industry.
- The Scientific Council of senior researchers represents a forum for multidisciplinary integration as it manages the research agenda and priorities.

Weaknesses

- Unclear succession plans for the Director of CMIV (Anders Persson), who is a key, driving force in interdisciplinary research and the integration between research and clinical applications.

Staffing

Strengths

- The evaluation unit employs a mix of faculty members, researchers, and technical staff, with broad expertise. CMIV hosts a diverse team of researchers, including PhD students,

postdocs, engineers, and medical professionals, fostering interdisciplinary collaboration.

Weaknesses

- Gender balance remains a challenge at the senior level, with only 38% of academic staff being women, though PhD recruitment is more balanced.
- High demand for MRI and CT technologists, with a need for additional support staff to handle data-intensive imaging projects.

Funding

Strengths:

- The unit receives funding from government grants, competitive research grants, industry collaborations, and clinical research contracts (2023: 14.3 million SEK)

Challenges in Funding:

- Dependence on fluctuating project-based funding, making it difficult to permanent positions and support staff.

Research Infrastructure

Strengths :

- CMIV hosts state-of-the-art MRI and CT scanners, including 3 MRI scanners and 2 CT scanners (including advanced photon-counting CT).
- Advanced AI and Computational Resources including access to NAISS (National Supercomputing Infrastructure), Berzelius Supercomputer for AI-driven medical imaging.
- Access to federated AI training on sensitive health data.

Challenges:

- Need for dedicated research personnel (e.g., MRI physicists, radiographers, AI engineers) to maximize infrastructure use.

Support Functions

Strengths

- The university aids with research grant applications, including dedicated support for EU Horizon Europe, national, and regional funding applications.
- The unit offers workshops on AI, imaging techniques, and research ethics for PhD students and faculty.

Weaknesses:

- Limited technical support staff for managing AI, imaging, and data-heavy projects.
- Need for better coordination between academic and hospital IT systems to facilitate data sharing and analysis.

Recommendations

Base funding and support personnel

The panel identified CMIV is a catalyst and a critical hub that enables high-quality interdisciplinary and clinical research within the Radiological Sciences unit - not only by its cutting-edge equipment, but also as an inspiring, physical meeting place where researchers from various disciplines can meet informally and for seminars. The importance of CMIV clearly extends beyond this evaluation unit, to the cardiovascular and internal medicine units also evaluated by the panel. More broadly, CMIV is expected to be a major asset for researchers within biomedical engineering, computer science, applied physics and mathematics, engineering, data science (informatics, AI, visualization) at LiU and to promote their presence in healthcare-related research.

Today, CMIVs potential is not fully realized due to a lack of dedicated research physicists/engineers, who can develop and optimize e.g. tailored MR sequences and data analytics, and a lack of technicians who can ensure safety and high quality in research examinations. While researchers pay users fees for individual projects, the sustainability and scalability of CMIVs activities appear limited by a lack of long-term core funding for critical staff.

User-friendliness of LiU and RÖ structures and support functions.
The panel felt a general frustration among researchers that internal procedures at LiU and RÖ are unclear and poorly integrated (for example with respect to implementation of GDPR and access to IT) - and felt to be inaccessible to users. Examples include lengthy procedures for affiliation of industrial researchers and clinical/industry/external PhD students not having access to basic software otherwise provided by the university. Junior researchers struggle to find help on administrative procedures from institution websites - and more so from administrative staff.

The two institutions should take steps towards making their services visible and coherent as seen from the users' perspective.

Concluding Remarks

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The distribution of Regional research funds exhibits inertia, appears to be based more on bibliometric analysis than potential for population health improvement and may contribute to maintaining or increasing health inequalities nationally. How the Regional funds are distributed within Regions also seems to be similar, year on year, but there is considerable unexplained heterogeneity between Regions. The heterogeneity seems to be accepted with no assessment of whether one model delivers better quality research and health impact than another.

Time Allocation for Clinical PhD Students

Clinical PhD students currently face a challenging situation in which many are allocated only 25% of their paid working time for research, and are expected to devote a further 25% of their personal time. This arrangement, which effectively requires students to work 125% of a full-time schedule, is unsustainable and undermines the attractiveness of research careers for clinicians. To address these issues, it is strongly recommended that doctoral students be offered a more balanced and attractive research training framework. Specifically, a minimum of 50% dedicated research time over the eight-year period should be guaranteed to promote a productive environment conducive to high quality clinical research. This recommendation is in line with common practice in comparable countries, where clinical doctoral students can expect to be fully employed for 3 years with only 20% clinical responsibilities in a supernumerary role, providing a more sustainable and attractive model for aspiring clinical researchers.

The Importance of Gender and Diversity Perspectives and Patient/Participant Involvement

The Panel highlights a critical gap in the active inclusion of gender and diversity perspectives and patient involvement in research - elements that are essential to advancing scientific knowledge and improving health outcomes in diverse populations. Integrating gender perspectives ensures that studies take into account both biological and social aspects, such as sex, gender and ethnicity, leading to more comprehensive and applicable results. This approach can reveal important differences in disease manifestation, treatment effectiveness and healthcare experiences between different demographic groups. At the same time, patient and public involvement (PPI) improves the relevance and quality of studies by incorporating the unique insights, values and expertise of those directly affected by research findings. By involving patients and the public as partners in research, studies can more effectively address real-world needs, refine research design, and increase the likelihood of translating findings into practice. Importantly, these considerations are essential not only in the conduct of research, but also in strategic planning and teaching within academic and health care institutions, ensuring an approach to knowledge generation and dissemination that reflects the diverse needs of society.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Strengths

- Broad research interests ranging from general practice to pain, rehabilitation and occupational medicine
- A high proportion of clinical academics with good links to applied health care research settings
- Evidence of interdisciplinary and translational capability, albeit to varying degrees between research groups
- A progressive gender balance, including among senior scientists
- Important research assets (for example biobank, SQRP and SCAPIS) with potential for national/international impact
- Good access to techniques such as NMR and spectroscopy
- The Unit has generated a high number of completed PhDs
- The Unit has produced a high number of publications with almost half including a Unit researcher as first or last author
- Junior/mid-career researchers were notable for their success in obtaining competitive research grant funding as principal investigators

Weaknesses

- Papers have been published in relatively low impact journals, with a low field-normalized citation rate, and relatively few citations in policy documents. There was acknowledgement that higher impact journals could be targetted, although there may be fewer in the fields covered by this Unit than in some others
- There is little collaboration between the research groups within the Unit which are geographically spread, but effective collaborations exist between researchers and groups in other departments
- Plans to utilise the research assets were discussed but broader strategies to increase the quality of research and publications were not clearly formed at the individual research group or Unit level
- Researchers appeared slightly constrained in their aspirations for international impact
- A significant proportion of the research is currently focused more on local/national policy change and health impact than high-impact publications. This can be perceived as both a strength and a weakness, depending on priorities and perspective.

Recommendations

Develop a more strategic approach to undertaking and publishing more impactful research (higher impact open access journals, more highly cited papers and more policy and health impact) through:

- Critical appraisal of strengths and limitations of scientific resources (including staff, datasets, registers and existing collaborations) and scientific topic areas

- Leverage of strengths in clinical access and interdisciplinarity to pursue more high impact research questions
- Ongoing horizon scanning of potential opportunities and threats
- Consideration of scientific ambitions and assessment of what would be required to achieve them, for example:
    - staff recruitment
    - international collaborations
    - local collaborations with internationally competitive people / groups / infrastructure / equipment
    - use of large open-access observational study datasets and national registers
    - visiting workers/internationally competitive role models bringing expertise and challenging status quo
    - reducing the breadth of topics
    - development of applications for programme as well as project grant funding
- Reflection on the balance of observational and interventional research given that several of the research themes have the potential to inform the development and subsequent evaluation of interventions

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Strengths

- Progressive gender balance overall and in senior positions
- Regular well-attended scientific seminars (that attract people in from their community base) and annual retreats to foster collaboration
- Multidisciplinary research culture with diverse backgrounds among PhD students
- Strong connection between research and clinical practice
- The largest research group has established mechanisms for peer support

Weaknesses

- Research culture is focused more on (albeit important) aspects such as multi-disciplinarity and strengthening clinical/university links, than on research quality and impact
- Challenges for staff in balancing the demands of clinical work (frequently based in the community, away from the University campus) and research time
- Difficulty retaining PhD graduates for postdoctoral research
- Lower than average international co-authorship
- The nature, extent, purpose and strategic value of some of the collaborations was unclear

Recommendations

- Develop strategies to create more postdoctoral opportunities and career pathways to retain clinical and non-clinical PhD graduates and to enable early career researchers to bridge the gap to independent scientist status

- Consider ways in which the 'research culture' initiatives might focus on aiming to increase the quality of the research and the ambitions of researchers to conduct internationally competitive science as well as the quality of the conduct of the research
- Develop clearer policies and support for balancing clinical and research responsibilities
- Consider structured joint (university and clinical) appraisals to clarify and manage expectations of clinical academic staff
- Actively and strategically pursue more international research collaborations and exchanges

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Strengths

- Good access to precise, expensive measurement techniques eg NMR and spectroscopy
- Access to biobank facilities and national research infrastructure
- Strong funding from Swedish Research Council for senior researchers
- Good collaboration with regional healthcare system for research funding

Weaknesses

- Income exceeds expenditure and research funding is dependent on regional health care budgets which may be threatened by rising costs of healthcare delivery
- Limited access to operational support (for example statistical support), especially for PhD students and early/mid-career researchers
- Increasing administrative burden on researchers, albeit this appeared to be less of a barrier than in some other departments
- Challenges in external recruitment (for example research staff on fixed short-term contracts) and PhD student attraction

Recommendations

- Strategic reflection on nature and number of international collaborations and how they might positively influence the research quality
- Strategic reflection on research funding sources and aspirations
- Review internal communication channels and staff induction schemes to increase efficiency of administrative processes
- Review formal training of early career researchers including income-generating options such as modular masters degree courses (aligned to the university 'Agenda 2030' goal of increasing the number of foreign students)
- Improve access to operational support (for example a clinical trials unit and statistical advice) especially early in doctoral training
- Streamline administrative processes and consider alternative organisational models (for example decentralised) and culture to facilitate provision of more effective/efficient administrative support to researchers
- Develop strategies to attract external talent and promote research careers to potential PhD students

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The assessment of research quality of evaluation units appears to be driven largely by bibliometric analysis rather than impact on policy, practice and population health. This may disadvantage some specialties/disciplines working on more applied rather than basic science.

The close integration of research and health care in the Clinical Medicine unit affords significant potential for clinical and scientific impact, which has not been fully realised, but also generates challenges in balancing clinical and academic demands.

There is a need for better alignment between university and healthcare region policies to support research careers and time allocation.

The unit could benefit from more strategic planning around scientific direction and priorities, publication and international collaboration, in order to increase research impact. For example, there are opportunities for primary care/public health to add value to existing successful university groups conducting research on conditions that are largely prevented, diagnosed and treated in the community.

Overall, the Clinical Medicine unit demonstrates strong potential with its clinical connections and interdisciplinary approach, and unit members appeared receptive to suggestions. However, unit members need to focus on increasing the impact and visibility of research outputs, while addressing challenges in research-clinical balance and development of early/mid-career researchers.

The panel would like to express that this was a positive experience and the organisation and support both before and during the site visit was excellent. We hope that our recommendations and assessments will further strengthen LiU. Finally, we appreciate the openness and commitment shown throughout the visit, which allowed for a comprehensive assessment and constructive dialogue.

Panel P Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

We thank the personnel of Linköping university, departments, divisions and all units involved for facilitating our task to evaluate central aspects of the research and its associated factors conducted at the evaluation units HMV.SH.HSA Health Care Analysis, HMV.SH.FH Public Health, IBL.PSY Psychology and IBL.FUSA Disability Research. Panel members represent developmental psychology, health economics, educational research, affective and cognitive neuroscience and consist of professors Monica Melby-Lervåg (chair), Dorte Gyrd Hansen, Monika Nerland, Lars Nyberg and Mats Fredrikson, co-ordinated by Gesine Ensle.

In advance of the site visit we have studied the fact-rich material sent out for review. We found that the material covered important factors shaping research. In the period up to the site visit we made further preparations in terms of three online meetings, as well as searches on university web-sites and other sites such as Google scholar. During the site visit we have had meaningful discussions regarding general and specific issues.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Overall, we are impressed by the breadth and depth of the research conducted by the divisions and units we evaluated. Also, the entities evaluated all had rich contact networks with clinicians, practitioners and policymakers in their areas of research enabling important pathways for societal impact.

However, we observed some issues that could be important to address in order to ensure that the units and divisions are better equipped for future research successes:

1. There is a potential for the university to focus more on developing high performing researchers by nurturing talented post docs and early career researchers. The post

doc positions seem to be used in highly different and sometimes unproductive ways. The duration of post doc positions as well as content in terms of balance between teaching and research is highly variable. Also, the postdoc positions do not always seem to be linked to a career plan for the individual researcher.

2. Since internal recruitment is highly common at LiU, and probably also will be in the future, a core focus should be on ensuring that the researchers obtain international experience to improve their career paths and assure high performing research. The University should not only facilitate research-stays abroad for professors, but also for younger researchers, PhDs, and post docs. As it is now, few younger researchers seem to have research stays abroad for longer periods. This lack of international experience is something that may have a negative impact on their research career trajectories.
3. The entities evaluated have not all succeeded in reaching out to global talents and making competition on an international scale a top priority in hiring. There are probably different reasons for this, but at the university level it is important that the university is as competitive as possible when it comes to hiring international researchers.
4. The entities evaluated also have potential to be more active and targeted towards the ERC. There are a number of researchers in the entities evaluated here that are likely to be successful candidates for prestigious grants. The university could consider establishing programs for talented researchers across fields that show ERC potential.
5. Further, a general observation is that the mandatory PhD courses are rather general, and because they are supposed to fit students from different backgrounds and different methodological angles, they are not sufficiently advanced to develop PhD students to do cutting edge research. It is important to focus on how this situation might be improved.
6. Finally, several of the entities evaluated pointed out that getting legal support in relation to their research activities was time consuming and tedious.

Evaluated Unit's Name: HMV.SH.HSA Health Care Analysis

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

It is the panel's impression that the Health Care Analysis unit is quite unique in that it combines research relating to health economic evaluation with research in decision making and priority setting in health care. The unit's researchers represent a broad set of social science fields that complement each other. The unit scores very highly on societal relevance, and the unit is clearly impacting on priority setting in the context of the Swedish health care sector – both locally and nationally. The unit should be commended on their performance in this regard. The unit has also succeeded in attracting external funding for their research, thus covering approximately 90% of their expenses. There is a high level of academic output in the form of publications in peer-reviewed international journals. However, it is the panel's impression that the quality of the publications could be higher if the publication strategy were more focused. Importantly, the unit seems somewhat inward looking, with a low degree of internationalization, and seemingly insufficient time and focus on development of research methods and theory. The research unit holds much promise, but future performance is at risk of being inhibited by financial circumstances, insufficient international networks and lack of continuous contact with relevant academic peers. It is important that the unit is not merely perceived as a support unit for clinical researchers and other stakeholders, and a problem solver of local or national problems, but that the research unit also identifies own research questions and conducts high-quality research which is of broader interest and is publishable in well-esteemed international social science journals.

Recommendations

The panel suggests that the unit should prioritize their publication efforts and mainly seek to publish in academic journals when the quality of the research is sufficiently high. If the unit prioritizes publication efforts, this may enable more publications in higher ranked journals. The panel's judgement is that the unit's research has the potential of being of a quality that warrants more frequent publication in high-end journals. Currently, the unit does not appear to have a clear publication strategy. It may be fruitful to have a discussion regarding such a strategy. While the unit prioritizes relevance, and communication of research

outcomes to stakeholders (e.g. politicians and clinicians), we recommend that the researchers also prioritize the academic dialogue with their academic peers via publications, invited presentations and conference presentations. The unit's researchers come from different scientific fields (e.g. sociology, philosophy, economics, political science), and thus the unit should make a greater effort at publishing in journals associated with these research fields. It is recommended that the unit ensures that all researchers regularly publish in journals that are esteemed journals in the individual researchers' specific field of research. This would require increased focus on more generalisable "basic" research, i.e. development of methods and/or theories representing contributions to the relevant social science fields. Currently there is a relatively high frequency of publications in specialised clinical journals that are not top-ranked. The panel recommends that the unit seeks to publish in higher ranked (general) clinical journals. Fulfilling higher ambitions should be feasible given the strengths of the unit and the unique Swedish registry data. More dialogue regarding the optimal publication strategy for individual manuscripts may help to identify research that warrants publication in high-end journals. We recommend that the unit's researchers assist each other in improving manuscripts and provide mutual advice on appropriate outlets. It is especially important that PhD students and other early career researchers receive guidance in their publication efforts.

Being a group of social science researchers based in a medical faculty represents a risk of losing contact with academic peers. That the unit is placed in the medical faculty has obvious advantages but requires a continuous focus on establishing and nurturing academically relevant national and international networks. The panel recommends that the unit prioritizes participation in national and international conferences, where the individual researcher is appropriately challenged and can receive high quality feedback on their research. Moreover, conference participation should nurture relevant networks with academic peers and should enable a continuous updating on relevant methods and theories.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Although the unit may have a strong local and national brand, there has been little focus on establishing the unit on the international scene. The unit has in recent years not focused on nurturing international relations. International visitors are infrequent and there is not a

strong tradition for PhD students and early career researchers – or seniors – to spend time in international research environments.

The unit has success in filling PhD positions, but the unit finds it difficult to recruit more experienced researchers from other universities, national or international. Many of the unit's PhDs students are therefore encouraged to stay on in post doc positions. It is noticeable that almost all the currently employed researchers received their PhD degree from the unit. That the unit is training its own researchers represents a risk of lack of innovation and new ways of thinking. The proactive recruitment amongst internal candidates also entails that it may not be the most research-motivated persons that are hired. An additional and important issue is that it is difficult to ensure research independence for young researchers, since it is challenging to end collaborations with PhD supervisors, when early career researchers stay on in a relatively small research environment.

There are currently only a few post docs employed at the unit, and some of these are only employed in fractional positions.

Recommendations

The unit has expressed difficulties in recruiting internationally. The panel believes that more proactive recruitment efforts to attract external candidates are required including more presence on the international scene. The panel's impression is that the apparent inability to attract researchers that are not the unit's own production is likely to be partly a cultural issue, and possibly a reflection of risk aversion and a preference for the status quo. International recruits may not be able to handle all types of activities (due to possible language restrictions), but new ways of organizing the work will most likely solve any issues. We strongly encourage the unit to engage more in the recruitment of researchers from other institutions. If the unit can recruit highly qualified national or international early career or mid-career researchers with high ambitions, it is likely to improve the quality of research in the unit and increase innovation.

Investing in the unit's international brand will increase the chances of high-end recruitment. The panel suggests that the unit invests more in marketing their research internationally. To increase their international network, the unit may want to prioritize/enforce international visits for PhD students and early career researchers. Also, the unit may want to encourage international visits at the unit. A more frequent presence at relevant conferences may also be a means of recruitment. For example, the annual EuHEA PhD and Supervisor conference is a place where early career health economists are often recruited.

Marketing of the unit may also be done via a greater social media presence across all researchers in the unit. The panel recommends that the unit has a uniform social media

strategy. It has also been noted that several researchers in the unit do not have a google scholar profile. This should be amended. There could also be a greater emphasis on the researchers at the unit having their own homepages.

It is the panel's impression that it could be beneficial for the unit if more full-time early career researchers were employed. Post docs often have sufficient experience to operate independently and may therefore represent an effective means of generating more high-quality research in a busy research environment.

Further, it is the panel's impression that more could be done to increase internal communication, so that everyone knows which projects are ongoing at the unit. This lack of internal exchange of information and academic discussion may impact on the work environment and reduce the sense of belonging to a research community. Moreover, it does not foster collaboration or mutual inspiration. The unit acknowledges this issue, and has recently established a seminar series which runs every other week. At the seminar researchers currently present finished papers only. It may be equally important to present work in progress as this provides greater opportunity for giving and receiving valuable input. It could also be useful to present grant applications and very sketchy research ideas. Presenting such work-in-progress may foster increased collaboration and generate an increased level of trust in the organisation. Post docs who need to establish their independence and demonstrate an ability to attract funding may benefit from more structured talks regarding research ideas and applications. Ideally, a more open research culture may foster increased collaborations amongst early career researchers, which may enhance their career.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The unit's SWOT analysis suggests that the unit faces a high demand for involvement in research projects and commissioned work, but that it is difficult to meet demand. The supply of flexible resources seems to be constrained by lack of appropriate long-term funding. It is the panel's impression that a key problem that the unit faces is that the unit's researchers spend a lot of resources on attracting relatively short-term funding from regional health authorities, the industry and other stakeholders. Short term funding from many stakeholders is challenging because much time is spent investing in the upstart of relatively small projects including aligning project content with stakeholder interests. Also, short term funding represents high budget risks, since such budgets are often relatively tight and thus some budgets may not cover the hours required to conduct the research. Furthermore, short term stakeholder-initiated projects often do not allow sufficient time for

writing proposals, writing papers, and for developing methods and theories. Working on many smaller projects with strict deadlines may put constant pressure on the researchers thereby limiting creativity and long-term strategic thinking. It is the panel's impression that the current funding strategy may not be highly conducive to innovative thinking, high quality research and a good working environment.

Recommendations

It is the panel's recommendation that the unit thoroughly re-thinks their funding strategy to ensure more long-term and flexible funding that enables more time for methods development and general contemplation, and thereby more high-quality research. The senior researchers at the unit indicate that they have little time to publish methods papers, and little time to write larger and more ambitious applications. We recommend that the unit re-organizes its work routines to free time for such activities. More focus on improving the researchers' CVs by improving the publication rate in highly esteemed journals may enable success with attracting prestigious national and/or international funding in the longer run. It is the panel's impression that the unit could benefit from an increase in base funding from the university to give the unit some respite and support for building a more sustainable future funding strategy.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The present evaluation is a common assessment of the two centres CMT and PrioC . The two centres are currently led by the two centre heads, professors Lars-Åke Levin (CMT) and Lars Sandman (PrioC). An official merge of the two centres is planned (November 2025). The merger represents an opportune time for adjusting the unit's strategy to ensure a bright future for the unit. The future head-of-unit should ideally focus on ensuring higher quality in research (i.e. publications in highly ranked social science and clinical journals), a more international, innovative and integrating research environment, as well as a sustainable funding strategy

Panel P Report

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However, we observed some issues that could be important to address in order to ensure that the units and divisions are better equipped for future research successes:

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doc positions seem to be used in highly different and sometimes unproductive ways. The duration of post doc positions as well as content in terms of balance between teaching and research is highly variable. Also, the postdoc positions do not always seem to be linked to a career plan for the individual researcher.

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3. The entities evaluated have not all succeeded in reaching out to global talents and making competition on an international scale a top priority in hiring. There are probably different reasons for this, but at the university level it is important that the university is as competitive as possible when it comes to hiring international researchers.
4. The entities evaluated also have potential to be more active and targeted towards the ERC. There are a number of researchers in the entities evaluated here that are likely to be successful candidates for prestigious grants. The university could consider establishing programs for talented researchers across fields that show ERC potential.
5. Further, a general observation is that the mandatory PhD courses are rather general, and because they are supposed to fit students from different backgrounds and different methodological angles, they are not sufficiently advanced to develop PhD students to do cutting edge research. It is important to focus on how this situation might be improved.
6. Finally, several of the entities evaluated pointed out that getting legal support in relation to their research activities was time consuming and tedious.

Evaluated Unit's Name: HMV.SH.FH Public Health

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The unit comprises different areas, which in the self-evaluation are described as three autonomous areas: a) *Social Medicine and Public Health*, with a range of sub-specialties, b) *Medical Education Research*, focusing on professional and interprofessional practice and learning, and c) *Nutrition research.* The first area is the largest and comprises projects addressing a wide range of topics from different methodological angels. Except for the Medical Education group, which is organized as an established research group with links to other departments and faculties at LiU, it is the panel's impression that the activities in the unit are organized around projects led by individual senior researchers with distinctive specialties rather than around shared agendas.

The senior researchers have succeeded in attracting external research funding from a variety of agencies, and the unit shows an increase in such funds during the last years. Together with government grants and commissioned research, this covers almost 100% of the personnel costs in the unit. The research conducted in the unit is clearly of high relevance. It has an impact on policy, professional communities and other stakeholders, and the panel observed a strong awareness towards cultivating good relationships with regional funders to sustain these opportunities. The researchers are productive. 17% of the outputs are published in level 2 channels, which is above the average at LiU. Still, the panel sees a potential for a more ambitious and deliberately varied publication strategy.

Future research plans are developed at the project level, with the aim of securing funding and time to continue existing research paths. While this may be productive for the research of individual senior researchers in the short term, the strategy is vulnerable for shifting priorities in the funding agencies and for the overall sustainability of the research environment. Our impression is that the unit has not yet developed prioritized agendas that provide a ground for collaboration across the specialties.

Recommendations

As research funding forms the main income in the unit, there is potential for a higher proportion of articles to be published in high impact journals, and the ambitions for research impact could to a larger extent be directed towards international research frontiers. At the same time, the panel recognizes the need to tailor publication- and

dissemination strategies to the type of funding and stakeholders. To balance these concerns, the panel recommends developing clear publication strategies towards different outlets at the unit or group level, for instance by clarifying their strategies for achieving societal impact and for contributing to the research frontiers in their domains .

The panel recommends that researchers in the unit seriously discuss the potential for developing shared research agendas above the project level. The panel sees this as necessary for the robustness of the research environment and its capacities to handle shifting funding priorities, upcoming generation shifts and increasing its competitiveness.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research culture in the unit is marked by high individual autonomy among senior researchers and by heterogeneity in types of research projects and methodologies. The unit has developed a culture for joint development and discussions of research in some areas, but the panel's impression is that this is unevenly distributed. Early career researchers show academic ambitions and seem to develop their own ideas; however, they also express a need for more joint seminars and discussions with senior researchers beyond their project teams. The Medical Education group has regular seminars and the PhDs in this area have access to a larger network through a research school, while PhDs in the other areas do not have these opportunities. Although recruitment was largely internal from LiU programs and environments, the panel observed a general awareness of fostering independence for early career researchers.

Forty-six percent of publications in the unit are co-authored with international colleagues. However, it is the panel's impression that such collaboration reflects the network of individual senior researchers. Research stays abroad are encouraged, but not realized by PhDs or early career researchers. There is potential for elevating and systematically developing research collaboration at the group or division level, which may provide the ground for other research funding and increased mobility. The Medical Education group has built an agenda based on a longstanding international collaboration, currently manifested in a collaborative project funded by the Swedish Research Council and led by the LiU team. Similar strategies could be relevant for other areas as well. The self-evaluation report recognizes the need for developing and formalizing international networks and suggests

several relevant actions. For these initiatives to work, a better organization of and commitment to the unit as a collaborative research environment seem necessary.

Recommendations

In one sense, the unit provides a good organizational frame for individually driven projects as long as it is possible to obtain funding along these tracks. However, this is vulnerable, and the panel's impression is that the unit is not functioning well as a joint research environment. The research areas do not have much in common, and some areas are marked by high internal diversity. The panel sees increased collaboration as necessary for developing a culture that is supportive for all early career researchers.

The self-evaluation report indicates awareness of these challenges. The panel sees some opportunities for resetting the agenda in the time to come and capitalizing on the strengths of the different arenas, such as experiences with different funding schemes, methodological advancements for digital interventions and interdisciplinarity. While upcoming retirements may generate continuity challenges in some research tracks, these may be eased by forming research topics above the project level and thereby strengthening common agendas. However, this would imply some difficult decisions in the formulation of research topics.

The panel also recommends better support for networking and career guidance among and for the early career researchers. More flexibility in the PhD program would be beneficial to meet the candidates' different needs for advanced methods courses. A specific suggestion is to establish open 90% seminars for PhD theses as a norm, which in addition to supporting the PhD candidate would offer arenas for interaction and discussion in the unit.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

With respect to funding, the division seems to do well. However, funding is highly dependent on individual senior researchers and vulnerable for shifting priorities in commissioned research and funding agencies. Teaching forms a very limited part of the income and more opportunities for teaching responsibilities may be considered.

The number of staff in the respective research areas in the unit is limited, and it is the panel's impression that this may be a reason for organizing these areas together. The panel was surprised to learn that the division seems to be more of an administrative unit, which explains why the Head of division did not take part in the interviews. The senior researchers seemed satisfied with this arrangement and with the available support functions for their

own research. At the same time, limited funding and high overhead costs makes (international) recruitment difficult and generates insecurity for early career researchers. The slowness of recruitment processes was mentioned as a challenge.

It is the panel's impression that there is no formalized research leadership at the level of the unit or division. Such leadership seems to be more located at the project or group level, with the division as an administrative arrangement.

Recommendations

The panel's overall impression is that the research conducted in the unit has both strengths and more potential, but that the development of prioritized research areas and a shared research culture is needed to strengthen its robustness and sustainability. This would require more formalized research leadership. Given the diversity in research interests and approaches, one question to consider is whether this co-organizing of public health research and medical education is the best solution for the department. The panel agrees with the description in the self-evaluation that the areas have complementary strengths and therefore may learn from each other. At the same time, research collaboration is highly content-driven and dependent on shared agenda setting to function well over time.

The panel sees two alternative ways forward, which we recommend is discussed in the division as well as on the department level:

a) The areas develop a sufficient common ground to build a shared research environment around prioritized research agendas that form a basis for joint seminars and activities above the project level. This would imply some hard decisions on what to include and what should be left out in future strategies and in the formulation of research topics.
b) The areas in the unit are experienced as too diverse to pursue alternative a) without high academic costs and could therefore be considered reorganized with other groups in the Medical faculty.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel appreciated the open description and reflections around experienced challenges in the self-evaluation and its SWOT analysis. Our observations and recommendations relate more to the organization of the research culture and environment than to the quality of research conducted in the unit. We hope this is useful in the further development of research strategies in the respective areas.

Panel P Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

We thank the personnel of Linköping university, departments, divisions and all units involved for facilitating our task to evaluate central aspects of the research and its associated factors conducted at the evaluation units HMV.SH.HSA Health Care Analysis, HMV.SH.FH Public Health, IBL.PSY Psychology and IBL.FUSA Disability Research. Panel members represent developmental psychology, health economics, educational research, affective and cognitive neuroscience and consist of professors Monica Melby-Lervåg (chair), Dorte Gyrd Hansen, Monika Nerland, Lars Nyberg and Mats Fredrikson, co-ordinated by Gesine Ensle.

In advance of the site visit we have studied the fact-rich material sent out for review. We found that the material covered important factors shaping research. In the period up to the site visit we made further preparations in terms of three online meetings, as well as searches on university web-sites and other sites such as Google scholar. During the site visit we have had meaningful discussions regarding general and specific issues.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

Overall, we are impressed by the breadth and depth of the research conducted by the divisions and units we evaluated. Also, the entities evaluated all had rich contact networks with clinicians, practitioners and policymakers in their areas of research enabling important pathways for societal impact.

However, we observed some issues that could be important to address in order to ensure that the units and divisions are better equipped for future research successes:

1. There is a potential for the university to focus more on developing high performing researchers by nurturing talented post docs and early career researchers. The post doc positions seem to be used in highly different and sometimes unproductive ways.

The duration of post doc positions as well as content in terms of balance between teaching and research is highly variable. Also, the postdoc positions do not always seem to be linked to a career plan for the individual researcher.

2. Since internal recruitment is highly common at LiU, and probably also will be in the future, a core focus should be on ensuring that the researchers obtain international experience to improve their career paths and assure high performing research. The University should not only facilitate research-stays abroad for professors, but also for younger researchers, PhDs, and post docs. As it is now, few younger researchers seem to have research stays abroad for longer periods. This lack of international experience is something that may have a negative impact on their research career trajectories.
3. The entities evaluated have not all succeeded in reaching out to global talents and making competition on an international scale a top priority in hiring. There are probably different reasons for this, but at the university level it is important that the university is as competitive as possible when it comes to hiring international researchers.
4. The entities evaluated also have potential to be more active and targeted towards the ERC. There are a number of researchers in the entities evaluated here that are likely to be successful candidates for prestigious grants. The university could consider establishing programs for talented researchers across fields that show ERC potential.
5. Further, a general observation is that the mandatory PhD courses are rather general, and because they are supposed to fit students from different backgrounds and different methodological angles, they are not sufficiently advanced to develop PhD students to do cutting edge research. It is important to focus on how this situation might be improved.
6. Finally, several of the entities evaluated pointed out that getting legal support in relation to their research activities was time consuming and tedious.

Evaluated Unit's Name: IBL.FUSA Disability Research

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Disability research division (FUSA) focuses on hearing impairment and intellectual disability in relation to communication, cognition, and social participation. The research topics align very well with the overall LiU vision to generate new knowledge of high relevance to the broader society. The Division has a long and strong track record. One prominent example is the Linnaeus centre HEAD – an excellence centre supported by the Swedish Research Council during the period 2008-2018. The FUSA scientists are national leaders in their areas of research and have a very strong standing internationally. HEAD and various spin-off projects have addressed several novel research topics.

Journal articles constitute the main research output. The division has a strong emphasis on open science and open-access publishing. A large percentage (36%) of their output is in level-2 journals, and their field normalized citation rate is high (1.4). FUSA has a strong impact outside of academia. Many projects actively involve stakeholder organizations, such as advocacy organizations and service providers. FUSA conducts workshops, publishes popular science articles for stakeholder groups, and will launch a popular science journal.

A Steering group has the overall responsibility for forming long-term strategies. They describe two main priorities for future research spanning three main areas. Robust and transparent methods and aiming for large sample sizes are emphasized. Examples of new/planned projects include an international large-scale (30+ labs) multi-site collaboration, utilization of unique registry data, systematic reviews and meta-analyses, and intervention studies. The emphasis on interventions is a prominent example of aiming to conduct research that can have immediate impact for individuals and societies.

Recommendations

The evaluation panel found FUSA's research and research quality solid but noted that their novel focus and expertise on disabilities should be more strongly highlighted when promoting the division. The three main areas for future research are all important and relevant, but are quite wide in scope (e.g., sign language, deafness and brain imaging). The project goals could also be more specific. An example is the CO-IND project, where open

science was stressed but limited detail was given on the research questions. Thus, the panel recommends more precise definitions of research areas and project goals.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The publication strategies are good and, as noted above, the scientific productivity is strong. The expertise and commitment to open science is exceptionally strong. FUSA is well established with strong national and international collaboration networks. The early career researchers are encouraged to develop their own ideas and apply for grants as PIs, and several grants have been secured. The PhD students as well as early-career researchers come from Sweden as well as abroad. The international composition of researchers at FUSA is a strength and attests to the division's visibility and ability to attract students. A challenge in relation to teaching is limited opportunities to teach in English and more generally limited teaching opportunities. This can be a serious challenge for the career development of more junior scientists.

Recommendations

The quality of PhD training seems overall fine, but some students requested higher-level courses or at least an opportunity to choose among several mandatory courses. The evaluation panel's impression is that the PhD students are well integrated into FUSA activities, get adequate supervision and are highly engaged in their projects. The panel noted that many students regularly work from home and the self-report noted that opportunities for remote participation are well functioning. Still, the panel recommends the FUSA leadership to try to find ways to encourage more on-site participation.

Limited opportunities for teaching is a threat to the growth of the division. The evaluation panel recognizes challenges related to a limited number of available teachers at the division, and thereby difficulties balancing teaching demands with fluctuating grant availability and involvement in research. Still, a larger, more formalized, and long-term role of FUSA in various education programs and courses seems necessary for expansion of the division.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

FUSA has a rather informal organization with three research groups. In total, at the time of the evaluation, there were 25 employees at the division. It is mentioned in the self-evaluation that a strategic decision was made a few years ago to build seniority from within rather than by external recruitment. The FUSA leadership have taken several steps to maintain and ideally increase the amount of external funding. Three infrastructures are highlighted as particularly important to FUSA researchers, and one of these is external (at SU). In addition, at the site visit it was mentioned that efforts are made to acquire a fNIRS system, which could be yet an important infrastructure for research as well as student training. Access to, and updates of, infrastructures are dependent on funding. Overall, the FUSA members seem to receive good support from LiU, although they note that slow support from the legal unit can compromise external project collaboration.

Recommendations

The evaluation panel recognizes past efforts by the FUSA leadership to expand through external recruitment and the difficulties with attracting competitive candidates from outside. Still, such challenges are shared by many universities in and outside of Sweden. For the future, the panel recommends the FUSA leadership to reconsider their strategic decision to (solely) build from within and also consider possibilities of external recruitment.

The panel found the FUSA infrastructure plans relevant and ambitious, in particular the expansion to fNIRS. For functional and structural brain imaging with MRI, the collaboration with SUBIC is a good alternative, in particular for projects in which a rare pool of participants for a particular project may be easier to recruit in Stockholm than at LiU. In other cases, it is clearly advantageous to have access to MRI at LiU, including projects that involve repeated MRI assessments and/or extensive phenotyping outside the MRI environment. Local access will also facilitate student training and can be an asset in future recruitments of senior researchers. Therefore, the panel recommends FUSA to continue to explore and develop local MRI infrastructure, perhaps in collaboration with colleagues at psychology.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel was happy to note the positive and optimistic responses from the FUSA researchers, including PhD students, early career researchers, and senior staff. It was apparent that the evaluation had been discussed in detail at the division, where many had contributed input at various division meetings and at a dedicated brainstorming session. We see the good working climate as an additional major strength of the FUSA division.

Panel P Report

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5. Further, a general observation is that the mandatory PhD courses are rather general, and because they are supposed to fit students from different backgrounds and different methodological angles, they are not sufficiently advanced to develop PhD students to do cutting edge research. It is important to focus on how this situation might be improved.
6. Finally, several of the entities evaluated pointed out that getting legal support in relation to their research activities was time consuming and tedious.

Evaluated Unit's Name: IBL.PSY Psychology

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

We are impressed with the breadth and depth by the research conducted at the division. It is reflected in high quality output, well-funded external grants, national and international visibility and high citation frequencies as well as profound societal influences by transforming clinical treatments using internet platforms.

The research within the division represents the work of several small groups, but mostly the work and output from two larger groups, one focused on factors influencing individual decision-making and its aggregated effects in society and another devoted to digitizing behavioral treatment procedures for internet applications. Both these two larger groups are scientifically successful and well-respected within and outside academia. For example, one leading professor has for a number of years been among the most cited scholars internationally. This speaks to a high impact within and beyond the specific research area. Clinical applications of internet treatment both locally in Sweden and internationally reflect the societal impact of this ground breaking research. The continuous application to new groups and diagnoses all over the world is an important clinical development. Another leading professor within the division also has success with his group disentangling processes underlying judgement and emotional experiences using subjective reports and measures of peripheral and central nervous system activity. The two larger groups, we argue, reflect that when a critical mass of researchers at different levels in the academic system ask questions of mutual interest, without restraining ideas, this creates high impact scientific output.

In contrast, even though the smaller units – "the promising 10" -; which are in social psychology, educational psychology, personality psychology, cognitive psychology like mathematical cognition, work psychology, discursive psychology, LGBTQ studies, developmental psychology, neuropsychology including brain imaging, sport psychology and a few additional topics; attract grants and publish internationally, they cannot compare with the two larger highly successful units. It is highly desirable to provide means so that some of those scientists can step up, grow and create their own successful groups. There are several senior and mid-career scientists who hold promise as group leaders. We believe it is important to find mechanisms to allocate more research time and provide external seed funding to those individuals.

Based on grant applications the larger groups seem to continue their successful track record, while the economic situation for the "promising 10" could be better, particularly with respect to time devoted to research.

Recommendations

The main challenge, that two major groups dominate the research area, is a complex and multifaceted task to resolve. We argue that the most promising and least provoking way is to provide support for research excellence to senior and mid-career scientists that prosper. We are confident that if some of those could reach a critical mass, they would be competitive for external grants, recruit researchers and thus be stable over time. There are several potential promising areas and individuals for growth, but as of now these lack necessary funding and time to prosper. Teaching of course is independent of research but an important stability "back-bone" for the department. Both junior and senior researchers at the division teach. Some of the individuals in the "promising 10 group" are teachers at the psychology program and given limited time off for research in their teaching positions. While that is commendable, the distribution of time may be structured more competitively.

Right now, time off from teaching to perform research is distributed with 10 % to all "universitetslektorer". We think that support instead should be allocated based on performance and competition. It could be based on a combination of PhD supervision, grants funded and papers published. It is importantly vital that this is supplemented by university funds matching department support (i.e. corresponding to an additional 10%). Our recommendation is that base funding centrally from LiU is used to facilitate and encourage this. In order for this process, which will alter the status quo and most likely meet with resistance, to be implemented, LiU base support will be a necessary incentive. With restructuring some scientists will be given sufficient time to perform research, write grants and build groups. There are several senior and mid-career researchers present at the division that are able to create groups that reach a critical mass given support. This seems cost-effective since LiU base funding will support an already well functioning division. Additionally, this will enhance gender equality as several small groups are led by women.

A couple of groups utilize brain imaging techniques. The availability for scanning on the LiU site is not sufficient and some perform data collection at SUBIC in Stockholm. This is true also for FUSA. We argue that more effective utilization of infrastructure present at LiU could be facilitated. This is best handled at the vice-chancellor level. One approach could be to assemble scientists who use similar methods and investigate if there are synergy effects in terms of research questions. For example, many neuroimaging sites supplement studies with additional measures collected "off scanner". This might create common ground and promote shared interest over disciplines. We found no examples of this during our visit. Possibly, additional time slots for scanning may be found. Late hours, holidays and week-

ends are often underused slots but enthusiastically accepted by career scientists. At the LiU level there is an impressive scanning knowledge and processing capabilities that might be more effectively shared across the university.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The output quality is stable, reflected in a proportion of publications in level 2 journals at par with other departments at the university. The output often reflects international collaborations. However, except for a few publications most are in specialist journals, many with a decent impact factor, but except for a few exceptions not in generalist outlets such as Science, Nature Nature communications and PNAS and the like. Publications on internet interventions often have authors from different countries reflecting that they are based on the Iterapi platform. Thus, there are wide-spanning international and sometimes also company collaborations centered around the Iterpi platform.

We believe that there is a good research culture within the department, characterized by collaboration across levels within the unit and by international collaborations manifest primarily in papers. PhD students and postdocs during the interviews generally gave positive judgement of their mentors and training. Group leaders also were positive towards PhD´s and postdocs. The atmosphere within the department seems friendly and helpful. One concern is that several post-docs seem to be semi-independent rather than fully independent as they work in collaboration with their supervisors. That may be fine as long as the former supervisors are supportive and generous, but we like to see a blooming culture where independence is strived for. This is more of an attitude development than something which should be processed externally.

Publication strategy is relevant for the department and reflects the historical movement from books and similar outlets within the humanistic tradition to peer-reviewed outlets characterizing empirical areas in psychology and medicine. The output from the department lies within both or in the intersection between the disciplines. That said, it is also noted that the number of outlets in category 2 journals could be higher.

The international collaboration seems to center around publications and the Iterpi platform but less so in terms of visits from international scientists at the division and from scientists in the division at other sites. An increased physical exchange is desirable.

Recommendations

Even though independence seems valued and encouraged most mid-career researchers did their PhDs at LiU, they come from the major research groups and presently collaborate with their supervisors. It is an active environment and the PhD students are given freedom, possibilities to go on conferences and given good supervision but we would like to see more independence. That too would be facilitated if the department not was centered around just two major groups. LiU support and internally restructuring will increase the way research time is given will be crucial also for building independence in the long run.

We applaud the initiative from the vice-chancellor to support time abroad to enhance international collaboration for senior researchers, but would argue that this would be even more important for mid-career researchers as we found international collaborations occurring mostly through publications but rarely face-to-face. We suggest a program also for mid-career scientists, alternatively broadening the inclusion of scientists in the present program.

To support travel to meetings and other labs we suggest that LiU builds from below and give base funds for visits to scientific meetings firstly to PhD students and secondly to mid-career scientists by creating a fund dedicated to this type of travel only. Presentation for travel to meetings should be necessary to obtain funding. This will foster collaboration, enhance self-esteem and increase visibility.

The Iterpi platform is an important research asset, now run and supported by grants. We were surprised that university base funding did not cover those costs. Please do! That will provide stability and ameliorate its present vulnerability based just on a couple of persons and their grant support. This is an important low budget advice.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The information given from the head of research was promising as there is a strategy for the future and a recent tenure-track position has been filled. There we spot a possibility for growth and would like to see a raise in base funding support. We see no major challenges with the grant applications for the next five years as they mainly are a continuation of present projects. Given the size of the division the grant support is good, but not great. We call for a general strategy in order to involve and support scientists from the smaller groups and support grantsmanship so that more major groups can be created. Those who will drive this will need support both in terms of time and resources and we suggest that the university match the support given by the division. This will create incentive, goodwill and enhance quality.

If the brain imaging facilities and possibilities are viewed as a support function, that needs attention from the Vice-chancellor level as detailed previously.

Recommendations

Create another “biträdande lektorer” position in order to form additional successful research groups at the department.

Support the Iterapi platform by university funding as it is presently vulnerable but a pivotal node for research and international collaboration.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The division is sound and prosperous meaning that LiU base funding given to this unit most likely is a low cost - high gain operation and therefore represents a low-risk investment in excellence.

Panel Q Report - Division of Ageing and Social Change (ASC)

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

1.1. Composition of the panel

The panel, chaired by Charlotta Mellander from Jönköping University, SE comprised experts from various academic disciplines. The panel members were Päivi Rasi-Heikkinen from the University of Lapland, FI (Professor of Education), Mikael Granberg from Karlstad University, SE (Professor of Political Science), Thomas P. Boje from Roskilde University, DK (Professor emeritus of Sociology), and Knut Holtan Sørensen from the Norwegian University of Science and Technology, NO (Professor emeritus of Science and Technology Studies).

Each evaluator had been nominated by a specific research unit and, accordingly, served as the main responsible evaluator for that unit. While the assessments were carried out collaboratively and discussed thoroughly within the panel, the lead evaluator had particular responsibility for synthesizing observations and drafting the evaluation for their assigned unit. In the case of the Division of Ageing and Social Change (ASC), Päivi Rasi-Heikkinen was the main responsible evaluator.

The overall composition of the panel made it possible to draw upon a wide range of disciplinary and interdisciplinary expertise and institutional experiences. Each member contributed unique insights. For example, direct experience within the Swedish context enabled the panel to better understand the local dynamics and challenges faced by higher education institutions in Sweden. At the same time, members from international institutions offered valuable perspectives based on their respective educational systems. Moreover, the panel's combination of backgrounds—from both traditional academic disciplines and interdisciplinary research environments—proved especially valuable in identifying not only opportunities but also the challenges that can arise in interdisciplinary research settings.

1.2. Preconditions for making the report

Prior to the visit, the panel members reviewed all provided materials and participated in several online preparatory meetings. The group held their initial in-person meeting on the first day of the site visit in Linköping. During this meeting, key areas were outlined, and specific questions and issues for further exploration were identified—both in general terms

and tailored to each research unit. The group also reviewed the instructions and guidelines, agreed on individual responsibilities, and, when necessary, divided tasks among themselves.

All five panel members were physically present in Linköping during the evaluation week (April 7–11, 2025). As requested, the panel focused on assessing the research units with respect to:

- Research and research quality
- Research culture
- Conditions for research
- General observations

The university's instructions emphasized a forward-looking perspective. The panel was asked to concentrate on future opportunities rather than past performance and to avoid making comparisons across the evaluated research units.

During the visit, the panel held three scheduled meetings with representatives from each research evaluation unit. These meetings were conducted separately and involved groups of senior researchers, mid-career researchers, and junior researchers (postdocs and/or PhD students).

The panel opened each meeting by inviting participants to describe the interdisciplinary identity of their research unit and how they practiced interdisciplinarity. This step helped the panel understand the relationship between individual researchers' original disciplinary backgrounds and the joint research focus of the unit. The panel then proceeded with more specific, pre-prepared questions targeting the critical areas identified in earlier discussions. These questions were adjusted based on the seniority level of each group to explore potential structural challenges relevant to different career stages.

Overall, the panel found the resources, assistance, and responsiveness of the research evaluation units to be excellent. We wish to acknowledge and commend Linköping University for their high-quality support throughout the evaluation process. The self-assessment report and appended materials represented a significant effort and demonstrated deep reflection.

Although the panel was provided with a well-written self-evaluation, the absence of publication lists early in the process made it more difficult to assess the quality of research beyond the basic bibliometric data that was provided. Early access to these lists would have offered a deeper understanding of the research units' research quality and publication strategies. We did, however, appreciate the late efforts by most units to compile and share this information, as it provided helpful additional context during the latter part of the evaluation.

1.3. The evaluated research unit

Based on the research unit's self-evaluation, as well as doctoral degree data, financial data, personnel data, and bibliometric analysis (within the LiRE25 context), we gained an

understanding of the research unit's background prior to the physical visit in Linköping accordingly:

The Division of Ageing and Social Change (ASC) at Linköping University is a interdisciplinary research environment focusing on ageing, life course dynamics, and societal transformation. ASC integrates perspectives from sociology, health sciences, and policy studies, contributing to both academic research and public policy. The division maintains strong international collaborations and secures external funding for research projects addressing demographic shifts and social challenges. Its work is widely disseminated through peer-reviewed publications, policy briefs, and open-access research. ASC's research is highly collaborative, with a significant share of publications involving international co-authors. The division wishes to engage actively to translate research findings into practice. With a strong commitment to open science, societal engagement, and policy impact, ASC wants to play a central role in advancing knowledge on ageing and social change.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

General observations

The connection between the research unit and the department

When the evaluation group asked researchers in the various research units organized under the IKOS department about their relationship to the department as a whole, there was a noticeable fragmentation. Although these units are formally organized under the same departmental structure, many researchers reported having little to no interaction with colleagues outside their own unit. This was a consistent theme across all levels of seniority.

While the physical separation between the Linköping and Norrköping campuses may contribute to this situation, the sense of fragmentation appears to go beyond geographical distance. There seems to be a lack of meaningful academic or collegial exchange between the research units, limiting opportunities for cross-unit collaboration, knowledge sharing, and the development of a shared departmental culture.

The only group that reported feeling connected to the broader IKOS structure were individuals in managerial or leadership roles, who engage more regularly with departmental administration and decision-making processes.

It is worth emphasizing, however, that many researchers spoke highly of the administrative support provided at the departmental level. This support was described as efficient, accessible, and highly appreciated.

On the one hand, this internal fragmentation may limit the potential synergies that could arise from being part of a larger department. Opportunities for collaboration, shared learning, and a stronger collective identity might be missed when research units operate in isolation. On the other hand, this fragmentation may also reflect a deeper structural issue—namely, that the current departmental organization may not be optimal for these research units, which may make it challenging to function as an integrated, larger unit in practice.

It is also important to note that this observation applies specifically to the research units organized under the IKOS department; researchers at TEMA T, by contrast, expressed that they do have collaborative relationships with other units within the overall TEMA department.

Teaching opportunities

A recurring concern across the interdisciplinary research units we evaluated was the challenging situation regarding teaching opportunities for junior and mid-career researchers. Many described the need to act as "entrepreneurs," independently seeking out teaching roles outside of their own research environments, sometimes even in other universities. Within the units themselves, there appears to be limited support or coordination to help early-career scholars access teaching opportunities, which places significant responsibility on individuals and may hinder their professional development.

Another challenge raised repeatedly was the lack of teaching opportunities for junior and mid-career researchers who do not speak Swedish fluently. As the vast majority of teaching at the undergraduate and master's levels is conducted in Swedish, international researchers are at a disadvantage. This issue not only limits their ability to gain crucial teaching experience but also affects their opportunities for promotion.

Even in research units where teaching is integrated—through doctoral training or hosting undergraduate/master's programs—junior researchers often struggle to secure enough teaching hours.

Given the importance of teaching experience for academic career progression, and since this appears to be a structural issue across several units, it seems necessary to address it at a level beyond the individual research unit.

Possible approaches could help mitigate this challenge:

- Centralized teaching coordination: Another solution could involve the establishment of a faculty- or university-level support function that helps coordinate and distribute teaching opportunities for early-career researchers in interdisciplinary environments. This would help ensure a more structured and equitable process, rather than leaving it to individual efforts.

- Affiliation with disciplinary departments: One strategy could be to ensure that junior scholars within interdisciplinary research units also retain an affiliation with their original disciplinary department, where most teaching is traditionally organized. This could provide better access to relevant teaching opportunities aligned with their background. It could also be worth exploring the possibility of offering specialization courses within existing programs in the traditional disciplines, thereby creating additional teaching opportunities for interdisciplinary researchers.
- Increasing English-taught courses: A further step could be to offer more courses in English, particularly at the master's level or within doctoral programs. Since much of the teaching material already used is in English, this would not require a major curricular shift but could significantly expand access for non-Swedish-speaking researchers to participate in teaching.

Stress

Another area of concern that emerged during our interviews with most of the researchers was the apparent high level of stress experienced by mid-career staff, and notably also reported by many senior researchers. This was to a certain extent also true for the senior researchers. This stress appears to stem largely from financial insecurity, and thereby the uncertainty of employment, presented within many of the interdisciplinary research units. The heavy reliance on external funding creates significant pressure on this group of researchers to continuously write and submit research grant applications, often with little to no institutional stability or core funding to rely on.

In many of the evaluated units, this was identified as a major concern, with considerable time and energy devoted to grant writing. It was also evident that several units operate with highly fragmented project portfolios, where it was not uncommon for individual researchers to be involved in five or more concurrent projects. While we acknowledge that this situation is partly a consequence of the university's overarching funding model, the cumulative effects on staff well-being, research quality, and strategic focus cannot be overlooked.

There seems to be a need for more strategic thinking in several of the research units when it comes to how they apply for funding. One possible way forward could be to build longer-term collaborations within smaller sub-groups of the unit, instead of creating new groups for each funding call. This approach could help researchers save time and reduce the constant pressure to apply for funding by making the process more efficient and less fragmented.

Working in more stable groups could also allow researchers to develop stronger themes in their work, improve continuity between projects, and make it easier to respond to new funding opportunities. In the long run, this could help make the research units more sustainable and support a better, less stressful work environment, especially for mid-career

researchers who are currently carrying a heavy burden. Another option is to utilize the units' research more in new teaching initiatives.

PhD students' future career choices

A fourth concern raised during our interviews relates to the level of career support provided to PhD students—and to some extent, postdoctoral researchers—in some of the interdisciplinary research units. Many PhD students expressed a desire for more guidance and information about what is expected of them in order to be competitive in the academic job market after completing their dissertations.

For example, several PhD students reported having chosen to write a monograph dissertation instead of a compilation of articles. While this is a legitimate format, it has become increasingly uncommon in many academic fields. The ability to write academic journal articles is a key skill for researchers, and publishing articles during the PhD period can provide valuable peer review and strengthen competitiveness for future academic positions. Despite this, some of the PhD students may not have had a clear discussion with their supervisors about the potential implications of choosing a monograph format over a compilation thesis. One argument mentioned by a PhD student was that this might be their only opportunity to write a book. While that may hold true in some cases, we believe that it is equally important that students are made aware of how their choice of dissertation format may influence their future opportunities in academia and beyond.

Although it was not a focal point in the interviews, one general observation relates to the potential role of alumni in research environments. Across the evaluated units, there is little or no mention of systematic alumni engagement in the self-evaluations. While informal contact with former colleagues and students likely occurs on an individual basis, more structured forms of alumni collaboration—such as contributing to curriculum development, participating in seminars, or joining advisory activities—do not appear to be in place.

Given Linköping University's strategic ambition to involve alumni in shaping the educational programs of the future, this may represent an untapped opportunity. Former PhD students and researchers, now active in other academic or professional contexts, could offer valuable perspectives based on recent experience and strengthen career opportunities. While such efforts may be more appropriately organized at the IKOS level, the units within the department might still benefit from reflecting on how contact with their alumni could be strengthened or better utilized in ways that align with their mission and capacity.

While senior researchers highlighted the strength of interdisciplinary environments based on the way different disciplinary perspectives are brought together to solve complex problems, most of the current PhD students seem not to be encouraged to maintain a connection to their original disciplinary background. Instead, the focus is placed almost exclusively on the interdisciplinary framework of the research unit.

We wish to raise a concern about this approach, while also recognizing that it may not be equally relevant for all students. Some PhD students enter with a clear disciplinary background, while others may come from more interdisciplinary or applied academic trajectories.:

Limited disciplinary foundation: For those with a disciplinary background—often grounded in a master's degree—there may be a risk that this foundation is not further developed during the PhD. In such cases, the lack of sustained disciplinary engagement could limit their ability to contribute deep, field-specific insights, which senior researchers themselves often see as central to productive interdisciplinary collaboration. At least the issue should be considered. Narrow career opportunities: In some cases, but of course not always, a strong emphasis on interdisciplinary work may limit future career opportunities for students whose fields still place importance on disciplinary identity. Many traditional academic departments remain cautious in hiring candidates without a visible disciplinary profile. For these students, having support to maintain some connection to their discipline could improve their competitiveness in both academic and applied job markets. This should be discussed.

Potential benefits of dual affiliation: Where appropriate, it might be beneficial to encourage PhD students to maintain some affiliation or interaction with their original disciplinary department. This could provide a broader academic identity, open additional teaching opportunities, and help position them for a wider range of future roles. In summary, while interdisciplinarity is clearly a strength in these research environments, we suggest that some flexibility might be helpful in supporting PhD students and postdocs. For those with a disciplinary background, greater attention to balancing interdisciplinary engagement with disciplinary anchoring could enhance their academic development and career prospects—without diminishing the integrative value of interdisciplinary research. However, that has to be done in ways that do not increase an already large workload.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

The Division of Ageing and Social Change (ASC) was institutionally established in 2018 with a faculty grant to cover two professorships and associated PhD positions. In the interview, the Head of research highlighted the history of the unit as an important issue. The historical narrative focused on building the unit from the ruins of the old institution and succeeding in reorganizing everything. The panel acknowledges and commends the unit's successful work in *developing into a interdisciplinary research environment* with strong international collaborations, substantial external funding, and a staff of 17 members at the time of writing the present report.

The panel's second observation concerns the *relevance*, *novelty* and *uniqueness* of the research performed in the unit. According to the unit's self-evaluation, it has "a clear focus on the concepts of ageing, life course and social change, the three main pillars of inequality, adaptation and context, as well as the policy orientation". The panel sees the unit's research topics as highly relevant and well aligned with LiU's profiling area "Societal Transformations". However, it was not clear neither from the unit's self-evaluation nor from the interviews with the staff—whether the research occupies a *unique position* in relation to the international research forefront, or what the *novelty* of the research carried out actually is. In the self-evaluation, the unit was portrayed as having gained "a high reputation in Swedish and European research on ageing, life course and social change", and in the interview senior researchers described the unit's position as "quite good" and "identifiable" within Europe.

Third, the panel invited the staff to describe the interdisciplinary identity of the unit and how *interdisciplinarity* is practiced. All researchers identified the unit as performing interdisciplinary ageing research, with a social science core. Besides having various disciplines represented in the unit, the appropriate array of disciplines to tackle each research problem is ensured through external collaboration and co-supervision. An example provided by the senior staff was the collaboration with LiU's Faculty of Medicine and Health Sciences, which was assessed as a challenging task in which progress had nevertheless been made. Even if interdisciplinarity clearly is a strength of the unit, there could still be untapped potential in collaboration with other prominent areas within LiU such as *adult education* and *computer science*. New collaborations related to the unit's focus on the "triple transition" (demographics, technology, climate) could contribute to the novelty of insights produced, as well as to the uniqueness of the unit's research profile. As older adult learning in informal, non-formal and formal education contexts is one of the key processes in ageing, life course,

social change and adaptation, it could enrich the unit's perspectives, while also being an under-researched area, and thus meriting further research.

A fourth issue—connected to the previous ones—concerns *the relation* of the unit's research programmes and projects to its key research themes: Ageing and Social Structure, Ageing between Health and Disease, and Ageing in Context. While the first two themes are well-covered by the research programmes and projects, the third one, *Ageing in Context*, is broader than the research performed in the unit's research programmes and projects that presently target almost exclusively late working life. The panel, however, acknowledges that the recent recruitment of a second full professor—specializing in inequalities in older adults' social relationships, loneliness and health—will promote opportunities to target also other societal contexts of ageing beyond late working life.

Fifth, the unit self-evaluates its *academic performance* as "very good" with strong *external funding* being one indicator. The financial data indicates substantial external funding, which has, however, slightly decreased from 2020 to 2023, and in 2023, came almost entirely from Swedish funders. In light of the size of staff, the *number of publications* is high, the publications representing mostly sociology and media and communications. The bibliometric analysis indicates a dominance of *journal articles*, though their share *in level-2 journals* is smaller than that of LiU and Faculty of Arts and Sciences. The unit acknowledges this in their self-evaluation. Conversely, the share of *open access journal articles* is higher than that at LiU and Faculty of Arts and Sciences. The unit is very strong in *international co-authorship*, reaching the level of LiU and exceeding that of Faculty of Arts and Sciences. The citation analysis, interpreted here with caution, suggests that the citation impact of journal articles is comparable to that of LiU and Faculty of Arts and Sciences. Contrary to the very good research output, the *popular dissemination* of the unit's research is less advanced, in particular, in terms of "popular science articles" in Swedish. In the interview, the senior researchers reported efforts to invest more in public engagement and challenges in contacting and communicating with industry and ministries, while communication with municipalities was assessed as being more successful.

Recommendations

- To produce even more holistic insights into ageing and social change, and to enrich the thematic scope of research performed within the unit's key theme "Ageing in Context", we recommend that the unit seeks opportunities to secure funding for research that also targets ageing in other societal contexts beyond late working life.
- To differentiate and distinguish the unit's research profile in relation to the international research forefront, and to strengthen the unit's interdisciplinarity, we recommend that the unit continues its efforts to integrate medicine and health sciences (incl. the nursing community) and explores opportunities to integrate adult education and computer science into the research through collaborations and recruiting.
- To strengthen the popular dissemination of its research, we recommend that the unit develops—with support from LiU and units that are successful in popular

dissemination—a dedicated strategy and concrete measures for communicating with industry and ministries.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The unit's *publication strategy* emphasizes international and interdisciplinary peer-reviewed journal articles, as evidenced also by the bibliometric analysis. When interviewed, all staff members clearly agreed on the strategy. The unit's publication strategy is a justifiable choice from the perspective of their highly interdisciplinary and international research.

The unit has been successful in *recruiting* a substantial number of talented researchers since its establishment in 2018, presently including 17 members (10 female, 7 male). From the interview with the senior staff, it was clear that recruiting was not a problem from the perspective of the unit's attractiveness. Based on the self-evaluation report and interviews with senior and early career researchers, opportunities for early-career researchers *to handle career development and independence* are provided in numerous ways such as meetings with supervisors, PhD training, international networking, and the National Graduate School on Ageing and Health (SWEAH), which offers also alumni programs for post-docs.

The panel agrees with the self-evaluation in that *the PhD program* is ”running well” and acknowledges the importance of the unit's involvement in SWEAH. However, both the self-evaluation and discussions with the PhD students revealed a need to further develop PhD training through building a jointly organized onboarding programme at the department level and to improve the LiU PhD course website. In terms of *future competence development*, the middle career interviewees expressed a need to develop skills in leadership, PhD supervision, funding applications, technological and climate change, and advanced quantitative methods. The training offerings did not always meet the needs—both in terms of content and time allocation. The interviews corroborated the self-evaluation in that LiU support for mid-career researchers is not yet adequate. We would also like to raise the issue of lifelong learning, as senior staff may also need and benefit from support for their competence development.

The unit is very active in establishing both *academic and non-academic national and international collaborations*. However, the self-evaluation identified “Scarcity of cross- and intra-departmental cooperation” as a weakness of the unit, sometimes leading to partial isolation, which the interviews corroborated. A lack of opportunities to exchange knowledge and experiences at the department level was brought up also in the discussions with the PhD students. From an intra-unit perspective, the unit has succeeded in developing *collegiality* and, to cite the self-evaluation, ”a culture of collaboration and mutual support”. The interviews with mid- and early career researchers corroborated this, as the researchers described the unit as ”very low hierarchy”,” on eye level”, ”very friendly”, and ”inclusive”.

Recommendations

- To enhance the PhD training and researchers' competence development, we recommend measures at the LiU and department level. These could include a jointly organized PhD onboarding programme, improvements on the LiU PhD course website, and flexible, need-based training tailored for middle-career as well as for senior staff.
- To prevent the unit's intra-university isolation, we recommend LiU and department level measures such as a PhD onboarding programme. In addition, we recommend that the unit explores new possibilities for collaboration with Faculties of Medicine & Health Sciences; Educational Sciences (adult and popular education); and Science & Engineering.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The self-evaluation, data package, and the interviews indicated that the *organization of the unit* stimulates high quality research and good working conditions. The panel agrees with the unit's self-evaluation in that the unit has "reached its self-defined 'good structure'". However, even if new recruitments are not a problem from the perspective of attracting talented researchers, affording the recruitments is a challenge for the unit.

Based on the self-evaluation and interviews, the panel's impression is that the Head of research holds a prominent position of authority and influence in the unit—its past, present and future. However, measures to *distribute leadership roles* and *responsibilities* have also been made, most recently the appointment of a second full professor. While the overall *balance* between research, teaching and other duties seemed to be good among the staff, some mid- and early career researchers mentioned occasional stress caused by teaching, albeit simultaneously showing a highly positive attitude towards teaching.

The unit has secured substantial, although slightly decreasing *external funding*. The unit has good strategies to maintain and even increase its external funding. In the interview the senior researchers reported that the unit surveys both EU and special calls, but lacks adequate resources to build highly competitive, large-scale applications. The unit relies much on international networks for initiating applications.

While the unit views the *support functions* mostly as highly valuable and sufficient—department's administrative support even as excellent—the self-evaluation and the interview with the senior staff revealed discontent with university support for funding (Grants office), internationalisation, and communication. Furthermore, both the self-evaluation and the interview with the senior staff pointed to the experienced incongruence between the academic priorities of the department and those of the unit.

Recommendations

- To mitigate the potential vulnerabilities related to the prominent position of the Head of research, we recommend that the unit sustains its measures to distribute the leadership roles and responsibilities and provide support for the distributed leadership roles.
- To promote the unit's high-quality research and good working conditions, we recommend improvements in LiU's support for external funding, internationalisation and communication. We also recommend that the incongruence experienced by the senior researchers between the academic priorities of the department and those of the unit will be brought up and opportunities to solve it will be explored at the department and LiU levels.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The panel commends the Division of Ageing and Social Change (ASC) for its rapid development into a vibrant, interdisciplinary, and internationally engaged research environment. In just a few years, ASC has established a strong foundation of high-quality research and international collaboration. The division's commitment to interdisciplinarity and policy-relevance positions it well to contribute meaningfully to societal transformations related to ageing. This is an especially important and timely area of research, as demographic shifts mean that societies around the world are facing the challenges and opportunities that come with an ageing population.

At the same time, ASC is now at an important stage in its development as a research unit. Moving forward, it will be important to focus on strengthening and broadening its research areas—especially those that are not yet fully developed, like the wider social aspects of ageing. Building stronger collaborations with other university departments and improving how research is shared with the public will help raise the unit's profile and increase its impact on society. It is also important for the unit to continue developing a broader and more distributed leadership structure. This will reduce the group's dependence on a few key individuals and help ensure long-term stability and resilience in the face of future challenges.

Panel Q Report- Centre for Local Government Studies (CKS)

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

1.1. Composition of the panel

The panel, chaired by Charlotta Mellander from Jönköping University, SE comprised experts from various academic disciplines. The panel members were Päivi Rasi-Heikkinen from the University of Lapland, FI (Professor of Education), Mikael Granberg from Karlstad University, SE (Professor of Political Science), Thomas P. Boje from Roskilde University, DK (Professor emeritus of Sociology), and Knut Holtan Sørensen from the Norwegian University of Science and Technology, NO (Professor emeritus of Science and Technology Studies).

Each evaluator had been nominated by a specific research unit and, accordingly, served as the main responsible evaluator for that unit. While the assessments were carried out collaboratively and discussed thoroughly within the panel, the lead evaluator had particular responsibility for synthesizing observations and drafting the evaluation for their assigned unit. In the case of the Centre for Local Government Studies (CKS), Mikael Granberg was the main responsible evaluator.

The overall composition of the panel made it possible to draw upon a wide range of disciplinary and interdisciplinary expertise and institutional experiences. Each member contributed unique insights. For example, direct experience within the Swedish context enabled the panel to better understand the local dynamics and challenges faced by higher education institutions in Sweden. At the same time, members from international institutions offered valuable perspectives based on their respective educational systems. Moreover, the panel's combination of backgrounds—from both traditional academic disciplines and interdisciplinary research environments—proved especially valuable in identifying not only opportunities but also the challenges that can arise in interdisciplinary research settings.

1.2. Preconditions for making the report

Prior to the visit, the panel members reviewed all provided materials and participated in several online preparatory meetings. The group held their initial in-person meeting on the first day of the site visit in Linköping. During this meeting, key areas were outlined, and specific questions and issues for further exploration were identified—both in general terms

and tailored to each research unit. The group also reviewed the instructions and guidelines, agreed on individual responsibilities, and, when necessary, divided tasks among themselves.

All five panel members were physically present in Linköping during the evaluation week (April 7–11, 2025). As requested, the panel focused on assessing the research units with respect to:

- Research and research quality
- Research culture
- Conditions for research
- General observations

The university's instructions emphasized a forward-looking perspective. The panel was asked to concentrate on future opportunities rather than past performance and to avoid making comparisons across the evaluated research units.

During the visit, the panel held three scheduled meetings with representatives from each research evaluation unit. These meetings were conducted separately and involved groups of senior researchers, mid-career researchers, and junior researchers (postdocs and/or PhD students).

The panel opened each meeting by inviting participants to describe the interdisciplinary identity of their research unit and how they practiced interdisciplinarity. This step helped the panel understand the relationship between individual researchers' original disciplinary backgrounds and the joint research focus of the unit. The panel then proceeded with more specific, pre-prepared questions targeting the critical areas identified in earlier discussions. These questions were adjusted based on the seniority level of each group to explore potential structural challenges relevant to different career stages.

Overall, the panel found the resources, assistance, and responsiveness of the research evaluation units to be excellent. We wish to acknowledge and commend Linköping University for their high-quality support throughout the evaluation process. The self-assessment report and appended materials represented a significant effort and demonstrated deep reflection.

Although the panel was provided with a well-written self-evaluation, the absence of publication lists early in the process made it more difficult to assess the quality of research beyond the basic bibliometric data that was provided. This comment is generic to the whole evaluation process and early access to these lists would have offered a deeper understanding of the research units' research quality and publication strategies.

1.3. The evaluated research unit

Based on the research unit's self-evaluation, as well as doctoral degree data, financial data, personnel data, and bibliometric analysis (within the LiRE25 context), we gained an understanding of the research unit's background prior to the physical visit in Linköping accordingly:

The Centre for Local Government Studies (CKS) at Linköping University is a multidisciplinary research center focused on local governance, democracy, and regional development. Established as a bridge between academia and society, CKS conducts research that informs policymaking and strengthens municipal capacity. CKS's research spans political science, sociology, and social and economic geography, with a strong emphasis on applied studies relevant to local and regional governance. The center collaborates extensively with municipalities, regional authorities, and policymakers. The center's publication strategy includes both international journal articles and Swedish-language outputs tailored for practitioners and policymakers. CKS prioritizes open-access research, enhancing the accessibility and societal impact of its work. By integrating academic inquiry with practical policy engagement, CKS wants to play a vital role in advancing knowledge on governance, democracy, and regional development.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

General observations

The connection between the research unit and the department

When the evaluation group asked researchers in the various research units organized under the IKOS department about their relationship to the department as a whole, there was a noticeable fragmentation. Although these units are formally organized under the same departmental structure, many researchers reported having little to no interaction with colleagues outside their own unit. This was a consistent theme across all levels of seniority.

While the physical separation between the Linköping and Norrköping campuses may contribute to this situation, the sense of fragmentation appears to go beyond geographical distance. There seems to be a lack of meaningful academic or collegial exchange between the research units, limiting opportunities for cross-unit collaboration, knowledge sharing, and the development of a shared departmental culture.

The only group that reported feeling connected to the broader IKOS structure were individuals in managerial or leadership roles, who engage more regularly with departmental administration and decision-making processes.

It is worth emphasizing, however, that many researchers spoke highly of the administrative support provided at the departmental level. This support was described as efficient, accessible, and highly appreciated.

On the one hand, this internal fragmentation may limit the potential synergies that could arise from being part of a larger department. Opportunities for collaboration, shared learning, and a stronger collective identity might be missed when research units operate in

isolation. On the other hand, this fragmentation may also reflect a deeper structural issue—namely, that the current departmental organization may not be optimal for these research units, which may make it challenging to function as an integrated, larger unit in practice.

It is also important to note that this observation applies specifically to the research units organized under the IKOS department; researchers at TEMA T, by contrast, expressed that they do have collaborative relationships with other units within the overall TEMA department.

Teaching opportunities

A recurring concern across the interdisciplinary research units we evaluated was the challenging situation regarding teaching opportunities for junior and mid-career researchers. Many described the need to act as "entrepreneurs," independently seeking out teaching roles outside of their own research environments, sometimes even in other universities. Within the units themselves, there appears to be limited support or coordination to help early-career scholars access teaching opportunities, which places significant responsibility on individuals and may hinder their professional development.

Another challenge raised repeatedly was the lack of teaching opportunities for junior and mid-career researchers who do not speak Swedish fluently. As the vast majority of teaching at the undergraduate and master's levels is conducted in Swedish, international researchers are at a disadvantage. This issue not only limits their ability to gain crucial teaching experience but also affects their opportunities for promotion.

Even in research units where teaching is integrated—through doctoral training or hosting undergraduate/master's programs—junior researchers often struggle to secure enough teaching hours.

Given the importance of teaching experience for academic career progression, and since this appears to be a structural issue across several units, it seems necessary to address it at a level beyond the individual research unit.

Possible approaches could help mitigate this challenge:

- Centralized teaching coordination: Another solution could involve the establishment of a faculty- or university-level support function that helps coordinate and distribute teaching opportunities for early-career researchers in interdisciplinary environments. This would help ensure a more structured and equitable process, rather than leaving it to individual efforts.
- Affiliation with disciplinary departments: One strategy could be to ensure that junior scholars within interdisciplinary research units also retain an affiliation with their original disciplinary department, where most teaching is traditionally organized. This could provide better access to relevant teaching opportunities aligned with their background. It could also be worth exploring the possibility of offering specialization courses within existing

programs in the traditional disciplines, thereby creating additional teaching opportunities for interdisciplinary researchers.

- Increasing English-taught courses: A further step could be to offer more courses in English, particularly at the master's level or within doctoral programs. Since much of the teaching material already used is in English, this would not require a major curricular shift but could significantly expand access for non-Swedish-speaking researchers to participate in teaching.

Stress

Another area of concern that emerged during our interviews with most of the researchers was the apparent high level of stress experienced by mid-career staff, and notably also reported by many senior researchers. This was to a certain extent also true for the senior researchers. This stress appears to stem largely from financial insecurity, and thereby the uncertainty of employment, presented within many of the interdisciplinary research units. The heavy reliance on external funding creates significant pressure on this group of researchers to continuously write and submit research grant applications, often with little to no institutional stability or core funding to rely on.

In many of the evaluated units, this was identified as a major concern, with considerable time and energy devoted to grant writing. It was also evident that several units operate with highly fragmented project portfolios, where it was not uncommon for individual researchers to be involved in five or more concurrent projects. While we acknowledge that this situation is partly a consequence of the university's overarching funding model, the cumulative effects on staff well-being, research quality, and strategic focus cannot be overlooked.

There seems to be a need for more strategic thinking in several of the research units when it comes to how they apply for funding. One possible way forward could be to build longer-term collaborations within smaller sub-groups of the unit, instead of creating new groups for each funding call. This approach could help researchers save time and reduce the constant pressure to apply for funding by making the process more efficient and less fragmented.

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A fourth concern raised during our interviews relates to the level of career support provided to PhD students—and to some extent, postdoctoral researchers—in some of the interdisciplinary research units. Many PhD students expressed a desire for more guidance

and information about what is expected of them in order to be competitive in the academic job market after completing their dissertations.

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Given Linköping University's strategic ambition to involve alumni in shaping the educational programs of the future, this may represent an untapped opportunity. Former PhD students and researchers, now active in other academic or professional contexts, could offer valuable perspectives based on recent experience and strengthen career opportunities. While such efforts may be more appropriately organized at the IKOS level, the units within the department might still benefit from reflecting on how contact with their alumni could be strengthened or better utilized in ways that align with their mission and capacity.

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We wish to raise a concern about this approach, while also recognizing that it may not be equally relevant for all students. Some PhD students enter with a clear disciplinary background, while others may come from more interdisciplinary or applied academic trajectories.:

Limited disciplinary foundation: For those with a disciplinary background—often grounded in a master's degree—there may be a risk that this foundation is not further developed during the PhD. In such cases, the lack of sustained disciplinary engagement could limit their ability to contribute deep, field-specific insights, which senior researchers themselves often

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Potential benefits of dual affiliation: Where appropriate, it might be beneficial to encourage PhD students to maintain some affiliation or interaction with their original disciplinary department. This could provide a broader academic identity, open additional teaching opportunities, and help position them for a wider range of future roles. In summary, while interdisciplinarity is clearly a strength in these research environments, we suggest that some flexibility might be helpful in supporting PhD students and postdocs. For those with a disciplinary background, greater attention to balancing interdisciplinary engagement with disciplinary anchoring could enhance their academic development and career prospects—without diminishing the integrative value of interdisciplinary research. However, that has to be done in ways that do not increase an already large workload.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

CKS identifies itself as interdisciplinary with three thematic focuses: Local Politics and Democracy, Management, Organization and Welfare, and Local Development and Community Planning. According to the interviewees, there is a "disciplinary bias" in all three thematic focus areas: Local Politics and Democracy has a tendency towards political science, Management, Organization and Welfare towards social work and Local Development and Community Planning towards geography. CKS focuses on relevant research topics and is one of the leading research centers in local government studies in Sweden and Europe and the close collaboration with the municipalities stands out as a clear strength from this perspective with the potential of facilitating an innovative research agenda.

According to the senior scholars, CKS interdisciplinarity is integrated in the cross-disciplinary work, but also in the use of methods. The focus is on the research problem and not defined or driven by disciplinary perspectives. Hence, interdisciplinarity is stated as CKS natural approach. CKS is currently missing expertise in economics as well as organisation and management of welfare policies. It is perceived that such perspectives could add to CKS broader competence.

A core strength of CKS is outreach and a close collaboration with municipalities and the number of policy briefs and commissioned research is a clear indication of the CKS's outreach ambition and strive for societal impact. The close collaboration with the municipalities is also a foundation for the societal relevance of CKS research output. Accordingly, the research output must be considered as having strong impact outside academia and the growing body of publications in the international academic context indicates a growing relevance and impact in the scientific community. The perception among the interviewees at all stages of their academic career is that CKS has high academic standards combined with clear utility for municipal actors.

According to the senior scholars CKS continuously work on developing its research program as a basis for funding possibilities and in order to keep the research focus areas relevant.

Recommendations

CKS appears to successfully balance societal relevance with impact in the scientific community. However, an analysis is needed on the potential impact of the increasing emphasis on publishing in internationally peer-reviewed journals and books, as well

assecuring external funding on CKS core strength - its outreach and close collaboration with municipalities. This strength is central to the future identity of CKS and, perhaps even more crucially, to maintaining a stable funding situation grounded in the relevance to, and collaboration with, the regional municipalities.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

CKS has an open publication strategy and does not recommend specific journals. CKS publishes in both disciplinary journals and in interdisciplinary journals. At CKS there is a tradition of publishing in Swedish in order to reach the important target group: the Swedish municipalities. Currently, there is a clear increase in international peer review publications, and the publication strategy entail a growing emphasis on internationally peer-reviewed journals and books. Swedish-language publications, however, still represent an important share of the total publication volume. Individual researchers and individual research projects at CKS can have a publishing strategy based on the subject area of the project. The junior/mid-level scholars stated that individual publication strategies are discussed with senior researchers.

CKS is very closely affiliated with the regional municipalities (that are also a main funder through a consortium). The senior researchers at CKS state that CKS has developed a “skill” in communicating with the public actors and understanding their needs. This is not only about “end use” of a research result but an interactive, ongoing process in all phases of the research process. CKS also continuously reports what has emerged as central issues back to the municipalities annually with the aim of maintaining the relevance of CKS and its research. This has clear impacts on the identity and research culture of CKS.

All of the interviewees stress that CKS is an interdisciplinary environment grounded in its close contact with the municipalities. CKS has a weekly seminar where researchers meet and present research ideas and challenges. Full papers are not expected. All researchers are expected to be present at the seminar at least once per semester. The researchers state that the seminars are characterized by a clear scientific openness. The weekly seminars are attended by many, are highly interactive and there are exchanges between researchers from different disciplinary perspectives. The seminars stimulate co-writing and exchange of different methodological experiences. The size of CKS also allows for smaller research clusters focused on specific research areas. The seminars are perceived as an important component in building a common identity and in keeping CKS together.

CKS has also identified aging as one of the key societal challenges that needs to be tackled by research in the coming five years. Given this thematic priority, a collaboration with the

Division of Aging and Social Change (ASC) group—another research unit within the IKOS department that focuses on aging, life courses, and social change—is strongly recommended. While collaboration across units within the department seems to have been generally weak, as noted in interviews with many researchers across IKOS, such a partnership could create valuable synergies, enhance interdisciplinary output, and help address complex societal issues more effectively.

It is, in general, considered by the researchers to be a very supportive environment. The interviews highlighted how, as a younger researcher, it is good to develop both your interdisciplinary skills, and your disciplinary competence and skill set and find a balance in doing this. To get promoted, you need to publish in ways that are accepted within your discipline.

It is stated in the interviews that it is possible to keep a disciplinary profile in an interdisciplinary environment and still thrive as a researcher, as you get many important inputs from other disciplines (both theoretical and methodological) which broaden your perspective on your own research and can also lead to a broader research interest. At the same time, the interdisciplinary approach in combination with fulfilling the demands of a discipline can be challenging.

The researchers interviewed stated that they are satisfied with the balance between teaching, research and administration.

Recommendations

For junior researchers it is important to address, with the aid of senior researchers and supervisors, the potential challenges in being part of an interdisciplinary research environment while fulfilling disciplinary criteria and demands associated with PhD education, dissertation and a future academic career. This could be a theme incorporated into the seminar series in ways that would help junior scholars orient themselves if/when they embark on a career in academia.

CKS could initiate collaboration with the Division of Aging and Social Change (ASC), which has a strong research focus on aging, life courses, and social change. Given CKS's identification of aging as a key societal challenge for the coming years, partnering with ASC could provide valuable expertise, strengthen interdisciplinary research, and help address the current lack of collaboration across units within the IKOS department.

CKS seem to have an open and professional research culture that relies heavily on the weekly seminar. From the evaluators' perspective, efforts should be made to build a broader research culture that goes beyond the weekly seminar. Is the common interest in municipalities enough as a foundation for a cohesive research culture?

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The stable funding and close collaboration with the municipalities give CKS access to data and a closeness to municipal problem definitions that facilitates policy-relevant research and contributes to CKS's identity. On top of the stable "base" funding, CKS has a clear increase in external funding over the period 2020-2023.

In the SWOT analysis, CKS highlights the strengths of established collaborations with municipalities, multidisciplinary research focus, and strong societal engagement; weaknesses include the lack of dedicated PhD programs and limited control over undergraduate teaching (which we will discuss this in more detail below); opportunities involve addressing societal challenges such as climate change, ageing populations, and urban-rural dynamics, and threats include dependence on municipal funding and competition for research funding (which we also will discuss in more detail below).

Senior scholars see the lack of dedicated PhD programs and limited control over undergraduate teaching as a problem. PhD supervision and teaching are important components in the career development of PhD students and junior/mid-level scholars and are central in building merits for future academic positions and promotions.

Also, junior scholars raised the issue that CKS does not have a bachelor program and that this makes teaching opportunities and education merits hard to reach. Teaching opportunities can be found at other LiU departments, but this requires "hunting" for teaching opportunities taking away valuable time from research, etc. The junior/mid-level scholars also raised the issue that there are very few PhD students at CKS and this makes it harder to get supervision experience - something that can influence academic careers, as positions and promotions can become harder to attain.

Postdocs stated that there was somewhat unclear what was expected from them when coming to CKS and that they found it confusing to land in a new environment without guidance. At the same time junior scholars noted that it is quite clear what is needed for an academic career - even though there is no formal structure for this at CKS, there is openness among senior colleagues to give career advice and support. There is also a willingness from senior staff to support external funding applications. There is, however, limited opportunity for junior researchers to remain at CKS, and they have to look for positions elsewhere.

A junior scholar stated that there are many upsides to being part of CKS, including stable funding that makes a larger share of research possible, avoids teaching "overload," and also provides space to work on external funding applications. Taken together, this means that junior scholars perceive CKS as a good place to be in an early academic career.

The interviewees are positive towards the administrative support they receive, especially financial support when working with funding applications.

Recommendations

The stable funding from regional municipalities can be seen as both a strength and a vulnerability. The interviews indicated an awareness of this vulnerability. At the same time, it was revealed that there is no clear plan for addressing this potential problem. CKS needs to expand its share of external funding, but the reviewers are concerned about the long-term sustainability given the significant dependence on such funding. Here CKS - together with the faculty board and the central university administration - should find ways to alleviate this dependence on external funding.

CKS should develop an "onboarding" program to introduce new staff to CKS - its identity, conditions (e.g., the high pressure to compete for external funding), and research culture. This is especially relevant for PhD students and junior scholars joining CKS.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The evaluators see CKS's core strength in the collaboration with the municipalities, built on long-standing experience. Senior researchers appear to be most heavily invested in this. From the interviews, we draw the conclusion that postdocs' primary interest is to establish themselves as individual researchers, and not necessarily to collaborate with municipalities. This could be connected to the vulnerable position created by a two-year postdoc. It seems like a challenge to deliver high academic quality and policy-relevant local government research. CKS seems to be able to handle this challenge, but the evaluators question if this will be sustainable in the longer run - especially if junior and mid-level scholars are not invested in it to the same degree as the senior researchers.

There are problems with the career paths for junior scholars, particularly regarding teaching and PhD supervision. The evaluators are concerned about the model in which junior and mid-level scholars act as entrepreneurs, forced to individually "chase" teaching and PhD supervision opportunities. This creates great pressure on this group and poses a challenge to CKS as a whole. The problem is currently handled through collaboration with other departments. However, this appears to be a broader issue at the University, involving other units as well, and it indicates that the University needs to actively address this issue and implement supportive structures that facilitate career paths for junior scholars. This would most likely lead to better working conditions and also facilitate recruitment.

Panel Q Report - Institute for Research on Migration, Ethnicity, and Society

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

1.1. Composition of the panel

The panel, chaired by Charlotta Mellander from Jönköping University, comprised experts from various academic disciplines. The panel members were Päivi Rasi-Heikkinen from the University of Lapland, FI (Professor of Education), Mikael Granberg from Karlstad University, SE (Professor of Political Science), Thomas P. Boje from Roskilde University, DK (Professor of Sociology), and Knut Holtan Sørensen from the Norwegian University of Science and Technology, NO (Professor emeritus of Science and Technology Studies).

Each evaluator had been nominated by a specific research unit and, accordingly, served as the main responsible evaluator for that unit. While the assessments were carried out collaboratively and discussed thoroughly within the panel, the lead evaluator had responsibility for synthesizing observations and drafting the evaluation for their assigned unit. In the case of the Institute for Research on Migration, Ethnicity, and Society (REMESO) professor Thomas P. Boje was the main responsible evaluator.

The overall composition of the panel made it possible to draw upon a wide range of disciplinary and interdisciplinary expertise and institutional experiences. Each member contributed unique insights. For example, direct experience within the Swedish context enabled the panel to better understand the local dynamics and challenges faced by higher education institutions in Sweden. At the same time, members from international institutions offered valuable perspectives based on their respective educational systems. Moreover, the panel's combination of backgrounds—from both traditional academic disciplines and interdisciplinary research environments—proved especially valuable in identifying not only opportunities but also the challenges that can arise in interdisciplinary research settings.

1.2. Preconditions for making the report

Prior to the visit, the panel members reviewed all provided materials and participated in several online preparatory meetings. The group held their initial in-person meeting on the first day of the site visit in Linköping. During this meeting, key areas were outlined, and specific questions and issues for further exploration were identified—both in general terms

and tailored to each research unit. The group also reviewed the instructions and guidelines, agreed on individual responsibilities, and, when necessary, divided tasks among themselves.

All five panel members were physically present in Linköping during the evaluation week (April 7–11, 2025). As requested, the panel focused on assessing the research units with respect to:

- Research and research quality
- Research culture
- Conditions for research
- General observations

The university's instructions emphasized a forward-looking perspective. The panel was asked to concentrate on future opportunities rather than past performance and to avoid making comparisons across the evaluated research units.

During the visit, the panel held three scheduled meetings with representatives from each research evaluation unit. These meetings were conducted separately and involved groups of senior researchers, mid-career researchers, and junior researchers (postdocs and/or PhD students).

The panel opened each meeting by inviting participants to describe the interdisciplinary identity of their research unit and how they practiced interdisciplinarity. This step helped the panel understand the relationship between individual researchers' original disciplinary backgrounds and the joint research focus of the unit. The panel then proceeded with more specific, pre-prepared questions targeting the critical areas identified in earlier discussions. These questions were adjusted based on the seniority level of each group to explore potential structural challenges relevant to different career stages.

Overall, the panel found the resources, assistance, and responsiveness of the research evaluation units to be excellent. We wish to acknowledge and commend Linköping University for their high-quality support throughout the evaluation process. The self-assessment report and appended materials represented a significant effort and demonstrated deep reflection.

Although the panel was provided with a well-written self-evaluation, the absence of publication lists early in the process made it more difficult to assess the quality of research beyond the basic bibliometric data that was provided. Early access to these lists would have offered a deeper understanding of the research units' research quality and publication strategies. We did, however, appreciate the late efforts by most units to compile and share this information, as it provided helpful additional context during the latter part of the evaluation.

1.3. The evaluated research unit

Based on the research unit's self-evaluation, as well as doctoral degree data, financial data, personnel data, and bibliometric analysis (within the LiRE25 context), we gained an

understanding of the research unit's background prior to the physical visit in Linköping accordingly:

The Institute for Research on Migration, Ethnicity, and Society (REMESO) was established in 2008 as a Center of Excellence, with funding from the Swedish Research Council for Health, Working Life, and Welfare (FORTE) together with funding provided by Linköping University (LiU), and Norrköping Municipality.

In 2017, the extensive program funding ended after an evaluation stating, "REMESO has become a leading center for research on migration and ethnicity, with a growing reputation for the quality of its research both in the Nordic context and, more broadly, in Europe and internationally" (FORTE Centers of Excellence Evaluation, 2018).

By the end of the Center of Excellence program the institute of REMESO developed a strategy document "*REMESO—2018 and beyond*," which has been updated and has provided guidelines for research development over the past years. Today, REMESO is a university-wide institute and a division within the Department of Culture and Society (IKOS). Situated at Campus Norrköping, with about 30 faculty members and PhD students and it collaborates with around 20 affiliated researchers.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

General observations

The connection between the research unit and the department

When the evaluation group asked researchers in the various research units organized under the IKOS department about their relationship to the department as a whole, there was a noticeable fragmentation. Although these units are formally organized under the same departmental structure, many researchers reported having little to no interaction with colleagues outside their own unit. This was a consistent theme across all levels of seniority.

While the physical separation between the Linköping and Norrköping campuses may contribute to this situation, the sense of fragmentation appears to go beyond geographical distance. There seems to be a lack of meaningful academic or collegial exchange between the research units, limiting opportunities for cross-unit collaboration, knowledge sharing, and the development of a shared departmental culture.

The only group that reported feeling connected to the broader IKOS structure were individuals in managerial or leadership roles, who engage more regularly with departmental administration and decision-making processes.

It is worth emphasizing, however, that many researchers spoke highly of the administrative support provided at the departmental level. This support was described as efficient, accessible, and highly appreciated.

On the one hand, this internal fragmentation may limit the potential synergies that could arise from being part of a larger department. Opportunities for collaboration, shared learning, and a stronger collective identity might be missed when research units operate in isolation. On the other hand, this fragmentation may also reflect a deeper structural issue—namely, that the current departmental organization may not be optimal for these research units, which may make it challenging to function as an integrated, larger unit in practice.

It is also important to note that this observation applies specifically to the research units organized under the IKOS department; researchers at TEMA T, by contrast, expressed that they do have collaborative relationships with other units within the overall TEMA department.

Teaching opportunities

A recurring concern across the interdisciplinary research units we evaluated was the challenging situation regarding teaching opportunities for junior and mid-career researchers. Many described the need to act as "entrepreneurs," independently seeking out teaching roles outside of their own research environments, sometimes even in other universities. Within the units themselves, there appears to be limited support or coordination to help early-career scholars access teaching opportunities, which places significant responsibility on individuals and may hinder their professional development.

Another challenge raised repeatedly was the lack of teaching opportunities for junior and mid-career researchers who do not speak Swedish fluently. As the vast majority of teaching at the undergraduate and master's levels is conducted in Swedish, international researchers are at a disadvantage. This issue not only limits their ability to gain crucial teaching experience but also affects their opportunities for promotion.

Even in research units where teaching is integrated—through doctoral training or hosting undergraduate/master's programs—junior researchers often struggle to secure enough teaching hours.

Given the importance of teaching experience for academic career progression, and since this appears to be a structural issue across several units, it seems necessary to address it at a level beyond the individual research unit.

Possible approaches could help mitigate this challenge:

- Centralized teaching coordination: Another solution could involve the establishment of a faculty- or university-level support function that helps coordinate and distribute teaching opportunities for early-career researchers in interdisciplinary

environments. This would help ensure a more structured and equitable process, rather than leaving it to individual efforts.

- Affiliation with disciplinary departments: One strategy could be to ensure that junior scholars within interdisciplinary research units also retain an affiliation with their original disciplinary department, where most teaching is traditionally organized. This could provide better access to relevant teaching opportunities aligned with their background. It could also be worth exploring the possibility of offering specialization courses within existing programs in the traditional disciplines, thereby creating additional teaching opportunities for interdisciplinary researchers.

- Increasing English-taught courses: A further step could be to offer more courses in English, particularly at the master's level or within doctoral programs. Since much of the teaching material already used is in English, this would not require a major curricular shift but could significantly expand access for non-Swedish-speaking researchers to participate in teaching.

Stress

Another area of concern that emerged during our interviews with most of the researchers was the apparent high level of stress experienced by mid-career staff, and notably also reported by many senior researchers. This was to a certain extent also true for the senior researchers. This stress appears to stem largely from financial insecurity, and thereby the uncertainty of employment, presented within many of the interdisciplinary research units. The heavy reliance on external funding creates significant pressure on this group of researchers to continuously write and submit research grant applications, often with little to no institutional stability or core funding to rely on.

In many of the evaluated units, this was identified as a major concern, with considerable time and energy devoted to grant writing. It was also evident that several units operate with highly fragmented project portfolios, where it was not uncommon for individual researchers to be involved in five or more concurrent projects. While we acknowledge that this situation is partly a consequence of the university's overarching funding model, the cumulative effects on staff well-being, research quality, and strategic focus cannot be overlooked.

There seems to be a need for more strategic thinking in several of the research units when it comes to how they apply for funding. One possible way forward could be to build longer-term collaborations within smaller sub-groups of the unit, instead of creating new groups for each funding call. This approach could help researchers save time and reduce the constant pressure to apply for funding by making the process more efficient and less fragmented.

Working in more stable groups could also allow researchers to develop stronger themes in their work, improve continuity between projects, and make it easier to respond to new

funding opportunities. In the long run, this could help make the research units more sustainable and support a better, less stressful work environment, especially for mid-career researchers who are currently carrying a heavy burden. Another option is to utilize the units' research more in new teaching initiatives.

PhD students' future career choices

A fourth concern raised during our interviews relates to the level of career support provided to PhD students—and to some extent, postdoctoral researchers—in some of the interdisciplinary research units. Many PhD students expressed a desire for more guidance and information about what is expected of them in order to be competitive in the academic job market after completing their dissertations.

For example, several PhD students reported having chosen to write a monograph dissertation instead of a compilation of articles. While this is a legitimate format, it has become increasingly uncommon in many academic fields. The ability to write academic journal articles is a key skill for researchers, and publishing articles during the PhD period can provide valuable peer review and strengthen competitiveness for future academic positions. Despite this, some of the PhD students may not have had a clear discussion with their supervisors about the potential implications of choosing a monograph format over a compilation thesis. One argument mentioned by a PhD student was that this might be their only opportunity to write a book. While that may hold true in some cases, we believe that it is equally important that students are made aware of how their choice of dissertation format may influence their future opportunities in academia and beyond.

Although it was not a focal point in the interviews, one general observation relates to the potential role of alumni in research environments. Across the evaluated units, there is little or no mention of systematic alumni engagement in the self-evaluations. While informal contact with former colleagues and students likely occurs on an individual basis, more structured forms of alumni collaboration—such as contributing to curriculum development, participating in seminars, or joining advisory activities—do not appear to be in place.

Given Linköping University's strategic ambition to involve alumni in shaping the educational programs of the future, this may represent an untapped opportunity. Former PhD students and researchers, now active in other academic or professional contexts, could offer valuable perspectives based on recent experience and strengthen career opportunities. While such efforts may be more appropriately organized at the IKOS level, the units within the department might still benefit from reflecting on how contact with their alumni could be strengthened or better utilized in ways that align with their mission and capacity.

While senior researchers highlighted the strength of interdisciplinary environments based on the way different disciplinary perspectives are brought together to solve complex problems, most of the current PhD students seem not to be encouraged to maintain a

connection to their original disciplinary background. Instead, the focus is placed almost exclusively on the interdisciplinary framework of the research unit.

We wish to raise a concern about this approach, while also recognizing that it may not be equally relevant for all students. Some PhD students enter with a clear disciplinary background, while others may come from more interdisciplinary or applied academic trajectories.:

Limited disciplinary foundation: For those with a disciplinary background—often grounded in a master's degree—there may be a risk that this foundation is not further developed during the PhD. In such cases, the lack of sustained disciplinary engagement could limit their ability to contribute deep, field-specific insights, which senior researchers themselves often see as central to productive interdisciplinary collaboration. At least the issue should be considered. Narrow career opportunities: In some cases, but of course not always, a strong emphasis on interdisciplinary work may limit future career opportunities for students whose fields still place importance on disciplinary identity. Many traditional academic departments remain cautious in hiring candidates without a visible disciplinary profile. For these students, having support to maintain some connection to their discipline could improve their competitiveness in both academic and applied job markets. This should be discussed.

Potential benefits of dual affiliation: Where appropriate, it might be beneficial to encourage PhD students to maintain some affiliation or interaction with their original disciplinary department. This could provide a broader academic identity, open additional teaching opportunities, and help position them for a wider range of future roles. In summary, while interdisciplinarity is clearly a strength in these research environments, we suggest that some flexibility might be helpful in supporting PhD students and postdocs. For those with a disciplinary background, greater attention to balancing interdisciplinary engagement with disciplinary anchoring could enhance their academic development and career prospects—without diminishing the integrative value of interdisciplinary research. However, that has to be done in ways that do not increase an already large workload.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

REMESO is today a major European center for ethnic and migration studies. The unit attains considerable external project funding and publishes in major journals and leading international university presses. REMESO is one of the few academic milieus in Europe that combines interdisciplinary research on migration and ethnicity with a full range of educational programs (bachelor's, master's, and doctorate).

REMESO's research analyzes and explains how migration and displacement are caused by a complex number of forces and events such as socioeconomic inequalities, precarious livelihoods, exploitive labor conditions, climate change, and armed conflict. REMESO also examines how migration processes are met and managed by local, national, international, and geopolitical regimes of inclusion and exclusion. Specifically, this entails studying the contemporary border landscapes and border practices: an infrastructure shaped by political regulations, economic policies, government agencies, and legal instruments.

REMESO's primary theoretical foundation lies in migration and ethnicity studies combined with research on labour conditions and welfare in a broad perspective. In its major research projects, the REMESO scholars have been able to analyze the processes of inclusion and exclusion of migrant groups by combining socioeconomic parameters with institutional and political practices. This is an innovative approach that remains relatively uncommon within ethnic and migration studies in Europe and elsewhere.

In this landscape, the REMESO's research especially focuses on examining the precarity of work and citizenship; the role of race, ethnicity, and gender in healthcare, schools, and urban segregation; and the effects of climate change, wars, and eroding state sovereignty on refugee movements and the consequent transformations of the global, European, and national asylum systems. In reviewing REMESO's research, a major emphasis is placed on the voices, agency, and practices of migrant organizations and social movements, including these organizations' struggles for recognition, redistribution and rights.

REMESO's research is genuinely interdisciplinary in its approach. This has been the characteristic approach among the REMESO scholars since the beginning. Different methodological approaches (qualitative and quantitative) are employed depending on the research topic. Disciplinarity frameworks are applied when appropriate, depending on the specific topic investigated.

According to the scholars working at REMESO, it is necessary to have a trans - or interdisciplinary outlook when analyzing migration and ethnicity and this approach must typically be combined with unorthodox methodological approaches. This recognition underlies the common theoretical platform prevailing among most ongoing projects at REMESO, namely a dual critical commitment.

On the one hand, the scholars' activities are characterized by a materialist, historicizing sociological approach in which ethnicity and migration are studied in relation to ongoing transformations of the economy. On the other hand, the scholars adopt a critical approach to textual objects, ideologies, and discourses, according to which ethnicity and migration are entities that demand sustained interpretation and conceptual clarification.

According to the REMESO scholars, the idea is not that each individual scholar should embrace the same set of theoretical and methodological approaches, but that the different types of commitment should create the ground for critical dialog. Research and teaching that connect the two perspectives can surpass the limitations inherent in academic disciplines and specialized methodological and theoretical traditions.

Both mid-career scholars and the PhD students have noted a lack of historical perspectives on migration and its historical roots in the teaching and research within REMESO. This gap was emphasized and further described as a lack of knowledge or awareness of climate/environmental, historical and anthropological perspectives.

It was also mentioned that the unit lacks experience in the use of quantitative methods (e.g. statistical knowledge, which is increasingly in demand in academia).

Challenges with inter-disciplinary analyses were also highlighted – it can be difficult to identify core theoretical and methodological elements. This makes it harder for newly educated candidates to find positions that align with their qualifications.

Recommendations

REMESO could enhance its teaching and research by systematically incorporating historical perspectives on migration and ethnicity. Introducing core courses or seminars on the historical roots of migration processes could provide critical context and depth to both research and education.

To broaden the research and teaching profile, REMESO could integrate modules or guest lectures that address climate/environmental drivers of migration and anthropological approaches to ethnicity and societal change. Interdisciplinary collaboration with environmental studies or anthropology departments may also be encouraged.

REMESO could offer regular workshops or courses in quantitative research methods, including statistical analysis, to strengthen scholars' methodological toolkits. This would better prepare PhD students and early-career researchers for the demands of the academic job market and enhance their competitiveness.

To address challenges in interdisciplinary analysis, REMESO could organize internal seminars aimed at identifying and communicating the unit's shared theoretical and methodological foundations. This would support doctoral candidates and new researchers in situating their work clearly within broader academic debates and improve their career opportunities.

REMESO could further support PhD students and early-career scholars by offering career development activities that help them articulate how their interdisciplinary training matches job market demands, both inside and outside of academia.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategies

Publication strategy is discussed within REMESO's Research and Publication Strategy Group (RPSG). The intention is not to promote similar publication and output profiles, but rather to reflect on the advantages and disadvantages of different strategies in relation to the diverse range of research carried out at REMESO within an inter- and transdisciplinary research environment.

The recently implemented faculty funding model, in which publication plays a role, recognizes the variety of possible publication approaches.

Thus, while the bibliometric data of the data package reflects a more disciplinary and quantitatively oriented scientific approach that is not suitable as a general model for REMESO, the faculty approach recognizes not only variations between disciplines and research environments but also differences within them. Therefore, the full weight of REMESO's varied publications is considered, which has benefited REMESO. Combined with successful external funding, this explains the slow but steady growth of faculty funding.

In maintaining discussions on the publication strategy, the self-evaluation anticipates that REMESO scholars will continue to use various forms of publications, strategically selected for scientific and societal impact.

In addition to regular publications, the unit also published a REMESO-edited volume for 2013 (in Swedish) and for 2015 (in English) titled *International Migration and Ethnic Relations: Critical Perspectives*, in which all chapters were written by REMESO colleagues. A new REMESO-edited volume is planned for 2026.

This type of joint publication facilitates the development of a coherent research environment through book seminars and internal discussions of the state-of-the-art within the research field.

PhD education and the PhD School

REMESO hosts one of the very few PhD programs in ethnic and migration studies in Europe. This trans- and interdisciplinary program, which incorporates research traditions from both the humanities and the social sciences, provides doctoral students with insight into the central dimensions of Swedish and international research on ethnicity, migration, and society as such.

It is a four-year, mainly faculty-funded program focused on writing PhD theses and taking literature courses (with the possibility to be extended to five years through teaching and assistant work). Coursework and thesis writing are well integrated throughout the program.

PhD students are also given the opportunity to teach at the undergraduate level and complete training in pedagogics to help prepare for their academic careers. The program is intensive and held to a high international standard

REMESO encourages writing monographs. It is not mandatory but seems to have become the conventional publishing format at the unit. It might be problematic because writing articles for international journals have become an increasingly common practice among especially younger scholars. Furthermore, writing monographs also means missing out on article publishing experience.

The PhD students are not only a vital component in the existing research environment but are also drivers of new theoretical, methodological, and empirical development.

The PhD student's autonomous thesis work is supported by primary and secondary supervisors and is centered around a vibrant intellectual seminar culture. Aside from participating in general seminars, PhD students present their theses three times (20%, 60%, and 90%) before a final public defense. This stimulates PhD students to go beyond already established research, as demonstrated by the following list of PhD projects.

The REMESO PhD program is connected to the REMESO International Graduate School, which offers Swedish and international PhD students a wide range of courses within the field. Since its start in 2009, the Graduate School has offered approximately 40 PhD courses in which about 550 PhD students have participated. In addition, the school has hosted around 50 international scholars as guest teachers. The Graduate School has represented a major improvement in REMESO's PhD program and its research environment in general.

Initially, the Graduate School received external funding from FORTE (2008–2018). Starting in 2022, the school has been funded by The Swedish Research Council (VR), which explains its new name: the Swedish Research Council's Graduate School in Migration and Integration.

REMESO now runs the school in collaboration with the University of Gothenburg's Department of Sociology and its Center on Global Migration.

Research Quality and the Academic Culture

The REMESO seminar is one of the central activities in which invited scholars, REMESO scholars, and PhD students present and actively discuss their research. These seminars are often based on previously distributed texts that are read mostly by the seminar participants, thus allowing for dynamic and critical discussions of research already published or works in progress.

The RPSG (REMESO Research and Publication Strategy Group) is composed of all colleagues at REMESO with a PhD. It meets two or three times per semester to discuss research challenges, such as applying for funding, conducting and publishing research, developing the REMESO seminar, and discussing how REMESO research can be further developed.

Challenging and critical seminars are an important part of a dynamic and lively academic environment.

Through the RPSG, the REMESO scholars plan and implement research funding applications and hold seminars where the papers are peer-reviewed with constructive criticism. It should be noted that all employees and affiliates can participate in these seminars. This is, according to the self-evaluation, an intentional strategy that signifies that the scholars also "compete with each other" for funding based on academic freedom, and that they do not know in advance which of the applications will be funded, as the acceptance rate to the Swedish research councils are around 10%.

REMESO thrives as a research environment with a PhD education supported by itsstrong track record in securing external funding.

Yearly the REMESO organizes a two-day REMESO retreat in which researchers and PhD students present and discuss ongoing and future research undertakings. Aside from being a nice social environment, the REMESO retreat has made the group more aware of what research activities there are pursued and planned.

Strong collegiality and solidarity exist among the junior/mid-level staff. The seminars and the collegial debate can be challenging and critically - in a "good way" - but the collegiality among the scholars is maintained.

The most important issue is the preservation of the academic freedom in the current political climate. Academic freedom is increasingly challenged in different ways. In this situation REMESO has received special funding from the Vice Chancellor for organizing events, seminars, and minor conferences on how to defend and strengthen academic freedom. This funding is also aimed at strengthening dissemination and increasing societal dialog on research-based knowledge within the field of ethnic and migration studies.

In daily debates the professors at REMESO take most of the "heat" from criticisms and efforts to infringe academic freedoms. Being part of a group having a similar research focus makes it easier. The international network also helps mitigate the pressure.

Recruiting to the REMESO research group

REMESO is a research-dominated unit, advertisements for positions generally emphasize research and external funding skills broadly within the field of *ethnic and migration studies* (EMS), whereas project-related PhD students and postdoc positions are more narrowly advertised as they are formed directly by the research projects financed through external funding.

For faculty-decided positions, skills related to teaching, academic management and leadership are included in general advertisements. The REMESO leadership proposes external scholars (decided by faculty) who will evaluate the applications. However, it is the faculty, based on the external evaluations and faculty recruitment board that decides who will be accepted for employment.

PhD students are encouraged, while postdocs are strongly recommended to participate in research application seminars. The head of division and the director of studies and/or research offer career conversations to identify the interests of the PhD students and suggest ways to realize them. This involves teaching and helping them in writing research applications.

While most PhD students envision and succeed in a career within academia, some take the knowledge and skills of a PhD education to other forms of employment. Thus, part of their career advice is to be open to other labor market paths outside academia.

Some information events from other parts of the university aim to inform young researchers about their career development. These initiatives could probably be improved. However, the stress that PhD students and young researchers experience in conducting their research, teaching, and applying for funding often prevents them from prioritizing these offers. Nevertheless, the unit discusses these issues with PhD student representatives in the collegium of supervisors and with the PhD students in the RPSG.

The data package concerning the number of employees and gender composition of the unit is rapidly changing. At the time of reporting, there were seven full professors (43% women) but two full professors are today emeriti, leaving five full professors (40% women). There are similar changes in other positions. Currently, a decrease in the number of PhD students is expected, with 3–4 planned dissertations.

Internationalization of Academia

As the research field of ethnic and migration studies suffers from weak representation generally in the national PhD educations, the REMESO school of graduate studies serves as a vital national and international hub for PhD teaching, research training, career development, and networking, with a strong participation of students from both Sweden and across the world.

Financed by external projects and additional funding, REMESO has organized and is planning and organizing conferences, workshops, and symposia. Recently, and in the near future, this includes the following events, as noted in the self-evaluation: *Anti-Colonial Scholarship and Global Social Theory* (autumn 2023); *Legal status, Temporality, and Integration* (autumn 2024); *EuMIGS European consortium meeting* (autumn 2024); *Forging Solidarities* (autumn 2024); *Global Migration Regimes* (spring 2025); *Liberated Futures* (spring 2025); *Digital Infrastructures and the Imagined Communities and Ethnicity and Nation* (spring 2025); and *LiU 50th Anniversary Conference on Migration and Integration* (autumn 2025).

Direction of Future Research

Within the coming five years, research in the REMESO unit, in collaboration with partners inside and outside the LiU, will - according to the self-evaluation - be developed in five directions:

The first perspective considers *human mobility and migration* in relation to the boundaries of our environment and planetary ecology. This involves the effects of climate change, environmental disasters, and resource extraction on forced displacements.

The second perspective considers the *effects of digitalization and artificial intelligence* on human mobility and migration, as well as labor.

The third perspective concerns *biotechnical and biomedical boundaries*. This area is important to a welfare society that seeks to combat ethnic and racial health disparities and meet the policy ambitions of good health for all.

The fourth perspective relates to *educational challenges linked to migration and human mobility*. LiU hosts one of the largest research groups in the world around adult learning, with a strong focus on migration and integration

The fifth perspective centers on *the rapid regulative changes in Sweden concerning migration toward migrants and children of migrants*, exploring how general societal transformation not only affects policies of migration and integration but also shape societal transformation far beyond migration and migrants.

Finally, the REMESO's area of research—migration and ethnicity—is considered as an important area of research within LiU. Therefore, REMESO is one of the main initiators of the newly established "Profile Area" of research on Societal Transformations, established by

the vice chancellor as one of four areas of research excellence at LiU. In this research profile, REMESO will develop research related to climate change, human mobility, and migration.

Recommendations

Aside from the courses organized by REMESO and the often-expensive courses outside LiU in Sweden and abroad, PhD students would like to see a wider variety of courses available at LiU that are relevant to their research topics. It is common for PhD students to have difficulties finding courses within LiU that meet their needs.

The list of topics focused on in the PhD projects at REMESO are long and diverse. It might be worthwhile to combine the individual PhD projects in thematic groups both when it comes to theoretical qualification and collecting of empirical materials. The research seminars are part of this effort, but daily exchanges of experiences could also be of great importance.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

REMESO is heavily reliant on external project funding and that include all researchers from postdocs to professors. The only exception is two chair professors that have a guaranteed right to 50% faculty funding. This leads to some fragmentation. As mentioned, the REMESO unit started as a Center of Excellence (FORTE) with substantial base funding that created a common core). The reliance on external project funding leads to a considerable pressure especially on junior/mid-level scholars as there is no research time for this group included in their positions.

There is a high pressure to submit research proposals. If you are not successful after several attempts there is a possibility to get 20% research funding for a year from internal funds.

No real coordination of application for external funding for projects, based on individual initiatives. This can lead to fragmentation and projects that lie on the periphery of the REMESO core focus. Seminars are, however, arranged around specific calls.

The Relation REMESO and the University – IKOS, Central Administration etc.

The Senior scholars at the REMESO find the relationship and collaboration within IKOS – the Department of Humanities and Social Sciences – to be good and tight. IKOS gives very strong administrative support, and the geographical distance is not perceived as a problem

Furthermore, REMESO takes considerable responsibility for supporting and initiating activities within IKOS, including leading positions.

The main issue, when it comes to the department is that IKOS probably is too large. It would be beneficial to divide it into two departments, with one located in Norrköping, where REMESO is located.

Mid-career and PhD scholars are less satisfied with the central university administration. They consider the central university administration being to slow in its responses and sometimes quite reluctant. Student admission, office space, and internationalization are areas seen as less functional. The focus is on the university as an authority rather that an academic institution.

The younger REMESO scholars feel that they are isolated with no clear connection to IKOS. This is likely related to the fact that REMESO is in Norrköping. Generally, the junior scholars see little collaboration between the different units at the university (e.g. few invitations to seminars, etc.).

At REMESO the faculty has started a discussion and is planning for the forthcoming generational shift – two professors have retired and three more are expected within the next 4-6 years. This process entails replacing academic leadership and promoting or recruiting professors, although this is partly mediated by success in obtaining external funding.

While the intellectual and work environment will always be improved, the on-going experience thus far is that the unit, with an expected decrease in external funding over a 2–3-year period, may face difficulties in retaining its current level of highly qualified researchers.

All other internal resources go to the PhDs and their supervision. This model remains sustainable as long as REMESO can continue attracting external research funding. For the time being only two professors have the right to 50% research if they do not get external funding.

Improved internal financial support, especially for junior/mid-level researchers, would mitigate pressure and reduce stress. LiU allocates less resources, in general, to social science and humanities than other universities.

Recommendations

It is recommended that the university consider dividing IKOS into two departments, with one located in Norrköping where REMESO is based. A smaller, more focused departmental structure could enhance administrative efficiency, strengthen unit identity, and better support research environments like REMESO.

To mitigate pressure and reduce stress among junior and mid-level researchers, it is recommended that REMESO and the broader faculty develop mechanisms for stronger internal financial support. Providing base funding or seed grants would help early-career researchers maintain research momentum, particularly during gaps in external funding.

It is recommended that the university review and adjust its resource allocation policies to ensure a more equitable distribution of funding across faculties. In particular, increased support for social sciences and humanities—areas that currently receive less funding at LiU

compared to other universities—would strengthen REMESO's long-term research capacity and competitiveness.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

The Institute for Research on Migration, Ethnicity, and Society (REMESO) was established in 2008 and has since been a leading center for research on migration and ethnicity in both Nordic and international contexts. REMESO has developed a strong interdisciplinary research tradition in these areas, alongside a fully developed suite of educational programs (bachelor's, master's, and doctoral levels). The research unit consists of approximately 30 faculty members and PhD students and collaborates with around 20 affiliated researchers from Sweden and various other countries.

Based on the self-evaluation, our impression was that research among senior, mid-career, and junior scholars (including PhD students) was mainly conducted on an individual basis but in our communication with the REMESO we found that almost all the externally funded projects include 2-3 researchers, some more. While most PhD projects are individual, at least two of them are within externally funded projects. The self-evaluation lists many projects involving both tenured scholars and PhD students, but there is limited information on day-to-day collaboration or joint thematic work. Here we were again informed that most daily intellectual communication took place within project teams or clusters of projects.

Our recommendation in this respect will be that the REMESO community continues working in projects teams and reinforces their collaborative activities despite the trends towards more individual-based research procedures. This will ensure that the research become even more innovative, of higher quality, and less individually burdensome for the individual REMESO researcher.

Drawing from the bibliometric data, the submitted self-evaluation, and the list of publications by scholars affiliated with REMESO, we formed a very positive impression of the quality, relevance, and engagement of the faculty members. Their ability to contribute meaningfully to ongoing debates on migration, diversity, justice, and equality is evident. In this regard, it is highly appropriate that REMESO has been invited to serve as a key partner in the development of research on Societal Transformations—one of the four areas of research excellence prioritized at Linköping University.

The self-evaluation outlines five distinct research themes that will guide REMESO's work over the next five years, in collaboration with partners both within and beyond Linköping University. However, the successful implementation and advancement of these important research themes will depend on the recruitment of new faculty members at both senior and junior levels. During staff interviews, several skill gaps were highlighted, including limited

expertise in climate and environmental issues, the historical context of migration, and various subfields of anthropology. Additionally, the prevailing research approach at REMESO is largely qualitative, and the unit would greatly benefit from enhanced competence in quantitative methods. Addressing these needs will require securing additional financial resources, either from Linköping University or through external funding sources.

Panel Q Report - Tema Technology and Social Change

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

1.1. Composition of the panel

The panel, chaired by Charlotta Mellander from Jönköping University, SE comprised experts from various academic disciplines and fields. The panel members were Päivi Rasi-Heikkinen from the University of Lapland, FI (Professor of Education), Mikael Granberg from Karlstad University, SE (Professor of Political Science), Thomas P. Boje from Roskilde University, DK (Professor emeritus of Sociology), and Knut Holtan Sørensen from the Norwegian University of Science and Technology, NO (Professor emeritus of Science and Technology Studies).

Each evaluator had been nominated by a specific research unit and, accordingly, served as the main responsible evaluator for that unit. While the assessments were carried out collaboratively and discussed thoroughly within the panel, the lead evaluator had particular responsibility for synthesizing observations and drafting the evaluation for their assigned unit. In the case of the Division of Technology and Social Change (TEMA T), Knut Holtan Sørensen was the main responsible evaluator.

The overall composition of the panel made it possible to draw upon a wide range of disciplinary and interdisciplinary expertise and institutional experiences. Each member contributed unique insights. For example, direct experience within the Swedish context enabled the panel to better understand the local dynamics and challenges faced by higher education institutions in Sweden. At the same time, members from international institutions offered valuable perspectives based on their respective educational systems. Moreover, the panel's combination of backgrounds—from both traditional academic disciplines and interdisciplinary research environments—proved especially valuable in identifying not only opportunities but also the challenges that can arise in interdisciplinary research settings.

1.2. Preconditions for making the report

Prior to the visit, the panel members reviewed all provided materials and participated in several online preparatory meetings. The group held their initial in-person meeting on the first day of the site visit in Linköping. During this meeting, key areas were outlined, and specific questions and issues for further exploration were identified—both in general terms

and tailored to each research unit. The group also reviewed the instructions and guidelines, agreed on individual responsibilities, and, when necessary, divided tasks among themselves.

All five panel members were physically present in Linköping during the evaluation week (April 7–11, 2025). As requested, the panel focused on assessing the research units with respect to:

- Research and research quality
- Research culture
- Conditions for research
- General observations

The university's instructions emphasized a forward-looking perspective. The panel was asked to concentrate on future opportunities rather than past performance and to avoid making comparisons across the evaluated research units.

During the visit, the panel held three scheduled meetings with representatives from each research evaluation unit. These meetings were conducted separately and involved groups of senior researchers, mid-career researchers, and junior researchers (postdocs and/or PhD students).

The panel opened each meeting by inviting participants to describe the professional identity of their research unit and how they practiced interdisciplinarity. This step helped the panel understand the relationship between individual researchers' original professional backgrounds and the joint research focus of the unit. The panel then proceeded with more specific, pre-prepared questions targeting the critical areas identified in earlier discussions. These questions were adjusted based on the seniority level of each group to explore potential structural challenges relevant to different career stages.

Overall, the panel found the resources, assistance, and responsiveness of the research evaluation units to be excellent. We wish to acknowledge and commend Linköping University for their high-quality support throughout the evaluation process. The self-assessment report and appended materials represented a significant effort and demonstrated deep reflection.

Although the panel was provided with a well-written self-evaluation, the absence of publication lists early in the process made it more difficult to assess the quality of research beyond the basic bibliometric data that was provided. Early access to these lists would have offered a deeper understanding of the research units' research quality and publication strategies. We did, however, appreciate the late efforts by most units to compile and share this information, as it provided helpful additional context during the latter part of the evaluation.

1.3. The evaluated research unit

Based on the research unit's self-evaluation, as well as doctoral degree data, financial data, personnel data, and bibliometric analysis (within the LiRE25 context), we gained an understanding of the research unit's background prior to the physical visit in Linköping accordingly:

The Division of Technology and Social Change (TEMA T) at Linköping University is an interdisciplinary research environment examining the interplay between science, technology, society, and sustainability. They integrate perspectives from social sciences, humanities, and environmental studies, as they explore how scientific and technological development shapes and is shaped by societal, political, and economic structures. TEMA T has a strong research profile in areas such as energy transitions, digitalization, medical humanities, and sustainability governance. Doctoral education is a central component of TEMA T, with a structured training program that encourages interdisciplinary inquiry and methodology. Through its research, TEMA T wants to contribute to shaping policies and strategies for sustainable and socially responsible scientific and technological development.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

General observations

The connection between the research unit and the department

When the evaluation group asked researchers in the various research units organized under the IKOS department about their relationship to the department as a whole, there was a noticeable fragmentation. Although these units are formally organized under the same departmental structure, many researchers reported having little to no interaction with colleagues outside their own unit. This was a consistent theme across all levels of seniority.

While the physical separation between the Linköping and Norrköping campuses may contribute to this situation, the sense of fragmentation appears to go beyond geographical distance. There seems to be a lack of meaningful academic or collegial exchange between the research units, limiting opportunities for cross-unit collaboration, knowledge sharing, and the development of a shared departmental culture.

The only group that reported feeling connected to the broader IKOS structure were individuals in managerial or leadership roles, who engage more regularly with departmental administration and decision-making processes.

It is worth emphasizing, however, that many researchers spoke highly of the administrative support provided at the departmental level. This support was described as efficient, accessible, and highly appreciated.

On the one hand, this internal fragmentation may limit the potential synergies that could arise from being part of a larger department. Opportunities for collaboration, shared learning, and a stronger collective identity might be missed when research units operate in isolation. On the other hand, this fragmentation may also reflect a deeper structural issue—namely, that the current departmental organization may not be optimal for these research units, which may make it challenging to function as an integrated, larger unit in practice.

It is also important to note that this observation applies specifically to the research units organized under the IKOS department; researchers at TEMA T, by contrast, expressed that they do have collaborative relationships with other units within the overall TEMA department.

Teaching opportunities

A recurring concern across the interdisciplinary research units we evaluated was the challenging situation regarding teaching opportunities for junior and mid-career researchers. Many described the need to act as "entrepreneurs," independently seeking out teaching roles outside of their own research environments, sometimes even in other universities. Within the units themselves, there appears to be limited support or coordination to help early-career scholars access teaching opportunities, which places significant responsibility on individuals and may hinder their professional development.

Another challenge raised repeatedly was the lack of teaching opportunities for junior and mid-career researchers who do not speak Swedish fluently. As the vast majority of teaching at the undergraduate and master's levels is conducted in Swedish, international researchers are at a disadvantage. This issue not only limits their ability to gain crucial teaching experience but also affects their opportunities for promotion.

Even in research units where teaching is integrated—through doctoral training or hosting undergraduate/master's programs—junior researchers often struggle to secure enough teaching hours.

Given the importance of teaching experience for academic career progression, and since this appears to be a structural issue across several units, it seems necessary to address it at a level beyond the individual research unit.

Possible approaches could help mitigate this challenge:

- Centralized teaching coordination: Another solution could involve the establishment of a faculty- or university-level support function that helps coordinate and distribute teaching opportunities for early-career researchers in interdisciplinary environments. This would help ensure a more structured and equitable process, rather than leaving it to individual efforts.

- Affiliation with disciplinary departments: One strategy could be to ensure that junior scholars within interdisciplinary research units also retain an affiliation with their original disciplinary department, where most teaching is traditionally organized. This could provide better access to relevant teaching opportunities aligned with their background. It could also be worth exploring the possibility of offering specialization courses within existing programs in the traditional disciplines, thereby creating additional teaching opportunities for interdisciplinary researchers.
- Increasing English-taught courses: A further step could be to offer more courses in English, particularly at the master's level or within doctoral programs. Since much of the teaching material already used is in English, this would not require a major curricular shift but could significantly expand access for non-Swedish-speaking researchers to participate in teaching.

Stress

Another area of concern that emerged during our interviews with most of the researchers was the apparent high level of stress experienced by mid-career staff, and notably also reported by many senior researchers. This was to a certain extent also true for the senior researchers. This stress appears to stem largely from financial insecurity, and thereby the uncertainty of employment, presented within many of the interdisciplinary research units. The heavy reliance on external funding creates significant pressure on this group of researchers to continuously write and submit research grant applications, often with little to no institutional stability or core funding to rely on.

In many of the evaluated units, this was identified as a major concern, with considerable time and energy devoted to grant writing. It was also evident that several units operate with highly fragmented project portfolios, where it was not uncommon for individual researchers to be involved in five or more concurrent projects. While we acknowledge that this situation is partly a consequence of the university's overarching funding model, the cumulative effects on staff well-being, research quality, and strategic focus cannot be overlooked.

There seems to be a need for more strategic thinking in several of the research units when it comes to how they apply for funding. One possible way forward could be to build longer-term collaborations within smaller sub-groups of the unit, instead of creating new groups for each funding call. This approach could help researchers save time and reduce the constant pressure to apply for funding by making the process more efficient and less fragmented.

Working in more stable groups could also allow researchers to develop stronger themes in their work, improve continuity between projects, and make it easier to respond to new funding opportunities. In the long run, this could help make the research units more sustainable and support a better, less stressful work environment, especially for mid-career researchers who are currently carrying a heavy burden. Another option is to utilize the units' research more in new teaching initiatives.

PhD students' future career choices

A fourth concern raised during our interviews relates to the level of career support provided to PhD students—and to some extent, postdoctoral researchers—in some of the interdisciplinary research units. Many PhD students expressed a desire for more guidance and information about what is expected of them in order to be competitive in the academic job market after completing their dissertations.

For example, several PhD students reported having chosen to write a monograph dissertation instead of a compilation of articles. While this is a legitimate format, it has become increasingly uncommon in many academic fields. The ability to write academic journal articles is a key skill for researchers, and publishing articles during the PhD period can provide valuable peer review and strengthen competitiveness for future academic positions. Despite this, some of the PhD students may not have had a clear discussion with their supervisors about the potential implications of choosing a monograph format over a compilation thesis. One argument mentioned by a PhD student was that this might be their only opportunity to write a book. While that may hold true in some cases, we believe that it is equally important that students are made aware of how their choice of dissertation format may influence their future opportunities in academia and beyond.

Although it was not a focal point in the interviews, one general observation relates to the potential role of alumni in research environments. Across the evaluated units, there is little or no mention of systematic alumni engagement in the self-evaluations. While informal contact with former colleagues and students likely occurs on an individual basis, more structured forms of alumni collaboration—such as contributing to curriculum development, participating in seminars, or joining advisory activities—do not appear to be in place.

Given Linköping University's strategic ambition to involve alumni in shaping the educational programs of the future, this may represent an untapped opportunity. Former PhD students and researchers, now active in other academic or professional contexts, could offer valuable perspectives based on recent experience and strengthen career opportunities. While such efforts may be more appropriately organized at the IKOS level, the units within the department might still benefit from reflecting on how contact with their alumni could be strengthened or better utilized in ways that align with their mission and capacity.

While senior researchers highlighted the strength of interdisciplinary environments based on the way different disciplinary perspectives are brought together to solve complex problems, most of the current PhD students seem not to be encouraged to maintain a connection to their original disciplinary background. Instead, the focus is placed almost exclusively on the interdisciplinary framework of the research unit.

We wish to raise a concern about this approach, while also recognizing that it may not be equally relevant for all students. Some PhD students enter with a clear disciplinary background, while others may come from more interdisciplinary or applied academic trajectories.:

Limited disciplinary foundation: For those with a disciplinary background—often grounded in a master's degree—there may be a risk that this foundation is not further developed during the PhD. In such cases, the lack of sustained disciplinary engagement could limit their ability to contribute deep, field-specific insights, which senior researchers themselves often see as central to productive interdisciplinary collaboration. At least the issue should be considered. Narrow career opportunities: In some cases, but of course not always, a strong emphasis on interdisciplinary work may limit future career opportunities for students whose fields still place importance on disciplinary identity. Many traditional academic departments remain cautious in hiring candidates without a visible disciplinary profile. For these students, having support to maintain some connection to their discipline could improve their competitiveness in both academic and applied job markets. This should be discussed.

Potential benefits of dual affiliation: Where appropriate, it might be beneficial to encourage PhD students to maintain some affiliation or interaction with their original disciplinary department. This could provide a broader academic identity, open additional teaching opportunities, and help position them for a wider range of future roles. In summary, while interdisciplinarity is clearly a strength in these research environments, we suggest that some flexibility might be helpful in supporting PhD students and postdocs. For those with a disciplinary background, greater attention to balancing interdisciplinary engagement with disciplinary anchoring could enhance their academic development and career prospects—without diminishing the integrative value of interdisciplinary research. However, that has to be done in ways that do not increase an already large workload.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Tema Technology and Social Change (hereafter Tema T) was established in 1981 and is the oldest research unit with this focus in the Nordic countries. From the beginning, the unit served as a critical voice regarding technology and technological development. Critical perspectives remain prominent, but the focus has expanded to include medicine and life sciences. The research is characterized by problem-oriented empirical investigations of a wide range of topics, including the social shaping and transformation of infrastructures where sustainability issues are central, the politics of data, and medical humanities.

In general, the research is at the international forefront and addresses issues of social significance. It raises novel questions in several areas, and Tema T appears to be a good place for fostering curiosity regarding research issues and socially relevant problems to explore. The unit has extensive international collaboration and an impressive visiting scholar initiative, which contributes to Tema T's international visibility.

The quality of the research is strong, and the findings are mainly published in reputable journals.[1] However, the bibliometric analysis indicates that Tema T has the potential to publish more and attract greater attention from other scholars. Consequently, the academic impact of the significant research conducted by Tema T scholars could further be enhanced.

In the self-evaluation and the interviews conducted with Tema T staff, interdisciplinarity was emphasized as the primary quality and identity of the unit. This is not surprising, considering that Tema T - and the department it belongs to - were established to engage in interdisciplinary work. However, 'interdisciplinary' is often an empty signifier, akin to 'excellence'. Thus, it needs to be explained and contextualized in terms of the knowledge ecology of the unit. The critical issue is how it is actually practiced.

The self-evaluation lists 21 disciplines and discipline-like areas represented in the backgrounds of Tema T scholars. On the one hand, this scope is impressive and offers a wealth of intellectual resources. On the other hand, this complex knowledge ecology

[1] However, the bibliometric analysis shows that the journal with the largest number of Tema T articles is Sustainability. The bibliometric report claims that the journal meets the criteria of the so-called Norwegian model; however, this claim is incorrect. The journal is listed at level 0 of the model, reflecting that its publication practices are considered problematic. Consequently, one should avoid publishing in this journal. We have since been informed that Tema T now advises against publishing in this journal and others from MDPI.

presents challenges regarding how to utilize and integrate these resources effectively. Moreover, the situation may hinder the development of a shared professional identity. Some suggested to us that they could be 'un-disciplinary', but the implications of such identity remain unclear.

Indeed, in the interviews conducted, in addition to considering themselves interdisciplinary, the staff usually referred to a disciplinary or professional identity they had developed before coming to Tema T. When we asked about integration practices, they highlighted the seminars at the unit and the writing of grant proposals. Interdisciplinarity appeared to be achieved mainly through individual scholars learning about new perspectives and ways to frame research issues. While this may be valuable, seminar-based interdisciplinarity is a limited integration practice that does not fully utilize the potential of interdisciplinary collaboration.

Moreover, Tema T scholars engaged frequently with scholars outside the unit, occasionally to extend the scope of disciplinary sources. The emergent interdisciplinary practice was only vaguely described.

The Tema T staff explained that their research is problem-driven rather than arising from discipline-oriented curiosity. Consequently, disciplinary knowledge is mobilized as needed. While this is acceptable, it may restrict the scope of scholarly inquiry. Tema T publications clearly reflect this problem-oriented starting point, but they show limited efforts toward theoretical development or engagement with broader theoretical issues and debates.

The edited collection "The Imposter as Social Theory" stands out as a commendable exception that could inspire the integration of problem-driven research with theoretical engagement. Such efforts could also help align the intellectual diversity of Tema T.

The self-evaluation emphasizes outreach and communication with a broader society. Tema T's research clearly has significant public relevance. We lack information on whether this potential is exploited well enough, but the interviews emphasized that engagement in public debates is a long-standing tradition that they wanted to uphold.

Tema T is highly dependent on external funding. This situation encourages a pragmatic attitude towards developing strategies for future efforts that, above all, implies a need to survey funding opportunities and be adaptive to the focus of the advertised calls. The self-evaluation describes future research focal issues that seem reasonable and partly also represent a continuation of the ongoing research.

However, it may be fruitful to engage more with strategic thinking regarding the practice of interdisciplinarity, possible theoretical engagement, professional coherence, and teaching opportunities.

Recommendations

Tema T scholars could benefit from reflecting on how they practice interdisciplinarity, particularly regarding knowledge integration practices. Such reflection could facilitate a

further strengthening of the unit's research practice and enhance the staff's competence to engage in such collaborations. The research conducted by staff member Corinna Kruse on alignment work could serve as a valuable starting point for such discussions.

Engaging in dialogues about both professional identity and the unit's identity could also be productive. While multiple professional identities are not uncommon in interdisciplinary communities, Tema T might benefit from reflecting on the implications of their large multiplicity, the ensuing complex knowledge ecology, and how it can be fruitfully enacted.

We also recommend greater scholarly engagement with theoretical issues through publications. Units researching technology and social change often highlight science and technology studies as a source of inspiration or a foundational element for their work. STS is a partially stable scholarly discourse that has proven beneficial for interdisciplinary integration efforts. Tema T could benefit from a more sustained engagement with STS than is currently the case.

Finally, Tema T should consider measures to increase scholarly publication, its visibility, and the ability to attract other researchers to their activities. The present situation is good, but there is room for improvement. This could be achieved through mentoring and repeated discussions about reasonable publication goals as well as improving the strategy for achieving international impact.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Overall, Tema T seems to have a beneficial research culture that is open, inclusive, and with good collegial relations. The staff we met were positive and engaged, and they easily shifted in responding to our questions among themselves.

They said that they did not want an outspoken publication strategy. Decisions about what to publish and where should be an individual responsibility. However, they did discuss such issues at meetings. Tema T publications appear in relevant scientific channels. The self-evaluation report noticed a shift among the PhDs from writing monographs to compilation dissertations, but monographs remain a common format. Supervisors discussed this choice with the candidates in an open-ended way at an early stage of their process.

However, we got the impression that PhD candidates were insufficiently aware of the advantages of writing articles in the current academic labor market, where there is a strong preference for journal publishing and thus for candidates with demonstrated skills in writing articles.

Apparently, Tema T has succeeded in recruiting talented researchers. However, it was mentioned that they had challenges recruiting new PhDs due to a lack of funding opportunities. The students we talked with expressed clear satisfaction with their situation at Tema T.

Opportunities for early-career researchers were given considerable attention, and these researchers seemed reasonably well cared for. Given the pressure to achieve external funding, which was felt by all faculty with the possible exception of PhD students, these researchers appeared to have autonomy and the possibility to navigate the system gainfully.

Talking to the PhD students gave us the impression that their training is of good quality. The composition of the courses offered by Tema T seemed to meet the main needs of the students, who also had the opportunity to follow courses at other programs.

The academic networks of Tema T appeared strong both nationally and internationally. We were particularly impressed by their visiting scholar program. The level of collaboration with other Tema units was commendable. The units also had extensive collaboration at LiU beyond the Tema department and across Sweden. The networks are important regarding funding since many projects involve collaboration with national and/or international partners. Given Tema T's problem orientation, which makes Swedish issues a particular concern, the share of publications with international co-authors is good and indicates quality.

We have less information about the non-academic networks.

The gender balance among faculty appears to be acceptable. No gender equality issues were raised in our conversations, but we are confident that Tema T considers such issues when relevant.

We have a positive impression of Tema T's research practice. According to the self-evaluation, ethical issues are frequently discussed. The PhD students indicated that they are treated equally to faculty members. The seminars, other meetings, and personal interactions were reported to promote good research practices.

We were unable to engage comprehensively with the relationship between research and teaching at Tema T. The self-evaluation highlighted that teaching activities have increased significantly over the past decade, particularly due to the development of new study programs in urban planning. The PhD courses also demonstrated that the unit's research is utilized in teaching. We will return to the issue of the research-teaching relationship in the concluding remarks.

Recommendations

It is vital to continue the successful efforts to foster a strong research culture. As previously noted, further enhancements in publication practices could yield significant benefits. Academic units generally spend too little time discussing the research-teaching relationship

and how to leverage both internally and externally produced knowledge. Tema T could benefit from such discussions.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

According to the self-evaluation, Tema T is organized into three units. This structure is said to provide a manageable faculty-leader ratio. The three section heads and the division head comprise the Tema T management group that addresses day-to-day issues. Additionally, there are other decision-making and advisory meetings, which include the supervisory meeting convened by the PhD program director, a teachers' meeting chaired by the director of studies, and a T-council.

Two seminars constitute the backbone of Tema T research, STRIPE and P6. It is unclear how the seminar groups shape the organization of the research.

Tema T appears appropriately staffed, featuring a well-balanced senior-junior ratio and a suitable numerical proportion between PhDs and supervisors.

Tema T relies on external funding and impressively secures national and international grants, the latter primarily from the EU. However, the high level of external financing comes with a cost. The staff dedicates substantial amounts of time to acquiring grants and developing grant-writing skills. Such efforts and the inherent insecurity create a clearly stressful situation, particularly for the mid-level group, who face uncertainty about their positions. To some extent, this issue is alleviated by access to teaching activities, which serve as a buffer. The self-evaluation reports that a previously significant unspent balance has been considerably reduced in response to the Vice Chancellor's demand, indicating that the financial buffer has diminished. Operating with balanced budgets is challenging for units that rely heavily on external funding.

We believe that Tema T has access to relevant research infrastructures and uses them effectively. The relationship between the unit and the department appears positive. The support functions, especially the administration at both the unit and department, are considered good.

Recommendations

The condition for research appears to be satisfactory, but we are concerned about the long-term sustainability of the significant dependence on external funding. Tema T's organizational structure seems complex, with its numerous meetings and sections lacking grounding in a professional community.

We recommend revisiting the organizational structure to evaluate the role of the various meetings and committees and explore the possibility of implementing a research group-based structure.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

Compared to most university departments, Tema T has an imbalanced ratio of teaching and research. This situation has at least two consequences. First, it has led to what may be an unsustainable dependence on external funding. Second, it may mean that the valuable research at Tema T is underutilized as a resource and knowledge base for teaching. For example, there may be potential to offer more courses in the engineering and life sciences programs to teach about the social and value dimensions of these fields. Additionally, one could consider establishing a master's program in science and technology studies. Such programs are found at many universities in other countries, but not in Sweden.

Tema T should investigate such possibilities to propose plans to the Tema department and the university administration. The department and the university administration should also be encouraged to actively engage in and support this process that may be a way to alleviate the dependence on external funding.

Panel R Report

Introduction

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General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

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- developing a language and conceptual understanding for a LiU-wide shared framework for strategy and development, to be implemented at the level of departments and divisions;

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- developing best practices for professional peer consultation with the explicit aim of professional development.

2. LiU needs to support new forms of, and platforms for, **research output and scientific communication** for various stakeholders and audiences are extremely valuable in light of **societal impact** and **public engagement**. This requires strategy as well as practical, infrastructural, and financial support. Experiences and accomplishments in this area also need to be considered as part of individual career development. We recommend:

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3. We encounter an internally perceived lack of transparency and even unfairness in the LiU internal budgeting and allocation of **financial support**. We also found that continuity and long-term strategy building at the level of departments or divisions/units is difficult because of the temporary nature of (most of) their funding, which also causes stress and job insecurity for junior staff. The uneven and insecure funding of departments also results in an inconsistent influx of **PhD students** and weak, or even lack of, PhD cohorts, negatively impacting the research culture lack of r all staff involved. We recommend

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Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

IAS main research areas are individual mobility in labour markets, housing and education, immigration and radical rights discourses, cultural consumption, and segregation and polarization. These are topical areas of high **societal relevance**. **Novelty** consists in the use of advanced methodological techniques on large datasets. Relevance and novelty are confirmed by success in acquiring external funding totalling 70% of total income 2018-23.

IAS **output** is focused on quality rather than quantity, which is evidenced by 90% of publications being peer reviewed articles. Bibliometric data indicates that a high percentage of publications are in high-status journals, with international co-authorship, high impact rates and mainly open access.

There seems to be no explicit strategy for **societal impact**, but IAS produces policy-relevant research, staff members are actively engaged in media/social media dissemination, and there is collaboration with stakeholders: e.g. the AI and Global Development lab's collaboration with UNHCR, SIDA and the Foreign Ministry on health in refugee camps. Staff have been invited as speakers, policy advisors and authors of reports by public agencies and NGOs.

IAS **strategy** is articulated in long-term plans with visions oriented around securing high levels of external funding and high-quality outputs, recruiting highly qualified staff, and strengthening their international reputation. Recruiting PhD students and postdocs is a particular priority, but this is difficult given the low degree of faculty funding and as IAS need to bring in funding for early-career researchers since they have a low teaching assignment.

Recommendations

- As the IAS has been expanding and moving into a consolidation phase, consider developing a more structured organization around the main research areas;
- Shape a stronger narrative around how the research areas of IAS intersect to create synergies, before/or in conjunction with branching out in new directions;
- Bring societal collaboration, impact, and dissemination visions and strategies into the long-term strategy work at IAS;
- Consider offering incentives for individual staff to prioritize applying for funding for PhD students.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research culture is ambitious, with high expectations for staff to produce high quality research and research proposals. This creates stress among early-career staff and PhD students, but the Unit provides strong collegial support, and creative interdisciplinary collaboration through the flexible "circles of overlapping interests" in research areas, and training in stress management. There seems to be a strong identification of early-career researchers and PhD students with the unit, though IAS struggles with getting staff to come into the Unit. The **publication strategy** is focused on quality rather than quantity, with a very strong focus on peer reviewed articles.

IAS has been successful in **recruiting** talent internationally but highlights difficulties in securing funding for PhDs and in recruiting senior researchers. Early career researchers and PhD-students find ample **opportunities to develop** their research, publications, and proposal writing skills through multiple arenas for work-in-progress discussion: weekly meetings, periodic half-day and PhD conferences; 2-day symposia, and grant application workshops. They are also afforded good opportunities to internationalize through IAS hosting of international conferences and visiting scholars, through attending conferences and outgoing research stays, as well as through the senior researchers' strong academic **networks**.

PhD students have mostly individualized development tracks. Beside a selection of mandatory courses that all need to take during their PhD, the course work is individualized. Moreover, most acquire "learning by doing" by being integrated in research projects with senior and external researchers. The IAS also cooperates with other departments at LiU, and with other universities through the Research School in computational science, hosted by IAS. Given the small cohorts, integration into project teams and a research school seem critical. The completion rate of PhDs is good, and **the quality of the PhD program** is confirmed as all have managed to stay within the academy, in some cases, with high-prestige postdocs at Stanford, Chicago, and the Academy of Finland.

Gender equality is said to be something the division is working towards, by actively considering the underrepresented gender in recruitment. The current proportion is 26% women and 74% men, but the figures are more balanced among senior associated professors and PhDs (33% women) and among Adjunct Professors (50% women). **Teaching** is mainly related to a Master's program, and the educational assignments of IAS cover only 5-6% of IAS income.

Recommendations

- As much of the research is topical and of high societal relevance, consider expanding the publication and dissemination strategy with supplementary formats and outlets also

targeting stakeholders and the broader audience interested in the empirical fields studied;
- Encourage a stronger on-site presence among staff. Even if there is a very good program of regular events offering arenas to discuss work in progress, it would be beneficial for PhDs and postdocs to have opportunities for more of informal and unplanned discussions and for their sense of belonging, as their cohorts are rather small;
- Consider whether there is a need to facilitate PhD students to take part in teaching to get the opportunity to develop teaching skills needed for their future careers.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

IAS is led by a Head of Division, supported by deputies, various administrative functions, and an external board of international scholars. There have been difficulties in distributing administrative tasks, but that has improved through a task allocation scheme rotating functions with consideration of seniority, workload and place of residence. Given the research-heavy focus of IAS, the balance of different **staff** categories seems adequate. However, more PhD students are needed to reach a critical mass in, and across, the cohorts.

IAS have been successful in keeping a high and steady level of external **funding**, covering approximately 70% of their total income for the period 2018-2023. IAS have previously held two ERC grants, and recently several larger programme and research environment/excellence grants from leading Swedish research funders. Given the high dependence on external funding, they need to acquire more long term and stable funding from LiU and new large grants from external funders. IAS is pleased to be part of the LiU Fundraising Package.

IAS uses several national **infrastructures**: the super-computing NAISS-infrastructure; the MONA-platform to access and analyse data from Swedish registers; and the KB-labb at the National Library. These are essential for IAS research, but the access and coordination across them creates some difficulties that IAS wants to see improved. IAS also uses **support functions** at LiU and find them generally of high quality, if not always offered at the pace and in the quantity needed.

Recommendations

- Develop long-term strategies and processes for partnering with others and/or taking a leading role in developing future ERC-proposals;
- Consider shaping a more selective recruitment strategy in which the connection to the existing research area is even stronger, to make it easier for early-career staff and postdocs to feel they belong and get feedback relating to their substantive research area, and for PhD students to quickly get into the approach of analytical sociology;

- Keep an ongoing discussion on the importance of taking on administrative leadership tasks and teaching duties for both their individual careers and the joint strength of the division, so that such tasks are not avoided except when there is a lack in external funding;
- Encourage early-career staff without leadership experience to enrol in LiU leadership training courses when taking on administrative positions and cover the expenses for such courses;
- Increase transparency in communicating with early-career researchers about how research funding that is not expended is used strategically.

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Relevance and novelty of the research topics covered by the evaluation unit The Division of Social Work comprises two distinct research subjects: social work and welfare law. The unit has expanded in recent years, leading to the development of both existing and new research groups of relevance to social work. Four of the six groups focus on specific populations, children, young people and families, older adults (social gerontology), and individuals with disabilities. Two groups concentrate on particular phenomena, such as inequality and interaction in social work. Welfare law has been without a professor for the past two years; however, a new professor has been recruited.

Quality of the research output & Impact outside academia Two-thirds of the publications consist of books and book chapters, while one-third are journal articles. It is suggested both in the self-evaluation and the interviews that reversing this ratio would be desirable. New research findings are primarily presented at international and national conferences. Researchers actively share their results at seminars and conferences targeting professionals and policymakers at the municipal, regional, and national levels, including organizations such as the Swedish Association of Local Authorities and Regions (SKR) and the National Board of Health and Welfare (SoS). Additionally, research outputs have included interviews in popular science journals and other media. Looking ahead, increasing outreach and the dissemination of research findings through both traditional and social media is considered essential.

Strategies, priorities and future research plans One of the strategic aims is to establish a leading research environment focused on aging and later life. The main research projects have a multidisciplinary orientation and are described as being more problem-focused than discipline-focused. The research groups within the Division of Social Work appear to collaborate extensively with other units at LiU in areas such as funding applications, research projects, publications, and PhD supervision. There is an ambition to expand these collaborations to a European context and beyond. Another key objective is to enhance the integration of social work and welfare law in research projects. This is not only important for advancing research but also for strengthening the connection between research and teaching, as legal regulations are becoming increasingly relevant in social work education. Future research directions include inclusive research approaches aimed at enhancing participation and enabling clients to co-determine research priorities. Additionally, there is

potential to explore the implications of the growing number of individuals with neurodiverse diagnoses within the social services.

Recommendations

- Given the unit's expansion in recent years, it is recommended that the unit develops a research strategy to guide discussions on future decisions and priorities;
- Consider reducing the number of research groups to fewer than six to achieve critical mass in order to enhance research quality and secure long-term funding;
- Develop a structured dissemination plan, including strategies for engaging policymakers, practitioners, and the 'general public';
- Expand international collaborations, particularly within European networks, to increase research funding opportunities and impact;
- Ensure that opportunities are created for all early-career staff and doctoral students to be actively included in research groups.

Research Culture

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Publication strategies As noted above, approximately two-thirds of publications are books and book chapters, while one-third are journal articles. One argument for this publishing pattern is the need to ensure that research findings remain both relevant and easily accessible to institutions and organizations within the Swedish context. It has been observed that the unit's international research network is not yet sufficiently broad or strong. Consequently, there is a need to expand international collaborations to increase the number of internationally co-authored publications.

Recruitment, Opportunities for early-career researchers & Quality of the PhD training & Good research practice New positions are advertised through various channels, including the university's homepage, social media, mailing lists, and other platforms. All positions require formal clearance and are advertised nationally. Early-career lectureships and postdoctoral positions are managed internally by the Head of Department. For senior lecturer positions and above, candidates are selected by the faculty, which recommends the most suitable candidate. The evaluation process includes two referees for Senior Lecturer positions and three for professorships, as suggested by the Head of Department.

The unit holds a weekly higher seminar where PhD students can present their dissertation manuscripts. Visiting researchers and senior scholars within the unit are also encouraged to present drafts and new research. However, as the unit has expanded in recent years, the

seminar alone is no longer sufficient. Consequently, different research groups have established their own seminars. Additionally, there are seminars specifically focused on developing grant applications. All supervisors meet monthly to discuss the progress of PhD candidates, including a formal segment dedicated to routines and strategies for the PhD program. Once or twice per year, a presentation day is organized, during which colleagues deliver short research presentations to one another.

Since 2011, the Division of Social Work has admitted 27 PhD students. According to the self-evaluation, seven PhD degrees have been completed so far, with one or two dissertations expected to be finalized in 2025. The PhD students admitted since 2021 appear to be on track with their studies. Several factors have contributed to the limited number of completed degrees, leading to important lessons learned. For instance, it is advisable not to admit PhD candidates during periods of significant staff turnover among senior researchers. Additionally, having clearly written and officially established procedures for the admission process is essential. Regarding PhD education, the faculty provides excellent support, including high-quality courses for new supervisors. There are also collaborative efforts in course offerings with other universities, units within IKOS at LiU, and the National Research School in Social Work. New supervisors benefit from faculty-led courses and additional support.

Equal opportunities and gender equality As indicated by the data on staff composition, the majority of employees in the division are women. According to the self-evaluation, an increased presence of male employees is considered desirable. However, it is noted that the current gender distribution reflects the proportions found among both students and professional social workers.

Research in relation to teaching All staff members are required to teach, with at least 25% of teaching duties undertaken by Senior Lecturers and Associate Professors. Professors primarily teach at the doctoral level. The goal is to align research expertise with teaching subjects as closely as possible. Most of the teaching occurs at the Bachelor's and Master's levels, with approximately 650 students admitted annually. The budget allocated for teaching is twice as large as that for research.

Recommendations

- Prioritize publishing in high-impact, peer-reviewed journals to strengthen academic credibility and influence;
- Provide training on writing for peer-reviewed journals and facilitate mentorship for early-career researchers to improve their publication output;
- Establish structured mentorship programs to support postdoctoral researchers and early-career lecturers in career progression;
- Implement a structured review and follow-up process to support doctoral students in completing their studies;

- Consider flexible teaching loads for active researchers to support high-quality research output.

Conditions for Research

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Organization Regarding the organization of research, one proposed improvement mentioned in the self-evaluation is the distinction between the roles of the Head of Research and the head of doctoral education. The self-evaluation also suggests that there could be a clearer division of labour between the department's director of PhD studies and the local head of doctoral education.

Staffing The Social Work unit has attempted to allocate 10-20 percent of full-time faculty research time to new academics during their first years. However, due to financial constraints, maintaining this allocation appears to be challenging. This situation is viewed as a significant challenge, particularly for new academics, and runs the risk of losing staff members. Furthermore, the extent of faculty-financed research time for professors remains unclear.

Funding According to the self-evaluation and the interviews, the Division of Social Work has become more successful in securing funding. The goal for the next five years is to achieve a balance between faculty-funded and externally funded research. The primary funding sources include research councils such as FORTE, VR, and FORMAS. One key objective is to establish partnerships with European organizations to pursue ERC grants.

Research infrastructure & Support functions The Division of Social Work has requested increased local support due to ongoing challenges over an extended period, particularly concerning the strategic use of funding in the long term. According to the self-evaluation, support from the library has been highly effective. However, there is an identified need for additional support from Linköping University (LiU), including increased resources and assistance from communication officers.

Recommendations

- Text Formally define and document the distinct responsibilities of the head of research and the head of doctoral education to avoid overlap;
- Secure research time for new staff. Explore alternative funding models (e.g., internal research grants, workload adjustments) to maintain the 10-20% research time allocation for early-career researchers;
- Create a more transparent system for fair and equal allocation of research time for professors;

- Expand the role of Communication Officers to improve public engagement, media presence, and dissemination of research findings.

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Relevance and novelty of the research topics The Unit focuses on critical, emancipatory approaches to social change and equality. Over 36 years, it has pioneered research in adoption, foster care, child mental health, children's rights, and youth as political agents. It integrates visual studies with childhood sociology to explore children's culture.

Quality of the research output High-quality publications and international networks bolster the Unit's reputation, with over 80% of journal articles open access. Its innovative research contributes to analysing generational aspects of societal transformation in LiU's *Societal Transformations.*

Impact outside academia Tema B researchers critically examine how knowledge about children shapes policy and governance, emphasizing children's perspectives and childhood as a sociohistorical construct. They explore generational positioning in global challenges like climate crises and conflicts.

Strategies, priorities, and future research plans The Unit prioritizes funding to sustain the PhD program and appoint two new students while seeking additional funding for their employment. Long-term goals include graduate school funding, replacing retiring professors, expanding research areas, and strengthening international outreach. Plans include recruiting researchers with new expertise, broadening the range of children studied, making research data accessible, and becoming a hub for international child research.

Recommendations

- Impact generation could be increased by the production of novel means of communication such as blogs, infographics, podcasts and online videos linked to the Unit website. This will, however, require infrastructural support from the LiU central Communications Unit.
- To generate impact and maintain broad networks suitable for later collaborative partnerships in research, Unit members tend to accept every invitation from stakeholders and the media. This is obviously very time consuming. Two recommendations follow from this.
    - the Unit could develop a more manageably selective strategy.
    - the faculty and LiU senior leadership should allocate resources in recognition of the importance of impact generation and the time it takes away from funded research.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Publication strategies The Unit prioritizes high-quality publications for diverse audiences, including Swedish and international outlets. Faculty funding metrics discourage co-authoring and undervalue practitioner-focused publications. Despite challenges, the Unit pursues a pluralist strategy, including high-status journals and collaborative works. While output is high-quality, increasing it could enhance research impact and visibility.

Recruitment The strategy attracts researchers with expertise not currently represented to foster new directions while building on areas developed by fixed-term staff. International applicants are encouraged.

Quality of PhD training Each student has an annual Individual Study Plan with supervisor collaboration, regular meetings, and appraisal dialogues. Students present annually at departmental seminars to ensure progress. Supervisors meet twice per semester for support and mentoring on career development and funding. Ethics seminars are organized, and students can change supervisors if needed. A current aim is to help students build international networks. The students interviewed were very satisfied with the support they received to apply for research money and the chance to collaborate with senior colleagues.

Networks and collaborations The Unit prioritizes inclusivity, collaboration, and societal impact in research and teaching. Weekly seminars foster interdisciplinary knowledge-sharing, while researchers engage with advisory groups and stakeholders. Networks focus on topics like foster care in Sweden, generating invitations to expert advisory groups. Long-term partnerships support future projects despite uncertain funding.

Equal opportunities and gender equality Inclusivity and openness are core to the research culture, with collaboration central. Researchers across career stages contribute to projects, while weekly seminars build skills in grant applications and publications.

Good research practice The department emphasizes public engagement, collaboration, and inclusion while maintaining theoretical traditions. Seminars foster intellectual exchange, sharing critique of diverse perspectives, and offering feedback for funding application drafts. Workshops align with funding calls, encouraging idea-sharing among staff. Research integrity is upheld through peer reviews of work.

Research in relation to teaching Teaching enhances research strengths; all staff engage in undergraduate teaching. Synergies include the international Master's program in Child Studies (ten years old) and independent courses presenting current research. Further independent courses are being developed.

Recommendations

- The Senior Leadership Team need to find ways to help PhD students and early career researchers to develop their international networks since these are recognised as essential to maintaining high-quality research.

- The strategy to appoint PhD students using faculty money and then to obtain research grants on which they can be employed is admirable, but risky, tactic. The Unit needs to develop a strategy for alternative funding. One suggestion is to approach municipalities or regions to get public or private organisations to fund Tema Barn to do research relevant to their needs. This is a strategy that has worked in other institutions. This would also help the aim of diversifying funding sources.
- Given the lack of university funding, it is difficult to maintain a critical mass of PhD researchers. It might, therefore, be helpful to formalise PhD contacts across the faculty.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Staffing Academic leadership from professors and the Unit Head, focuses on priorities and future plans, while staff lead individual projects. Monthly meetings foster inclusivity and transparency. Administrative leadership, managed by the Unit Head and two deputies, supports research by facilitating collaborations and engaging researchers. Collegiality is supported by a strong on-site presence for intellectual exchanges. The high attendance at the weekly higher seminar, with internal and external presentations, promotes good research practices.

Funding The Unit maintains a 50:50 ratio of external to faculty funding but seeks diversification beyond VR and FORTE grants. International funding is limited, though currently a professor is applying for an EU grant. Permanent staff have consistently secured funding, and the Unit seeks LiU support for researchers active in public debate.

Research infrastructure The Unit benefits from library resources, IT, archives, and technical equipment but faces challenges from a 24% funding reduction (2014–2022) and a new financing model adding uncertainty. Increased administrative support is needed for international exchange and equitable participation.

Support functions While infrastructure is strong, navigating regulations is complex. Full-time administrative support and a research coordinator assist with tasks like grant applications, but issues with data storage and sharing hinder some projects. Improved access to the Swedish Newspapers Database is suggested by the staff.

Recommendations

- The work of the Unit is hampered somewhat by the infrastructure available such a lack of sufficient administrative support to help with a range of tasks, including international exchange. More resource needs to be provided by the faculty, including for providing tools necessary to efficient conduct of research.
- There is also a need for increased transparency at the university level about how resources are allocated and reimbursed to the university when researchers get grants.

This system leaves some early career researchers with funded research that they are not allocated the time to do. This needs to be rethought at university level.

- If there is a perceived lack of transcription programmes etc., it may be helpful to budget for these in grants.

Panel R Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The review panel consists of Prof. Magnus Jegermalm (Dept. of Social Work, Marie Cederschiöld University), Prof. Bengt Larsson (Dept. of Social Studies, Linnaeus University), Prof. Susanna Paasonen (Dept. of Media Studies, University of Turku), Prof. Ann Phoenix (Social Research Institute, University College London), and is chaired by Prof. Nanna Verhoeff (Dept. of Media and Culture Studies, Utrecht University).

The Units reviewed by the panel are: Analytical Sociology (IEI-IAS), Social Work (IKOS-SOCARB), Child Studies (tema Barn/TEMA B), and Gender Studies (tema Genus/TEMA G). The panel is very much impressed by the overall quality of the research conducted at these four Units and convinced of their high level of relevance for, and impact on, contemporary society – for Sweden, as well as for the current broader international (and geo-political) context.

The panel prepared for the site visit by reviewing the self-evaluation and data package for all the Units, and constructing questions for each interview, aiming to gain complementary insights as well as clarification of the written materials. All panel members actively took part in each interview and together we evaluated our findings and articulated our recommendations, as can be found in this report.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

1. The emphasis on and expertise in interdisciplinarity at LiU is excellent and noteworthy. The matrix logic of LiU's organization also produces some difficulties as the various departments and Units are organized and financed differently, challenging productive internal comparison, alignment, collaboration, and staff mobility. We see possibilities to develop a more collective LiU-wide care for **professional development, assessment, and social safety**. For this, we recommend:

- developing a language and conceptual understanding for a LiU-wide shared framework for strategy and development, to be implemented at the level of departments and divisions;
- clear communication to all staff about how LiU implements quality assurance with transparent rubrics for leadership competencies, and assessment on all levels (faculty, department, division);
- communicating a collective framework for professional ethics and socially-safe collegial communication and collaboration
- offering time and funding for training courses and training for professional development for all job levels;
- offering formal mentorship for all job levels. Mentorship in light of career planning is particularly important for more early-career staff and PhD students facing job insecurity;
- developing best practices for professional peer consultation with the explicit aim of professional development.

2. LiU needs to support new forms of, and platforms for, **research output and scientific communication** for various stakeholders and audiences are extremely valuable in light of **societal impact** and **public engagement**. This requires strategy as well as practical, infrastructural, and financial support. Experiences and accomplishments in this area also need to be considered as part of individual career development. We recommend:

- collecting, comparing, and sharing best practices on the level of faculty or department, in order to define strategies and to support the recognition and value of novel forms of generating societal impact;

3. We encounter an internally perceived lack of transparency and even unfairness in the LiU internal budgeting and allocation of **financial support**. We also found that continuity and long-term strategy building at the level of departments or divisions/units is difficult because of the temporary nature of (most of) their funding, which also causes stress and job insecurity for junior staff. The uneven and insecure funding of departments also results in an inconsistent influx of **PhD students** and weak, or even lack of, PhD cohorts, negatively impacting the research culture lack of r all staff involved. We recommend

- offering a stable minimum of internally funded PhD positions – specifically in the case of those divisions that are more dependent on grant funding than others.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Tema G is a key national and Nordic hub for interdisciplinary gender studies. The research conducted is of **high international quality,** and both theoretically and methodologically innovative. There is great value to the open research environment that fosters creative, innovative, and impactful research. The recommendations below for research strategy and impact building are offered for developing collaborative practices at unit-level and for improving the synergy between research interests and projects.

Tema G has four main research areas corresponding to professorial platforms institutionalised between 2014 and 2023. In addition, there is an emergent area and a sixth, shared research agenda under planning. All these areas are academically and societally **highly relevant** in both representing key concerns within the (inter)discipline of gender studies and pushing it in **novel** directions.

At the same time, the division between the areas does not seem optimal for productive synergies, and there is the risk of silo-like fragmentation in how research activities develop and how they are presented. The predominance of the professorial platforms makes the system top-heavy by design and may render other research foci and collaboration within the unit less visible. Overlaps in research agendas within the unit have not always resulted in collaboration, even as collective and co-creative research practices are valued within it. Beyond the professorial platforms, **future research plans** are project-based and hence insecure. As a result, the overall research strategy foregrounds individual decisions over collaborative, unit-level agendas.

The unit values and supports academic freedom in setting research agendas, asking daring questions, experimenting with methodologies, and collaborating with external partners. **Impact outside of academia** is a strong focus at Tema G. It is the characteristic of gender studies to aim for social impact and transformation beyond traditional publishing formats. The researchers within the unit do this by actively collaborating with activists, artists, public organizations, art institutions, and companies.

Recommendations

- rethinking the structure and public representation of the research domains which, in currently being individualised or "island-like", involve vulnerability in terms of continuity and do not cover all research conducted within the unit;
- experimenting with inclusive, bottom-up approaches to articulating common research themes and interests among all staff. The issue concerns communicating research foci

and expertise to external actors to profile the unit but also developing and recognising research agendas and collaborations within it;
- collectively planning strategies for external partnerships and (the forms and aims of) societal impact at unit level;
- collecting, formulating, and sharing best practices for fostering societal impact and external partnerships particular to gender studies and Tema G to be used for more formalised impact strategy development.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Tema G accommodates diverse discipline-specific academic publishing traditions. It balances publishing in leading journals with a "what fits best" approach to impact that also includes non-academic output. The freedom and independence that the unit fosters in research topics, methods, and theoretical trajectories has resulted in individualised, rather than unit-level, **publishing strategies.** The research culture is active and supported through grant writing retreats and visiting professorships. Tema G **recruits internationally**, which is clearly reflected in the staff profile.

PhD education forms a cornerstone for the unit's research activities. The work has been strong but has clearly suffered from an instability of resources. The credit requirement of 90 ECTS is high; it remains an open question whether requirements will be rendered uniform within Tema. There is a clear prevalence of monographs over compilation theses.

There are many **active international networks and collaborations** in place which, in practice, involve individual staff members rather than the unit as a whole. External partnerships are often bound to projects and there are not always resources for fostering them over time. In December 2023 the faculty was 89% female and 11% male. This results from a general gender imbalance within gender studies specialization across research generations rather than from limitations in **equal opportunities**.

Recommendations

- research leadership and managerial leadership are currently separate, and these roles could be brought more closely together in a collaborative manner through shared agendas in PhD education, strategy planning, career development and support;
- organising regular work-in-progress staff seminars to foster a collegial feedback culture and research environment across research projects and "pillars". This is also central to fostering a culture of trust and respect across academic rank – the desired collegial "us" evoked in the panel interviews. An annual in-house research symposium with

collaboratively selected external participants could be another platform of exchange towards this.

- adding transparency, and collective responsibility, to PhD supervision practices and education quality control:
  - organising meetings with all PhD students and supervisors as a group to discuss dissertation processes since many of the challenges are shared rather than individual;
  - articulating rules for discussing student progress in contexts where they are not themselves present and delimiting the scope of supervisors' meetings to peer consultation and support with the aim of professional development in supervisory skills;
  - ensuring that PhD students are aware of available support structures when facing problems in their position or education;
  - seeking out and making use of anonymous course feedback tools if these are not provided by the institution;
  - adding transparency to how course feedback is processed and made use of in curriculum development.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

Tema offers **a lively interdisciplinary research context** that is clearly appreciated at all career stages, and **the available institutional support** in grant application work is valued and appreciated within the unit. Tema G's research strategy is based on the institutionalised research areas and builds on PhD training on the one hand, and on securing external research funding, on the other. Project-dependent research culture nevertheless forecloses long-term planning and contributes to constant stress in career development. Mid-career scholars have limited job security and cannot do research without funding.

The staff at Tema G face cumulative vulnerabilities involved in interdisciplinary research falling in-between established fields, pushing against established research and publishing practices, and exploring "risky topics" in an age of anti-feminist backlash. The self-evaluation report speaks of unit-level precarity in terms of **resources** and the political climate where gender studies is under attack, as well as of difficulties in accepting/supporting PhD students. Boundary-pushing approaches also render scholars vulnerable, leading to a need to communicate what institutional support is in place e.g., for those facing harassment.

Recommendations

- the research grants secured have been national and there would be clear possibilities to pursue international/EU funding; the staff is well positioned to do so;

- grant writing retreats have previously been productive and securing resources for them would be beneficial especially for PhD students, early, and mid-career researcher staff dependent on external funding;
- a pre-emptive approach to attacks against gender studies is preferred, both on Vice Chancellor level and within the unit for social safety. Given the organized backlash, responding to it is an institutional challenge irreducible to individualized tactics or resilience.

For institutional continuity in PhD funding, see general recommendations on p.2

Panel S Report

Evaluated Unit's Name: IKOS.FTE Philosophy and Applied Ethics

Introduction

Evaluation panel S was responsible for the research evaluation of the following divisions within Linköping university's Department of Culture and Society (IKOS):

- the division of philosophy and applied ethics (FTE)
- the division of language, culture and interaction (SKI)
- the division of history, arts and religious studies (HKR)
- the division of culture, society, design and media (KSFM)
- as well as a part of the Division of Communication, Literature and Swedish (KLS), which formed one evaluation unit together with SKI (combining into the evaluation unit "Language and Culture").

The panel consisted of Professors Torunn Selberg (Cultural Studies, U Bergen/Norway), Sara Heinämaa (Philosophy, U Jyväskylä/Finland), Lena Roos (Religious Studies, U Södertörn/Sweden), Jan Svennevig (Linguistics, U Agder/Norway) and Peter Auer (chair, Linguistics, U Freiburg/Germany). The onsite visit included meetings with three groups of staff representatives from each of the research environments (RE)/evaluation units which took place on the 25th and 26th of March, 2025. The panel met for internal consultations and in order to prepare its report on the 24th and 27th of March, 2025. For each RE, a self-evaluation report had been prepared. In addition, our reports refer to the data provided by the university's central offices on doctoral degrees, finance, personnel and bibliometrics.

General Observations that go beyond the specific evaluation units

The four evaluation units visited and evaluated by Panel S have, in part, major teaching responsibilities and therefore include a significant number of staff whose contracts do not allow them to undertake research at all or in a very small percentage of their worktime. This structural feature is a constant problem for research to which the REs have devoted considerable thought and to which they have found different solutions. Despite these potential limitations, the units include teams with very substantial research outputs, which are nationally and, in some cases, also internationally highly visible. While details are provided in the sections of this report devoted to the four REs, we summarise here some general points relevant to the evaluation of IKOS as a whole, based on the 12 interviews we conducted with different groups over two days as well as the REs' self-reports.

Interdisciplinarity

Interdisciplinarity is central to LiU's identity. However, 50 years after its foundation, it is no longer a unique feature of the university that would distinguish and differentiate it from other Nordic and European universities, and both the concept and its practical implementation need to be reconsidered. At IKOS, interdisciplinarity is still perceived as a central part (and often a central asset)

of research, although the way it is implemented varies considerably. There is a general concern in the REs that the humanities are becoming more peripheral in the university. We believe that if this were the case, it would lead to a significant loss of interdisciplinary potential at the level of the university as a whole and would weaken its research output and its future prospects. Having said that, we also think that some of the REs in IKOS need to reflect on and reconsider their role in the university and on the ways in which they can enter into a dialogue and in collaboration with other research fields and disciplines. In some of the REs in IKOS we see promising and also highly successful strategies on which this process of reflection can be built.

Interdisciplinarity is not the same as disciplinary diversity, which at this point is characteristic of some of the REs. Strategic thinking and methodological and theoretical insights are needed to move from co-existence to genuine interdisciplinarity. The co-existence of different disciplines is in some cases seen as a source of "inspiration", but in their present make-up, some of the REs do not provide the optimal basis for the deeper methodological and theoretically founded exchange across disciplines that is needed for the establishment of interdisciplinarity. So, the composition of some of the divisions needs reconsideration in order to make sure that interdisciplinarity remains a meaningful concept.

In the case of TEMA Q, LiU might consider the option of moving this unit to the TEMA department in Linköping. This would appear to be a timely and beneficial move at a point when one new full professor, one assistant professor (biträdande lektor) and one associated professor (lektor) are entering tema Q and when this organizational change will allow, but also demand, profound reconsiderations and possible reformulations of the theoretical core(s) of tema Q.

Two other REs may also benefit from an open discussion of their developmental options and opportunities: HKR might want to strengthen the inner ties between its topics and disciplines, or alternatively look for a new homebase for religion studies; and SoK might want to strengthen its inner ties in a similar manner or rather look for a new homebase for literature studies.

Financial management and budget

Securing funding for research is an ongoing concern at IKOS. This applies not only to securing external research funding, which the departments have often been successful in obtaining, but also to securing internal funding in a transparent way that allows for forward planning and long-term development. There are strong concerns about faculty financial management and allocation, and the predictability and sustainability of RE budgets, partly due to the annual budget allocation, but perhaps also due to a lack of strategic planning at faculty/departmental level. On the staff side, the replacement of vacancies (e.g. due to retirement) is not always secured or even clear and this leads to uncertainty. This situation makes it difficult to make long-term plans and is detrimental to research.

Regarding external funding, all REs try to support applicants, especially younger colleagues, and have viable established practices for this. In most REs there is a good culture of encouraging grant applications through dedicated institutionalised meetings or senior seminars. There are, however, complaints that the central grants office is of little help when support is needed for medium-sized and smaller grants, which are crucial since they can be the stepping stones for larger applications.

In the context of tight budgets, the REs have to decide whether to spend available funds on recruiting PhD students or else on ensuring a minimum amount of research time for all staff. Many REs have found feasible ways to deal with this conflict, although there is no optimal solution due to limited budgets. 20% research time even for senior staff members is not what one would expect from a university which aims at excelling in research. What is worrisome is that not all research active REs are able to guarantee even this percentage under the given financial conditions.

One solution to this problem might be an increase in externally funded (project based) PhD positions. The present fears of the faculty that external funding might be insufficient for four- or five-year PhD positions could be counteracted by an active and forward-looking strategy to pool funds for a combined external and internal financing of PhD positions. A stronger link of PhD positions to research projects through external funding would also avoid the presently huge spread of PhD topics and would increase the fit between PhD projects and the supervisors' areas of specialization in research. Another solution could be to ear-mark and distribute internal funds for research active and internationally successful units without subtracting funds from elsewhere in research. Namely, PhDs are not only a matter of supervision: they are crucial and necessary for the development of research.

Internationalisation

LiU has ambitions to become more international also in research, and there are also excellent incentives in the humanities to do so, but many of them encounter major administrative problems. It is difficult for staff to go abroad for teaching or research, and there are no rewards for international collaboration. Career orientation is focused on a career at LiU, especially in REs in which research topics are dominantly national. The number of foreign PhD students and visiting researchers could be increased and visitors should be welcomed in all research units rather than considered as exceptions. We would like to emphasize here that some research groups (FTE and the multimodality group in "Language and culture") are already doing very well in this respect.

There are problems in implementing structures that are welcoming to incoming foreign researchers and that give them a clear account of their career opportunities. The rules and structures of the university are not always transparent, and sometimes contradictory information is given to newcomers and visitors; moreover, the necessary information does not seem to be easily available in English.

The university's self-presentation on the Internet needs overall improvement. It is difficult to find relevant information about ongoing research and leading researchers in the various institutions from the outside. We have also heard complaints that the same applies to communication within the University. This seriously limits opportunities for both international and interdisciplinary cooperation. One problem seems to be that REs are not allowed to change the content of their web pages and therefore cannot communicate up-to-date information.

Early career researchers and PhDs

Most ECRs and especially PhD students are very satisfied with their research environment.

However, at the doctoral level, there is a systemic risk of not reaching the minimum number of doctoral students required to form a cohort and for which doctoral seminars can be offered. Moreover, the wide variety of topics makes it difficult to design relevant courses. One option could be the establishment of a transdisciplinary IKOS doctoral school in which doctoral students could organise themselves in a bottom-up way and in a variety of formats (workshops, invited lectures, one-day seminars on topics of relevance to ad hoc subgroups of students). The faculty/divisions should investigate possibilities of increasing the number of externally or partly externally funded PhD positions (see above). Another option is to design and offer PhD lectures and seminars on the most crucial methodologies and theoretical paradigms that serve the REs as wholes.

The small number of doctoral students is also a challenge for ECRs, who need experience in supervising doctoral students in order to build a career. Appointing three instead of two supervisors seems to be a common and appropriate partial solution to this problem, which is also appreciated by the doctoral students themselves. In the long run, however, the number of PhD students needs to be increased and topical cohesion between PhD projects should be enhanced in order to make sure

that appropriate supervision is assured. Another option to solve the problem is to support the younger staff members in supervising or co-supervising PhD students outside of LiU in other Nordic and European universities. This would have the additional effect of adding to the LiUs international profile.

A particular problem is how the REs can accommodate ECRs who bring their own money and want to be affiliated to a LiU department. Since LiU is unwilling to take the risk of being obliged to offer to these researchers a permanent position after their research grant has expired, they refuse to accommodate them, risking losing highly dynamic young researchers and highly innovative research projects. The university must find a solution to this problem.

LiU should also pay more attention to ECRs who are offered attractive positions at other universities; individual negotiations are needed to make LiU attractive for them and to keep them in Linköping.

Digital Humanities

Given the strong technological and IT focus of LiU, we were surprised that none of the REs which do empirical work has plans to develop in the area of DH. On the positive side, several of the REs at IKOS contribute to research on new digital technologies and on the conditions and consequences of digitalization (AI, human-robot interaction).

Research and the Research Quality

FTE is a highly successful new research unit (RE from here onward). It combines two lines of research – philosophy of science, normative & applied ethics – in a unique and productive way and stands out in the field of contemporary philosophy as an innovative and attractive excellence center. It is exceptionally well networked – institutionally, nationally and internationally –, collaborating with several leading research units in the academic world.

FTE is truly interdisciplinary, not merely in its thematics but, more importantly, in its very methods and research agendas. It combines epistemology with several natural sciences, from physics, metrology and medicine to engineering, technology and AI studies, and it applies normative and meta-ethical expertise in the fields of medicine, population studies, climate and scarcity research.

The research output of FTE is solid and of high quality: during the evaluation period, FTE published 25% of its journal articles in top journals of the field (level 2), such as *Synthese*, *Journal of Medical Ethics* and *European Journal of Philosophy*. Its guiding goal is to target internationally leading journals and top publishing houses (OUP, CUP). At the same time FTE plays a considerable role in the counselling of high-level policy makers in Sweden and Central-Europe. These expert services are in the central fields of public health, technology and science management and development. So, FTE is committed to and contributes strongly to science-to-public practices and regularly produces also textbooks and popular scientific publications which adds to its impact outside academia.

FTE aims at securing its core theoretical projects and tasks in the future by two replacements and by developing its new PhD program, at the same time by expanding these functions into new thematic areas, most importantly AI. It has the potential to become a leading research unit in philosophy of science and technology in Europe, and should systematically be supported in this endeavor.

Recommendations

(i) FTE needs to secure its disciplinary core in research and the balance of its external teaching services so that these services do not become too time-consuming or diversify into too many directions. This requires that research funding can be planned for several years ahead and that it is not too dependent on the income from the external teaching services. For this purpose, the faculty should reconsider its university-immanent allocation systems in light of all research output, and not

just the output that is easily measured by ready-made standard (e.g. the Norwegian system). (ii) FTE also needs to secure the continuation and development of the excellent peer-counselling practices that it has established for production of publications, PhD theses and applications for research funding. LiU should support and reward such peer-counselling work. Namely, specialized peer-counselling is crucial to the university's and rectorate's aims of excelling in research.

Research Culture

The research culture of FTE is outstanding and very encouraging for junior scholars as well as for the PhD students. The research networks of the unit are exceptionally rich and very active, expanding from Swedish and European universities to the leading research centers in the USA.

FTE's bifurcated publication strategy of is both feasible and efficient. The unit excels in both of its functions: its research output is regularly of high quality and high impact and its societal output is outstanding. In the development of this dual strategy, the practices of peer-mentoring and peer-facilitating established in FTE seem crucial.

FTE is a relatively small RE, but it is growing by a new professor specialized in philosophy of technology and by two newly hired PhD students and a third one working in the field of AI (Microsoft Silicon Valley). The unit also expects to be able to fill the two full professor positions that soon will be open, but due to internal financial constrains it also expects that it will not be able to recruit these positions at the professor level but is forced to hire two junior researchers at the lecturer level. Replacing two professors at the same time by two lecturers may risk the RE's highly successful research strategies and the delicate balance between research and research-based teaching and counselling. The risk would be lessened, if one of these recruitments could be on a higher level.

The RE suffers from lack of gender diversity – a general and permanent problem in all philosophy units in the Nordic and North-European universities. The RE has solid plans of how to repair this condition, several of which have already been put in operation, but due to contingent obstacles these have not been successful. The one-gender structure is risky for research, since it tends to narrow both topical and methodological foci. So, the RE should pursue its significant attempts to recruit excellent female scholars on all levels of research.

Recommendations

(A) One additional possibility for recruiting top-level female philosophers is to emphasize those topics in the research profile of the RE which are known to be strong among female philosophers worldwide. In the fields of philosophy of science, philosophy of technologies, and applied and normative ethics, female scholars have excelled, for example, in the following subfields: philosophy of logic (logic as Kunstlehre), science ethics, epistemic justice studies, scientific and epistemic prejudice studies, and ethics of the biosciences. Another possibility is to emphasize in CFAs that the Swedish social and cultural system is highly supportive for families and at the same time start to develop, on the faculty and central adm levels, new practices of supporting the spouses of newly recruited staff members. (B) Junior staff members, e.g., postdoctoral researchers, can gain experience and develop their skills by supervising PhD students at other universities, either in Sweden or the Nordic countries and Europe. The faculty and the rectorate should therefore both support and reward such collaborative endeavors in all possible manners: they serve both research and research training. (C) LiU should institute manners of measuring and awarding the production of high-quality scholarly editions by top-level international publishing houses, such as CUP and OUP. LiU should also institute some manner of rewarding the national and international science-to-public output that FTE and its Center for Applied Ethics produce, since this entails counselling and advising top-level policymakers and authorities both nationally and internationally. Such high-impact and distinguished research-based activities should be acknowledged as crucial forms of research output

today, since their external demand may grow in the future, when policymakers become even more dependent on scientific experts than they are today.

Conditions for Research

The organization of FTE is outstanding, built on a strong disciplinary core but systematically developing in its interdisciplinary functions. FTE excels over many similar units in Nordic and North-European universities: its two parts – philosophy of science and applied ethics – make a unique and compact whole and support one another in all central functions, from research and teaching to extra-academic functions (e.g., counselling).

The staffing situation of FTE is in a dynamic stage, which entails risks but also great opportunities. The new soon-to-be-hired senior position in philosophy of technology is able to operate as a bridge between the two already established research orientations (philosophy of science and in normative & applied ethics). As already pointed out, FTE also expects its two soon-to-be-opened positions to be filled, and it would be of course be ideal if at least one of these could be filled on the same level as earlier and not on a lower one.

The funding strategy of FTE is dual: On the one hand, this RE aims at raising large-scale international research funding and, on the other hand, it also encourages and supports its members, especially junior members, in submitting applications to local funders for smaller grants. This strategy has proved feasible: FTE has managed to raise considerable amounts of external funding for larger international projects and at the same time it has trained its members to do the same also in smaller dimensions. More importantly, FTE has been very successful in raising funds from sources that are traditionally not approached by philosophers. This strategy of expanding the financial sources is innovative and significant and important for future of FTE as well as the faculty.

Recommendations

(1)–(2) The organization of FTE should be secured, and preferably also expanded by recruiting more PhD students. The ongoing and expected recruitments are crucial for the development of this very successful and dynamic RE. For these purposes it would be excellent if the RE could fill at least one of two soon vacant full professor positions on this same level, but financial conditions seem to be hindering this. The new associate professorship in philosophy of technology will establish new bridges between the two main research orientations of FTE, but this works best if "technology" is taken in the broad sense of *Kunstlehre*, which covers the practices of all sciences, from logic and ethics to physics and pedagogy etc., and not in the narrow sense of mechanization or computerization of the know-how. Moreover, it would be excellent if the PhD team could soon be expanded, and preferably by a robust faculty or rectorate funding, not just by external funding and not by resources subtracted from research. (3) FTE should continue with its dual funding strategy (large & small, local & global) as well as its unprejudiced exploration of potential funding sources beyond the traditional ones.

Concluding Remarks

All in all, this is a dynamic and very productive RE, with a great organization and highly innovative and successful interdisciplinary projects, but not (yet) enough PhD students. Its recruitment plans need to be secured on all levels of the organization, from the faculty to the rectorate. FTE could serve LiU as a research pilot in many respects, in its interdisciplinary breadth, its publication strategies, its funding strategies and its international research education. The research culture is outstanding and very encouraging for junior scholars as well as for the new three PhD students. The institutional conditions for research work are satisfactory but not excellent: secured research time is at minimum, and the service systems seem to be too far from active researchers and research

teams. Many of the projects of this highly successful international RE could be further supported simply by locating the unit at the *Norrköping Campus* on which its international activities are easier to organize than at its current location: research visits, higher seminars, international conferences and workshops, trans-national doctoral schools and summer schools, etc.

Panel S Report

Evaluated Unit's Name: IKOS.HKR History, Arts and Religious Studies

Introduction

Evaluation panel S was responsible for the research evaluation of the following divisions within Linköping university's Department of Culture and Society (IKOS):

- the division of philosophy and applied ethics (FTE)
- the division of language, culture and interaction (SKI)
- the division of history, arts and religious studies (HKR)
- the division of culture, society, design and media (KSFM)
- as well as a part of the Division of Communication, Literature and Swedish (KLS), which formed one evaluation unit together with SKI (combining into the evaluation unit "Language and Culture").

The panel consisted of Professors Torunn Selberg (Cultural Studies, U Bergen/Norway), Sara Heinämaa (Philosophy, U Jyväskylä/Finland), Lena Roos (Religious Studies, U Södertörn/Sweden), Jan Svennevig (Linguistics, U Agder/Norway) and Peter Auer (chair, Linguistics, U Freiburg/Germany). The onsite visit included meetings with three groups of staff representatives from each of the research environments (RE)/evaluation units which took place on the 25th and 26th of March, 2025. The panel met for internal consultations and in order to prepare its report on the 24th and 27th of March, 2025. For each RE, a self-evaluation report had been prepared. In addition, our reports refer to the data provided by the university's central offices on doctoral degrees, finance, personnel and bibliometrics.

General Observations that go beyond the specific evaluation units

The four evaluation units visited and evaluated by Panel S have, in part, major teaching responsibilities and therefore include a significant number of staff whose contracts do not allow them to undertake research at all or in a very small percentage of their worktime. This structural feature is a constant problem for research to which the REs have devoted considerable thought and to which they have found different solutions. Despite these potential limitations, the units include teams with very substantial research outputs, which are nationally and, in some cases, also internationally highly visible. While details are provided in the sections of this report devoted to the four REs, we summarise here some general points relevant to the evaluation of IKOS as a whole, based on the 12 interviews we conducted with different groups over two days as well as the REs' self-reports.

Interdisciplinarity

Interdisciplinarity is central to LiU's identity. However, 50 years after its foundation, it is no longer a unique feature of the university that would distinguish and differentiate it from other Nordic and European universities, and both the concept and its practical implementation need to be reconsidered. At IKOS, interdisciplinarity is still perceived as a central part (and often a central asset) of research, although the way it is implemented varies considerably. There is a general concern in

the REs that the humanities are becoming more peripheral in the university. We believe that if this were the case, it would lead to a significant loss of interdisciplinary potential at the level of the university as a whole and would weaken its research output and its future prospects. Having said that, we also think that some of the REs in IKOS need to reflect on and reconsider their role in the university and on the ways in which they can enter into a dialogue and in collaboration with other research fields and disciplines. In some of the REs in IKOS we see promising and also highly successful strategies on which this process of reflection can be built.

Interdisciplinarity is not the same as disciplinary diversity, which at this point is characteristic of some of the REs. Strategic thinking and methodological and theoretical insights are needed to move from co-existence to genuine interdisciplinarity. The co-existence of different disciplines is in some cases seen as a source of "inspiration", but in their present make-up, some of the REs do not provide the optimal basis for the deeper methodological and theoretically founded exchange across disciplines that is needed for the establishment of interdisciplinarity. So, the composition of some of the divisions needs reconsideration in order to make sure that interdisciplinarity remains a meaningful concept.

In the case of TEMA Q, LiU might consider the option of moving this unit to the TEMA department in Linköping. This would appear to be a timely and beneficial move at a point when one new full professor, one assistant professor (biträdande lektor) and one associated professor (lektor) are entering tema Q and when this organizational change will allow, but also demand, profound reconsiderations and possible reformulations of the theoretical core(s) of tema Q.

Two other REs may also benefit from an open discussion of their developmental options and opportunities: HKR might want to strengthen the inner ties between its topics and disciplines, or alternatively look for a new homebase for religion studies; and SoK might want to strengthen its inner ties in a similar manner or rather look for a new homebase for literature studies.

Financial management and budget

Securing funding for research is an ongoing concern at IKOS. This applies not only to securing external research funding, which the divisions have often been successful in obtaining, but also to securing internal funding in a transparent way that allows for forward planning and long-term development. There are strong concerns about faculty financial management and allocation, and the predictability and sustainability of RE budgets, partly due to the annual budget allocation, but perhaps also due to a lack of strategic planning at faculty/departmental level. On the staff side, the replacement of vacancies (e.g. due to retirement) is not always secured or even clear and this leads to uncertainty. This situation makes it difficult to make long-term plans and is detrimental to research.

Regarding external funding, all REs try to support applicants, especially younger colleagues, and have viable established practices for this. In most REs there is a good culture of encouraging grant applications through dedicated institutionalised meetings or senior seminars. There are, however, complaints that the central grants office is of little help when support is needed for medium-sized and smaller grants, which are crucial since they can be the stepping stones for larger applications.

In the context of tight budgets, the REs have to decide whether to spend available funds on recruiting PhD students or else on ensuring a minimum amount of research time for all staff. Many REs have found feasible ways to deal with this conflict, although there is no optimal solution due to limited budgets. 20% research time even for senior staff members is not what one would expect from a university which aims at excelling in research. What is worrisome is that not all research active REs are able to guarantee even this percentage under the given financial conditions.

One solution to this problem might be an increase in externally funded (project based) PhD positions. The present fears of the faculty that external funding might be insufficient for four- or five-year PhD positions could be counteracted by an active and forward-looking strategy to pool funds for a combined external and internal financing of PhD positions. A stronger link of PhD positions to research projects through external funding would also avoid the presently huge spread of PhD topics and would increase the fit between PhD projects and the supervisors' areas of specialization in research. Another solution could be to ear-mark and distribute internal funds for research active and internationally successful units without subtracting funds from elsewhere in research. Namely, PhDs are not only a matter of supervision: they are crucial and necessary for the development of research.

Internationalisation

LiU has ambitions to become more international also in research, and there are also excellent incentives in the humanities to do so, but many of them encounter major administrative problems. It is difficult for staff to go abroad for teaching or research, and there are no rewards for international collaboration. Career orientation is focused on a career at LiU, especially in REs in which research topics are dominantly national. The number of foreign PhD students and visiting researchers could be increased and visitors should be welcomed in all research units rather than considered as exceptions. We would like to emphasize here that some research groups (FTE and the multimodality group in "Language and culture") are already doing very well in this respect.

There are problems in implementing structures that are welcoming to incoming foreign researchers and that give them a clear account of their career opportunities. The rules and structures of the university are not always transparent, and sometimes contradictory information is given to newcomers and visitors; moreover, the necessary information does not seem to be easily available in English.

The university's self-presentation on the Internet needs overall improvement. It is difficult to find relevant information about ongoing research and leading researchers in the various institutions from the outside. We have also heard complaints that the same applies to communication within the University. This seriously limits opportunities for both international and interdisciplinary cooperation. One problem seems to be that REs are not allowed to change the content of their web pages and therefore cannot communicate up-to-date information.

Early career researchers and PhDs

Most ECRs and especially PhD students are very satisfied with their research environment.

However, at the doctoral level, there is a systemic risk of not reaching the minimum number of doctoral students required to form a cohort and for which doctoral seminars can be offered. Moreover, the wide variety of topics makes it difficult to design relevant courses. One option could be the establishment of a transdisciplinary IKOS doctoral school in which doctoral students could organise themselves in a bottom-up way and in a variety of formats (workshops, invited lectures, one-day seminars on topics of relevance to ad hoc subgroups of students). The faculty/divisions should investigate possibilities of increasing the number of externally or partly externally funded PhD positions (see above). Another option is to design and offer PhD lectures and seminars on the most crucial methodologies and theoretical paradigms that serve the REs as wholes.

The small number of doctoral students is also a challenge for ECRs, who need experience in supervising doctoral students in order to build a career. Appointing three instead of two supervisors seems to be a common and appropriate partial solution to this problem, which is also appreciated by the doctoral students themselves. In the long run, however, the number of PhD students needs to be increased and topical cohesion between PhD projects should be enhanced in order to make sure

that appropriate supervision is assured. Another option to solve the problem is to support the younger staff members in supervising or co-supervising PhD students outside of LiU in other Nordic and European universities. This would have the additional effect of adding to the LiUs international profile.

A particular problem is how the REs can accommodate ECRs who bring their own money and want to be affiliated to a LiU department. As LiU is unwilling to take the risk of being obliged to offer these researchers a permanent position after their research grant has expired, they refuse to accommodate them, risking losing highly dynamic young researchers and highly innovative research projects. The university must find a solution to this problem.

LiU should also pay more attention to ECRs who are offered attractive positions at other universities; individual negotiations are needed to make LiU attractive for them and to keep them in Linköping.

Digital Humanities

Given the strong technological and IT focus of LiU, we were surprised that none of the REs which do empirical work has plans to develop in the area of DH. On the positive side, several of the REs at IKOS contribute to research on new digital technologies and on the conditions and consequences of digitalization (AI, human-robot interaction).

Research and the Research Quality

1) Relevance and novelty of the research topics covered by the evaluation unit

The unit as a whole has an emphasis on modern and contemporary history as well as local history. They also identify "some common research questions or overlapping themes that enable collaborations", among these are the following thematic clusters that unite all three disciplines in the unit:
1. study of historical cultures
2. historical sites, cities, localities
3. history of beliefs, ideologies, convictions

These overlapping themes seem to be sufficiently broadly defined to be able to construct interesting research projects as well as joint courses that could be taken by students in all three disciplines. Especially the focus on local history is unique in Sweden and certainly worthy of further development. Merely thematic unity or coherence may however not suffice to unify the RE. Methodological and theoretical coherence may also be needed to develop the research profile further.

2) Quality of the research output

The output in publications in the appended data packages seems a bit on the low side for the studied period but in the interview the scholars from the unit stressed that much has changed since 2021–22, especially through the two externally financed professors and two more senior scholars that have been hired. We have, however not access to any data to assess that.

3) Impact outside academia

This is mainly shown through a considerable amount of popular science articles and also by the fact that many of the scholars regularly are invited to speak about their research fields outside of academia.

Strategies, priorities, and future research plans

The unit has strengthened its competence in Early Modern history, through the recruitment of two senior lecturers in 2024.

They also expect a revitalization of the Centre for local history, as well as the fields of Modern history and Modern and Contemporary Art History through the recruitment of three professors in these fields.

Recommendations

It is our recommendation to find concrete ways of developing research collaboration in the fields of Local history and Modern history, where there is competence and interest in all three disciplines, as well as interest among local donors of research funding. One way of doing this would be by developing shared methodologies and theoretical perspectives. This would put LiU in a unique position nationally. Ways of doing this could for instance be to design research projects where scholars from all disciplines study a local phenomenon (similarly to the former Vreta kloster project), perhaps also including admitting a cohort of doctoral students in such a collaboration. We would also encourage the unit to expand its international collaborations, as the emphasis on local history can contribute to a somewhat inward looking character of the unit. This could be balanced by an expanded engagement with research centres of local history in other countries where this focus is more developed than in Sweden.

It should also be noted that in the self-evaluation as well as the interviews, Religious Studies as a discipline was not so visible. It seems important for the future to ponder what the research contribution and position of that discipline will be, as well as the impact of it now being part of a unit focusing on historical studies, rather than being grouped with anthropology and philosophy as in the past.

Research Culture

Publication strategies

In the self-evaluation is noted a steady increase in peer reviewed publications in English. In the studied time-period a dominance of publications in Swedish can still be noted, as has been the tradition for History in Sweden. The percentage for co-authored publications is lower (13%) than LiU average and the unit has a goal of increasing the number of coauthored articles. The share of journal articles in Level-2 journals (21%) is in line with LiU's average.

Quality of PhD training

Out of the three disciplines that form the unit, only History has a PhD program, whereas Art history and Religious Studies do not. The current PhD program in history was launched in 2016. 7 PhD candidates have been admitted since then, one in 2016, and two cohorts in 2019 and 2023. Four PhD candidates from Pedagogic practices also form part of the division. Two of the PhD candidates are externally funded. A recent development is a more active engagement with the national research school for historical studies. The core of the research environment is the higher research seminar that seems to be productive and well attended by both junior and senior scholars.

Academic as well as non-academic networks and collaborations

In the self-evaluation it is stated that the schedule for the higher research seminar is distributed beyond the unit as well as to colleagues at Karlstad University to enable them as well to attend (also in hybrid form). How often this actually happens remains unclear.

Recommendations

If the aim is to increase the amount of international peer-reviewed publications, which it should be, the unit needs to find incentives that will encourage and help scholars to develop their publication plans in this direction, for instance by giving some kind of bonus for that type of publication. It is also necessary is to encourage and guide the scholars in the process of reframing their research in a way that holds more relevance for international audiences.

It is a major problem for the balance in the division that only one of the three disciplines currently offers a PhD programme. This is a place where the smaller disciplines could benefit from being part of a larger interdisciplinary unit, so even if they could only admit a small number of PhD candidates, those would still be part of a thriving research environment. One possibility would be to admit a cohort of doctoral students around a shared theme, for instance in local history, although the candidates in Religious Studies and Art History would have to be admitted in collaboration with other universities that have PhD degree rights. To such a cohort a group of senior scholars could be attached as supervisors and that group could form the beginning of an integrated interdisciplinary research environment. This seems all the more doable thanks to the long-time support by local funders.

Conditions for Research

Organization

The unit is quite a new one, formed in 2020, and with a substantial inflow of recently recruited scholars (3 new professors and 2 senior lecturers). The conditions for a thriving research environment have thereby substantially been improved, especially thanks to long-term external funding. However, it is still unclear how this will develop. The research environment has great potential for interdisciplinary collaboration as outlined above but its plans are still undeveloped. What is still lacking are strategies for making this happen. Merely being together in the same place as part of a common unit does not ensure that such collaborations take place.

Funding

What stands out in a Swedish setting is the presence of long-term external funding in the form of two professorial chairs. This collaboration with local donors has also resulted in the financing of two PhD positions, again, something unusual in Sweden. This seems like a very fruitful collaboration to build on for the future.

In addition to this, most of the research is done in individual and small projects, but there have also been some larger projects as well as some examples of national and international research collaborations. A strength is that externally funded projects have funding from many different sources, rather than depending on a few large funders where the success rate for applications is very low.

The unit has decided to grant all senior staff a base of 20% research time, as a strategic decision to enhance the research quality. A consequence is that less faculty funded PhD positions have been offered.

Support functions

One weakness that came up during the interviews was that the grant office seems to mainly lend support when it comes to applying for larger funding possibilities, and that the scholars at the unit would appreciate more support in applying for smaller grants: local, national and international.

The self-evaluation also stresses that there are weaknesses in the communication between units and departments at LiU that can form an obstacle for developing interdisciplinary collaboration. The RE also pointed to weaknesses in the LiU webpage for communicating about the research being done at

LiU. This was confirmed by our own experience in the assessment panel; it was very difficult get an overview of scholars and projects in each discipline from the LiU webpage.

Recommendations

It is our recommendation for the unit to work on building structures for making interdisciplinary research happen as outlined more in detail above.

It would be positive if the grants office could to a greater extent support the application for smaller grants.

The infrastructure for internal and external research communication should be improved in order to facilitate interdepartmental collaboration as well as more efficient research communication outside LiU.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

It can be a problem when a large, well established and well-funded discipline such as History in this case is paired with smaller disciplines, in this case Art History and Religious Studies. There is a risk that History will set the agenda and the two smaller disciplines will simply tag along. It is therefore also important for the two smaller disciplines to have a clear voice in this collaboration, in on order to outline what would benefit them as disciplines as well. This would be easier if they would also have the possibility of admitting PhD candidates, as well as hosting external scholars on temporary research projects. Such a balance between the three disciplines would make it easier for the smaller disciplines to get the full benefit of being part of a larger, interdisciplinary unit. Because of the small size of Art History and Religious Studies, it also seems important that they consolidate their disciplinary collaborations, nationally as well as internationally.

Panel S Report

Evaluated Unit's Name: IKOS.KLS Communication, Literature and Swedish and

IKOS.SKI Language, Culture and Interaction

Introduction

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The four evaluation units visited and evaluated by Panel S have, in part, major teaching responsibilities and therefore include a significant number of staff whose contracts do not allow them to undertake research at all or in a very small percentage of their worktime. This structural feature is a constant problem for research to which the REs have devoted considerable thought and to which they have found different solutions. Despite these potential limitations, the units include teams with very substantial research outputs, which are nationally and, in some cases, also internationally highly visible. While details are provided in the sections of this report devoted to the four REs, we summarise here some general points relevant to the evaluation of IKOS as a whole, based on the 12 interviews we conducted with different groups over two days as well as the REs' self-reports.

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Interdisciplinarity is central to LiU's identity. However, 50 years after its foundation, it is no longer a unique feature of the university that would distinguish and differentiate it from other Nordic and European universities, and both the concept and its practical implementation need to be reconsidered. At IKOS, interdisciplinarity is still perceived as a central part (and often a central asset) of research, although the way it is implemented varies considerably. There is a general concern in the REs that the humanities are becoming more peripheral in the university. We believe that if this were the case, it would lead to a significant loss of interdisciplinary potential at the level of the university as a whole and would weaken its research output and its future prospects. Having said that, we also think that some of the REs in IKOS need to reflect on and reconsider their role in the university and on the ways in which they can enter into a dialogue and in collaboration with other research fields and disciplines. In some of the REs in IKOS we see promising and also highly successful strategies on which this process of reflection can be built.

Interdisciplinarity is not the same as disciplinary diversity, which at this point is characteristic of some of the REs. Strategic thinking and methodological and theoretical insights are needed to move from co-existence to genuine interdisciplinarity. The co-existence of different disciplines is in some cases seen as a source of "inspiration", but in their present make-up, some of the REs do not provide the optimal basis for the deeper methodological and theoretically founded exchange across disciplines that is needed for the establishment of interdisciplinarity. So, the composition of some of the divisions needs reconsideration in order to make sure that interdisciplinarity remains a meaningful concept.

In the case of TEMA Q, LiU might consider the option of moving this unit to the TEMA department in Linköping. This would appear to be a timely and beneficial move at a point when one new full professor, one assistant professor (biträdande lektor) and one associated professor (lektor) are entering tema Q and when this organizational change will allow, but also demand, profound reconsiderations and possible reformulations of the theoretical core(s) of tema Q.

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Most ECRs and especially PhD students are very satisfied with their research environment.

However, at the doctoral level, there is a systemic risk of not reaching the minimum number of doctoral students required to form a cohort and for which doctoral seminars can be offered. Moreover, the wide variety of topics makes it difficult to design relevant courses. One option could be the establishment of a transdisciplinary IKOS doctoral school in which doctoral students could organise themselves in a bottom-up way and in a variety of formats (workshops, invited lectures, one-day seminars on topics of relevance to ad hoc subgroups of students). The faculty/divisions should investigate possibilities of increasing the number of externally or partly externally funded

PhD positions (see above). Another option is to design and offer PhD lectures and seminars on the most crucial methodologies and theoretical paradigms that serve the REs as wholes.

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A particular problem is how the REs can accommodate ECRs who bring their own money and want to be affiliated to a LiU department. Since LiU is unwilling to take the risk of being obliged to offer these researchers a permanent position after their research grant has expired, they refuse to accommodate them, risking losing highly dynamic young researchers and highly innovative research projects. The university must find a solution to this problem.

LiU should also pay more attention to ECRs who are offered attractive positions at other universities; individual negotiations are needed to make LiU attractive for them and to keep them in Linköping.

Digital Humanities

Given the strong technological and IT focus of LiU, we were surprised that none of the REs which do empirical work has plans to develop in the area of DH. On the positive side, several of the REs at IKOS contribute to research on new digital technologies and on the conditions and consequences of digitalization (AI, human-robot interaction).

Research and the Research Quality

1) Relevance and novelty of the research topics covered by the evaluation unit

The research of this unit falls into two main categories, linguistics/interaction analysis and literature. The research group working on multimodal interaction analysis has a very strong position both nationally and internationally. It has highly innovative projects, such as the one on embodied grammar and the one on interaction between humans and robots. The latter project also has a strong interdisciplinary character by involving collaboration with engineering and cognitive sciences, and thus it aligns well with the university's research profile.

2) Quality of the research output

The research output also seems to be quite important, with a high number of publications and a satisfactory share of level 2 publications. However, it is somewhat difficult to assess this, as the bibliometric analysis is conducted for the divisions SKI and KLS, while the research environment Language and Culture (SoK) cuts across these divisions. If one should take the divisions separately, SKI has more publications in total and a higher number of level 2 publications. KLS has very few level 2 publications and seems to publish more in national outlets.

The same problem concerns assessing external funding, but both SKI and KLS seem to have a relatively important share of external grants. The research environment has also shown the capacity to get funding for large projects, such as Keevallik's grant for research on embodied grammar (17.5 MSEK). This being said, the self-evaluation report identifies a problem that there is a rather large imbalance between members of the research environment concerning publications and research

grants. This is not visible in the statistics or the self-evaluations, but it seems to constitute a potential for improvement.

The research in multimodal interaction analysis is for a large part carried out as teamwork involving researchers at different levels. This has led to a high degree of co-authorship and ambitious publications in international, high-ranked journals. It is also a very fruitful way of promoting the research of PhD students and junior researchers and socializing them into a research career. In the field of literature, there are more small-scale and individual projects, some with fewer international publications. This is to a certain degree common in this field of research, but there seem to be opportunities for more collaboration and joint projects with more ambitious publication strategies.

3) Impact outside academia

The researchers are somewhat active in communicating their results to practitioners and the general public by giving talks and writing popular science articles. However, they note that there are few incentives in the university system for engaging in such activities. The research on human-robot interaction seems to have a potential for a substantial impact in the field of practice. However, it is not clear from the documents or the interviews how this potential is realized.

Recommendations

- Establish more joint projects and collaboration in the field of literature with the ambition of getting larger research grants and more high-level publications.

- Explore opportunities for engaging the research-passive faculty in small-scale projects and collaborations with active researchers, potentially encouraging them to become more active in applying for funding.

Research Culture

The research environment has chosen to allocate faculty funding to hiring PhDs rather than to giving a fixed percentage of research time to the faculty. This puts extra pressure on the faculty to apply for external funding. Some of the faculty are not active in research or in applying for grants, but the research environment encourages everyone to do so by offering up to 10% research time to those who have concrete plans for project applications. There are also seminars where the faculty give each other feedback on applications. These initiatives seem to be a successful strategy and has resulted in several larger and smaller grants.

Another way of promoting research has been to make it more salient in the recruitment strategy and in giving new employees a certain amount of research time during the first years of employment. The junior researchers report that they have good support for their career development. They are encouraged to participate in PhD supervision, which helps them qualify for promotion.

The research environment has a rather large cohort of PhD students, and they seem to be very well taken care of. They have three supervisors as a norm and are included in a large range of seminars, such as research seminars, higher seminars, data sessions and feedback sessions on the participants' conference presentations, abstracts and grant applications. The culture seems to be very supportive and the attendance at the seminars is high. They get the opportunity to get experience with teaching, and most of them manage to find relevant topics to teach. They are also encouraged to go abroad for shorter or longer periods of time and to participate in international conferences. All in all, the PhD students seem very pleased with the research training and the research environment's support for their research.

The research environment has large and important networks of researchers both nationally and internationally, and there are good examples of collaboration and co-authoring with researchers from other universities. However, this is somewhat unevenly distributed among the faculty. The interaction researchers seem to be better connected to international research environments than the literary scholars. They also have extensive contact and collaboration with researchers from other departments at the university, facilitated by the regular data sessions that attract researchers from a range of different disciplines. Finally, they seem to be successful in including PhD students and junior researchers in their networks and in encouraging them to attend conferences and establish their own networks.

Conditions for Research

1) Organization

The combination of linguistics and literature in one research environment seems to be rooted in historical tradition and in the organization of teaching more than in concerns for promoting research collaboration. The multi-disciplinary character of the environment seems to have both positive and negative aspects. Both the self-evaluation and the interviews identify problems with this organization by pointing to the fact that the administrative structures and financial systems of LiU do not support this organization of the research. Furthermore, there is little interdisciplinary research involving researchers from both groups. The researchers meet and exchange ideas and comment on each other's texts in joint seminars, but this does not result in common theoretical or methodological insights or joint projects or publications. On the positive side, researchers at all levels seem to appreciate the challenges and new perspectives arising from discussions across disciplinary boundaries. And the social cohesion inside the group seems to be very strong. It was also mentioned in the interviews that the groups might be too small in themselves to have a strong enough position inside the organization.

2) Funding

The RE has chosen to allocate the funding from the Faculty primarily to employing PhD students at the expense of giving research time to the permanent faculty (although this seems to be changing currently, with senior researchers being allotted 20% research time). This prioritization seems to be successful in creating a large and well-functioning group of PhD students. On the other hand, it may be detrimental to developing the research career of the junior faculty and to keeping young talents at the university. Other universities can offer way better research conditions.

Recommendations

We recommend that the research environment and the Faculty initiate a process to explore the possibilities of finding a different way of organizing the research environment and its activities. Having a more disciplinary, homogeneous group would support the existing research collaborations more and allow more focused discussions and feedback in the seminars. It would still be possible to organize cross-disciplinary meetings and seminars to take care of the dialogue between literature and linguistics that the researchers seem to appreciate. One alternative organization that was mentioned was to join forces with researchers in language and literature didactics respectively. Another was for linguists to seek collaboration with interaction researchers outside of the department, with whom they already have a tight network, while literature may have common interests with faculty from history or the history of ideas. What would be the most fruitful and viable solution should be the result of a discussion among the faculty and the leadership.

We would also recommend that the RE consider whether it would be possible to allocate more research time to junior faculty or to establish incentive programs to keep young talents at the university.

Concluding Remarks

All in all, the research environment has many indicators of high quality and ambitious research, although the research activity seems to be unevenly distributed among the faculty. Measures may be taken to encourage certain faculty members to become more research active or to become more ambitious in their project designs. The research culture seems to be very strong among the research-active participants, and the environment is supportive and encouraging for junior researchers and PhD students. The conditions for research are satisfactory, but the organization of the RE could be reconsidered, as well as the distribution of Faculty funding.

Panel S Report

Evaluated Unit's Name: IKOS. KSFM. Culture, Society, Design and Media

Introduction

Evaluation panel S was responsible for the research evaluation of the following divisions within Linköping university's Department of Culture and Society (IKOS):

- the division of philosophy and applied ethics (FTE)
- the division of language, culture and interaction (SKI)
- the division of history, arts and religious studies (HKR)
- the division of culture, society, design and media (KSFM)
- as well as a part of the Division of Communication, Literature and Swedish (KLS), which formed one evaluation unit together with SKI (combining into the evaluation unit "Language and Culture").

The panel consisted of Professors Torunn Selberg (Cultural Studies, U Bergen/Norway), Sara Heinämaa (Philosophy, U Jyväskylä/Finland), Lena Roos (Religious Studies, U Södertörn/Sweden), Jan Svennevig (Linguistics, U Agder/Norway) and Peter Auer (chair, Linguistics, U Freiburg/Germany). The onsite visit included meetings with three groups of staff representatives from each of the research environments (RE)/evaluation units which took place on the 25th and 26th of March, 2025. The panel met for internal consultations and in order to prepare its report on the 24th and 27th of March, 2025. For each RE, a self-evaluation report had been prepared. In addition, our reports refer to the data provided by the university's central offices on doctoral degrees, finance, personnel and bibliometrics.

General Observations that go beyond the specific evaluation units

The four evaluation units visited and evaluated by Panel S have, in part, major teaching responsibilities and therefore include a significant number of staff whose contracts do not allow them to undertake research at all or in a very small percentage of their worktime. This structural feature is a constant problem for research to which the REs have devoted considerable thought and to which they have found different solutions. Despite these potential limitations, the units include teams with very substantial research outputs, which are nationally and, in some cases, also internationally highly visible. While details are provided in the sections of this report devoted to the four REs, we summarise here some general points relevant to the evaluation of IKOS as a whole, based on the 12 interviews we conducted with different groups over two days as well as the REs' self-reports.

Interdisciplinarity

Interdisciplinarity is central to LiU's identity. However, 50 years after its foundation, it is no longer a unique feature of the university that would distinguish and differentiate it from other Nordic and European universities, and both the concept and its practical implementation need to be reconsidered. At IKOS, interdisciplinarity is still perceived as a central part (and often a central asset) of research, although the way it is implemented varies considerably. There is a general concern in

the REs that the humanities are becoming more peripheral in the university. We believe that if this were the case, it would lead to a significant loss of interdisciplinary potential at the level of the university as a whole and would weaken its research output and its future prospects. Having said that, we also think that some of the REs in IKOS need to reflect on and reconsider their role in the university and on the ways in which they can enter into a dialogue and in collaboration with other research fields and disciplines. In some of the REs in IKOS we see promising and also highly successful strategies on which this process of reflection can be built.

Interdisciplinarity is not the same as disciplinary diversity, which at this point is characteristic of some of the REs. Strategic thinking and methodological and theoretical insights are needed to move from co-existence to genuine interdisciplinarity. The co-existence of different disciplines is in some cases seen as a source of "inspiration", but in their present make-up, some of the REs do not provide the optimal basis for the deeper methodological and theoretically founded exchange across disciplines that is needed for the establishment of interdisciplinarity. So, the composition of some of the divisions needs reconsideration in order to make sure that interdisciplinarity remains a meaningful concept.

In the case of Tema Q, LiU might consider the option of moving this unit to the Tema department in Linköping. This would appear to be a timely and beneficial move at a point when one new full professor, one assistant professor (biträdande lektor) and one associated professor (lektor) are entering Tema Q and when this organizational change will allow, but also demand, profound reconsiderations and possible reformulations of the theoretical core(s) of tema Q.

Two other REs may also benefit from an open discussion of their developmental options and opportunities: HKR might want to strengthen the inner ties between its topics and disciplines, or alternatively look for a new homebase for religion studies; and SoK might want to strengthen its inner ties in a similar manner or rather look for a new homebase for literature studies.

Financial management and budget

Securing funding for research is an ongoing concern at IKOS. This applies not only to securing external research funding, which the departments have often been successful in obtaining, but also to securing internal funding in a transparent way that allows for forward planning and long-term development. There are strong concerns about faculty financial management and allocation, and the predictability and sustainability of RE budgets, partly due to the annual budget allocation, but perhaps also due to a lack of strategic planning at faculty/departmental level. On the staff side, the replacement of vacancies (e.g. due to retirement) is not always secured or even clear and this leads to uncertainty. This situation makes it difficult to make long-term plans and is detrimental to research.

Regarding external funding, all REs try to support applicants, especially younger colleagues, and have viable established practices for this. In most REs there is a good culture of encouraging grant applications through dedicated institutionalised meetings or senior seminars. There are, however, complaints that the central grants office is of little help when support is needed for medium-sized and smaller grants, which are crucial since they can be the stepping stones for larger applications.

In the context of tight budgets, the REs have to decide whether to spend available funds on recruiting PhD students or else on ensuring a minimum amount of research time for all staff. Many REs have found feasible ways to deal with this conflict, although there is no optimal solution due to limited budgets. 20% research time even for senior staff members is not what one would expect from a university which aims at excelling in research. What is worrisome is that not all research active REs are able to guarantee even this percentage under the given financial conditions.

One solution to this problem might be an increase in externally funded (project based) PhD positions. The present fears of the faculty that external funding might be insufficient for four- or five-year PhD positions could be counteracted by an active and forward-looking strategy to pool funds for a combined external and internal financing of PhD positions. A stronger link of PhD positions to research projects through external funding would also avoid the presently huge spread of PhD topics and would increase the fit between PhD projects and the supervisors' areas of specialization in research. Another solution could be to ear-mark and distribute internal funds for research active and internationally successful units without subtracting funds from elsewhere in research. Namely, PhDs are not only a matter of supervision: they are crucial and necessary for the development of research.

Internationalisation

LiU has ambitions to become more international also in research, and there are also excellent incentives in the humanities to do so, but many of them encounter major administrative problems. It is difficult for staff to go abroad for teaching or research, and there are no rewards for international collaboration. Career orientation is focused on a career at LiU, especially in REs in which research topics are dominantly national. The number of foreign PhD students and visiting researchers could be increased and visitors should be welcomed in all research units rather than considered as exceptions. We would like to emphasize here that some research groups (FTE and the multimodality group in "Language and culture") are already doing very well in this respect.

There are problems in implementing structures that are welcoming to incoming foreign researchers and that give them a clear account of their career opportunities. The rules and structures of the university are not always transparent, and sometimes contradictory information is given to newcomers and visitors; moreover, the necessary information does not seem to be easily available in English.

The university's self-presentation on the Internet needs overall improvement. It is difficult to find relevant information about ongoing research and leading researchers in the various institutions from the outside. We have also heard complaints that the same applies to communication within the University. This seriously limits opportunities for both international and interdisciplinary cooperation. One problem seems to be that REs are not allowed to change the content of their web pages and therefore cannot communicate up-to-date information.

Early career researchers and PhDs

Most ECRs and especially PhD students are very satisfied with their research environment.

However, at the doctoral level, there is a systemic risk of not reaching the minimum number of doctoral students required to form a cohort and for which doctoral seminars can be offered. Moreover, the wide variety of topics makes it difficult to design relevant courses. One option could be the establishment of a transdisciplinary IKOS doctoral school in which doctoral students could organise themselves in a bottom-up way and in a variety of formats (workshops, invited lectures, one-day seminars on topics of relevance to ad hoc subgroups of students). The faculty/divisions should investigate possibilities of increasing the number of externally or partly externally funded PhD positions (see above). Another option is to design and offer PhD lectures and seminars on the most crucial methodologies and theoretical paradigms that serve the REs as wholes.

The small number of doctoral students is also a challenge for ECRs, who need experience in supervising doctoral students in order to build a career. Appointing three instead of two supervisors seems to be a common and appropriate partial solution to this problem, which is also appreciated by the doctoral students themselves. In the long run, however, the number of PhD students needs to be increased and topical cohesion between PhD projects should be enhanced in order to make sure

that appropriate supervision is assured. Another option to solve the problem is to support the younger staff members in supervising or co-supervising PhD students outside of LiU in other Nordic and European universities. This would have the additional effect of adding to the LiUs international profile.

A particular problem is how the REs can accommodate ECRs who bring their own money and want to be affiliated to a LiU department. Since LiU is unwilling to take the risk of being obliged to offer to these researchers a permanent position after their research grant has expired, they refuse to accommodate them, risking losing highly dynamic young researchers and highly innovative research projects. The university must find a solution to this problem.

LiU should also pay more attention to ECRs who are offered attractive positions at other universities; individual negotiations are needed to make LiU attractive for them and to keep them in Linköping.

Digital Humanities

Given the strong technological and IT focus of LiU, we were surprised that none of the REs which do empirical work has plans to develop in the area of DH. On the positive side, several of the REs at IKOS contribute to research on new digital technologies and on the conditions and consequences of digitalization (AI, human-robot interaction).

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Tema Culture and Society, shortened to Tema Q, is part of the division KFSM (Culture, Society Design and Media) which additionally includes Sloyd and teacher education and the bachelor program Communication, Society and Media Production (KSM). Tema Q is the only unit doing whose primary task is research and this evaluation concerns this section.

At the time of the evaluation process, the unit was in a situation of transition. One professor, who had been the leader (co-ordinator) of a large and well-funded research project, was about to retire, and the hiring process of three new persons (1 full professor, 1 assistant professor (biträdande lektor) with 50% research, and 1 associate professor (lektor)) was still in process. Such a renewal of the staff may indicate or lead to changes and opportunities that are not included in this evaluation. The new positions were to be placed both in Tema Q (full professor) and Society and Media Production. This presentation, based on the self-evaluation and meetings, would probably look different if the new fellows (co-workers) were included.

Tema Q's main emphasis lies in the intersection of mediated culture and cultural heritage, a broad and inclusive approach, covering relevant issues of current interest within cultural studies both on a national and international level. Generally, it is Tema Q's policy to construct projects with a broad content, involving researchers on different levels. Tema Q encourages ideas that lead to inclusive research projects initiated "from below".

Within mediated culture one of the RE's specializations lies in the interdisciplinary study of intellectual property manifested in the research project "Patents and scientific information 1895 – 2020 (PASSIM) funded by The European Research Council. (2017-2023). One PhD student was funded. Other output of this project are publications in high-ranking journals, conferences and workshops creating new networks that may benefit Tema Q's future research. The funding of such an extensive and long-lasting project financed by a prestigious grant should be evidence of good quality.

Within heritage studies, a field of great interest and activity within cultural studies internationally, plans point towards studies of museums and their collections. They seem to have realized in the meantime, but are not covered in the evaluation documents(2021-2023). There are plans for a research cluster, including one new postdoc and an interdisciplinary network including ethnology, archaeology and museology. Tema Q's contribution will be research on museum collections and the musealization of computer and computation, which may be characterized as both classical and innovative heritage studies. Synergies between these two research fields (on patents and heritage) are to be found in the project "The protection of Classics" funded by Riksbankens Jubileumsfond.

Recommendations

The unit is in a position of change which may indicate many new possibilities and a strengthening of competence. This new situation makes it difficult to give advice and recommendations. We however indicate one possibility: Since KSFM is a rather small RE and since Tema Q is the only section that does research, it may be better for the section to consider working more closely with the other Tema institutions at LiU and for this purpose move Tema Q, or anyway consider a more thematic collaboration with the other Tema institutions.

Research Culture

Publication strategies

Tema Q publish mostly as single authors, and with a publication profile that also includes artistic outcomes. According to the Bibliometric Analysis (2020-2022), the share of articles on level 2 was a bit under the average for LiU (16%), but the share of book chapters on that level were higher (48 %). When it comes to Open Access, the unit scores higher than LiU's average, and since 2009 the unit has run their own digital journal "Culture Unbound", a journal of critical cultural studies, funded by The Swedish Research Council and by Tema Q and LiU humanities. Bibliometrics reflect that many of the unit's scholars now publish in English, which creates a dilemma that is shared with other scholars in the humanities who strive to be visible in national contexts where cultural studies may be of interest to a general public. There is also a dilemma in the bibliometric measurements implemented by the faculty for resource allocation between making strategic choices or reaching out for the appropriate audience, which may be wide and varied – also outside academia when it concerns topics discussed within Cultural Studies.

Quality of PhD training

The quality of PhD training in Tema Q depends on the weekly seminars and regular meetings described as "the heart of our collegial culture with an amalgam of invited guests". The seminars are of importance in securing PhD projects, for funding and developing interdisciplinary competence, and for the quality of publications and research applications.

Between 2020 and 2023, 11 PhD students took their PhD exams, and in the beginning of 2024 three more defended their thesis. In 2021 a last major revision of the program was made, reducing the number of course credits (from 90 to 75hp), as the students want more time for their own work on the theses, and are less interested in general problems and discussions. To this the RE comments that courses and seminars are crucial for establishing a common foundation among doctoral candidates with diverse backgrounds. The evaluation committee would proposethe establishment of an IKOS transdisciplinary doctoral school (see general observations).

Of the two young researchers we talked to one was was interested in interdisciplinary studies and found LiU, and especially Tema Q with it's media perspective, very attractive. He was satisfied with his own situation, but he indicated that the teachers could take more responsibility for the

departmental seminar. This could be an argument in favour of the idea of moving the doctoral seminars up one level covering the whole faculty and with that sharing the responsibility of PhD education.

The other researcher we talked to was an international ECR, whose funding had ended. She expressed her frustration about receiving no support after her funding had run out and about her career hopes/plans not being discussed. This demonstrates that the RE is attractive to international postdoctoral researchers, but it's practices of advising and supporting foreign scholars in their career planning and plans for applications of external funding need to be improved.

Academic as well as non-academic networks and collaborations

The division hosts several projects with alternative outputs, both across disciplines and with collaborators outside academia. One illustrating example of a many-sided cooperation is the project "The Shape of domestic hot water" which was accomplished as a collaboration between researchers at Tema "Technology and Social Change" and Tema Q, a visual artist and an advisory board of experts on water infrastructure and social issues. One of the main outcomes was an art installation "Water dances in the winding hall of oblivion".

Conditions for Research

As stated in the beginning, Tema Q is now in the process of renewing and increasing their staff which should strengthen the conditions for research.

At the meeting with the professors, we learned that applications had been turned down which led to disappointment and frustration. Without external funding, only the professors have guaranteed research time. For associate professors, research time depends on external funding, available resources and teaching needs in the undergraduate programmes, a situation that demonstrated clearly the importance external funding has today in the life of a Swedish university department.

Concluding Remarks

Tema Q is in a situation where one important staff member is about to leave, and new colleagues are coming in, which could mean both reinforcement and renewal. Since the committee does not know who the new staff members and their competencies will be it is difficult to give recommendations for future work.

Panel T Report 1. IBL.APS

Introduction

This panel reviewed six units which, in different ways, are dealing with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared among the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the positions of professors.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a

high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded Given such conditions, we conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university supports such ambitions – for instance the making of research review publications in international or national research journals.

Research and the Research Quality

Relevance and Novelty

The division of Education and Sociology, APS, conducts research in three core areas related to work and working life:

1. Learning and competence development in working life
2. Processes of change within and between organisations
3. Work in relation to welfare, health, and working conditions

These themes reflect the research profiles at the unit, although they do not structure how personnel are organised. The unit has a strong tradition of collaboration with wider society and working life, owing to successful long-term partnerships and major projects, such as MIO (Mer Innovationer i Offentlig sektor), and LiU HELIX Excellence/Competence Centre (Helix). Interviews indicate that various transitions in working life — such as hybrid work, the greening of working life, digitalisation, artificial intelligence, and more — are considered novel and impor-tant research areas. The research appears to be more praxis-driven than theory-driven, which was frequently mentioned in the interviews. This does not imply that theory is unimportant, but rather that it is not the primary focus.

Quality of Research Output, Impact Outside Academia, and Publication Strategies

APS is successful in attracting external funding, particularly from Vinnova and Forte. However, the unit is highly dependent on these sources, as professors and associate/assistant professors do not have time allocated for research in their employment contracts. Even the recruitment of doctoral students relies on external funds, as faculty funding only covers the cost of at most two PhD students at a time, which makes it difficult to build a strong doctoral environment. This is why the research program GROWL (Greening of Working Life) is currently so important, as it has enabled the recruitment of several additional PhD students to the unit.

The unit is particularly strong in applied research, and correspondingly, its impact beyond academia appears substantial. This is likely due to its long-standing history of close collabo-ration with organisations outside the academic sector. Many researchers at APS practise an interactive research approach, engaging in joint learning processes with practitioners in work-places and organisations. Conversely, the unit is less strong in basic research and in attracting funding from bodies such as the Swedish Research Council (VR) and Riksbankens Jubileums-fond (RJ). Doctoral students play a valuable role in the research environment, contributing to output by publishing articles that form part of their compilation theses.

Research outputs are primarily published in open access journals. However, interviewees emphasised the importance of also producing publications for educational use (e.g., textbooks) and for non-academic target groups (e.g., reports), something the evaluation panel strongly agree on. Few of the research journals in which APS researchers publish — and which are relevant to their key peer audiences — are rated as Level 2 on the Norwegian list; in fact, only 4% of all journal publications from APS fall into this category. In addition, APS researchers contribute through editorships, participation in editorial boards, expertise in government agency reports, and commissioned education – all of which are regarded as valuable research outputs.

Strategies, Priorities and Future Plans

To strengthen research quality, APS staff are encouraged to pursue academic career development. However, this is difficult without external funding for research. Many interviewees highlighted the need to use their spare time to write funding applications, something that is especially challenging for those with young children and potentially is a gender equality question. The new PhD students are viewed as an important investment in future research quality. The unit's close collaboration with organisations outside academia enables researchers to investigate current changes and challenges in working life. Notably, the GROWL-programme has the potential to bring together many researchers and PhD students, fostering significant impact in this increasingly important and innovative research area.

Summary

APS fosters an open research environment in which individuals are free to pursue their own research interests. The unit is particularly strong in applied and interactive research, as well as in securing funding from agencies and councils for collaborative projects with a range of organisations. It has a demonstrable impact on society and contributes to practical applications.

However, APS is comparatively weaker in basic research and is missing out on publishing in Level 2 journals (Norwegian list), which are often considered valuable outputs by the university. The relatively small — and decreasing — amount of faculty funding also limits opportunities to recruit PhD students and to offer them career positions post-PhD.

Recommendations

- **Discuss application and publication strategies.**
  Review and reflect on publication strategies, including exploring Level 2 journals that could be of interest, such as *Human Relations*, *Vocations and Learning*, and others. Publishing in these journals may help you identify new and valuable peers within your research fields.
- **Strengthen efforts to secure funding from VR and EU.**
  We recommend intensifying your work on research applications to the Swedish Research Council (VR) and the European Union, as also noted under *Research Culture* and *Conditions for Research*. Developing a more strategic approach in this area could enhance both visibility and funding opportunities.
- **Articulate and highlight your research impact and novelty.**

Make a concerted effort to identify, articulate, and discuss the societal impact and the novelty of your research. This will make it easier for everyone – from doctoral students to senior researchers – to clearly communicate the value of APS's research, both within and outside academia. Many interviewees found this a challenging task, so more collective reflection and dialogue may help.

- **Discuss future strategies for attracting new PhD students.**
  Consider coming together as a unit to develop a more robust and cohesive plan for funding and attracting doctoral students. Strengthening your recruitment strategy could be key to building and sustaining a vibrant research environment.

Research Culture

Quality Culture, PhD Training, Seminars, and Support for Early-Career Researchers

The unit's internal AoA (Arbete och Arbetsliv) seminars appear to be highly effective. A wide range of topics is addressed, and all participants are expected to contribute to open and collegial discussions. All interviewees — including doctoral students — expressed strong satisfaction with these well-attended seminars, describing the atmosphere as respectful, helpful, constructive, and engaging. The seminars also serve multiple functions: they provide a forum for discussing PhD students' work, including external reviews of thesis manuscripts at both the 60% and 90% stages of completion, and for reviewing research applications prior to submission. Both PhD supervision and the seminars were highlighted as particularly strong elements of the PhD training experience.

One area that was more challenging for doctoral students was the limited opportunity to gain teaching experience. This is regarded as an important qualification for future academic careers. There was general agreement on the difficulties of retaining PhD graduates after their public defence — a concern that the doctoral students themselves were well aware of.

Collaborations and Networks

Researchers at APS are engaged in collaborations at local, national, and international levels. Nationally, they are active in the PiA (Pedagogik i Arbetslivet) network in Sweden. Internationally, they participate in networks such as UFHRD (University Forum for Human Resource Development) and ESREA (the European Society for Research on the Education of Adults), and are also highly involved in the RWL (Researching Work and Learning) community. In fact, APS co-hosted a major international RWL conference, in partnership with other IBL units, in 2024. In addition, APS has a strong tradition of collaboration with organisations outside academia, rooted in the Helix community and other large-scale interactive projects. This model of working life research is seen as exemplary within Sweden, with APS often described as "best in class".

However, there is room for further development in terms of international research collaboration, particularly in co-authorship. While interest exists, the current level of co-publication with international colleagues is relatively low. Similarly, more strategic development of joint international research applications would be beneficial.

Equal Opportunities and Gender Equality

APS comprises slightly more women than men, and all current doctoral students are women. The self-evaluation did not include information on equal opportunities, and when asked about this in interviews, responses were limited. A shared reflection was that this may stem from the perception of the environment as already very equal. Doctoral students offered the most detailed insights, stating that they do not experience male dominance in the unit. Many leadership roles are held by women, and APS is described as warm, inclusive, and non-hierarchical. Speaking time in meetings is said to be evenly distributed between genders, contributing to a culture perceived as gender-equal and supportive.

Teaching in Relation to Research

The research profiles at APS are well aligned with teaching activities at both undergraduate and master's levels. All academic staff, including professors, senior associate professors, and senior lecturers, contribute to the unit's teaching responsibilities. Doctoral students, however, expressed a desire for more teaching opportunities to better prepare for future academic roles. Research results are frequently integrated into teaching, and students are sometimes involved in ongoing research projects. Overall, the research–teaching nexus at APS appears to be functioning very effectively.

Summary

APS demonstrates a strong and inclusive seminar culture, with an open and collegial climate and no apparent issues related to inequality. On the contrary, the unit is perceived as highly inclusive and gender-equal. The integration of research and teaching is clearly evident and well developed.

However, doctoral students would benefit from more opportunities to teach, which could support their academic career development. While APS engages in international collaborations, these are mainly driven by individuals rather than through strategic, unit-level initiatives. There is also scope to strengthen international cooperation in both research funding applications and scholarly publications.

Recommendations

- **Maintain and nurture the positive seminar and unit culture.**
  Do not take the strong, inclusive and gender-equal seminar and unit climate for granted. Continue to actively support and develop this culture in various ways.
- **Strengthen international collaborations at all levels.**

Work strategically to enhance international partnerships, engaging researchers at all levels – from PhD students to professors. Expanding such networks may also increase opportunities to apply for EU funding in the future.

- **Create opportunities for PhD students to gain teaching experience.**
  Aim to offer your doctoral students teaching opportunities of up to 20% of their time, where possible. The future academic careers of PhD graduates are a key concern among senior staff at the unit, and teaching experience is an important part of that development.

Conditions for Research

Organisation and Funding

The organisation of faculties and departments at LiU appears difficult to navigate, and the interviews revealed several ambiguities — particularly concerning the performance-based elements of funding. The explanations given at faculty and university levels differ from the way these matters are understood at the unit level, including within APS. As a result, the effects of the funding system may not be clearly perceived by senior staff at the unit level.

Faculty funding is predominantly allocated to education, with only around 11% designated for research — which covers the cost of two doctoral students at a time. Currently, the unit has no PhD students participating in or partly funded by doctoral schools, which makes it difficult to build a critical mass of doctoral students aligned with the unit's research profiles.

While internal funding for research is limited, the unit has been notably successful in attracting competitive external research grants. However, unless the systems governing research time allocation and resource distribution for research and doctoral training change at LiU, the unit's development will remain highly dependent on continued success in securing external funding. If Vinnova deprioritises research on work and working life from a behavioural and social sciences perspective, APS could face serious challenges. In such a case, the unit's reliance on Forte will increase, and it will become even more crucial to "crack the code" for obtaining EU funding.

At present, approximately 37% of APS's total budget is research-related (including external grants), while the remaining 63% is allocated to education. If APS does not receive increased funding for education while simultaneously experiencing reduced success in attracting external research funding, it could result in staff redundancies — a deeply concerning prospect for the unit.

Staffing

Regarding staffing, the recruitment processes at the faculty level are perceived as inefficient and time-consuming. As mentioned previously, there is a lack of financial capacity to systematically support the career development of early-career researchers within the unit. More robust support from the faculty and university is needed in this area.

To further strengthen the unit's research quality and dynamism, mobility — particularly through open calls for postdoctoral and professorial positions — would be highly beneficial. However, given that there is currently no funding for postdoctoral appointments, and that professorships by promotion come with 0% allocated time for research, it is difficult to attract academics from other higher education institutions. More importantly, hiring externally offers little advantage to the unit, as it may negatively impact the promotion prospects of current staff.

Research Infrastructure and Support Functions

At the departmental level, research infrastructure — including HR, administration, finance, and the IBL management team — appears to function well. However, support above the department level, such as research communication and services like language editing and transcription, is not regarded as efficient or effective.

Summary

The research conditions provided by the university and faculty are suboptimal, with faculty funding for research and doctoral education at very low levels. Centralised initiatives to support career development are also lacking, making it difficult to secure postdoctoral or permanent employment after PhD graduation. Over time, the teaching component of APS has also grown in proportion to its research activities — from 57% in 2021 to 63% currently.

Because there is no baseline allocation of research or skills development time for assistant, associate, or full professors, a substantial amount of unpaid work is required to secure external funding. While the unit has so far been successful in doing this, it remains vulnerable. If Vinnova reduces its support for research on working life in the social sciences, securing EU funding will become increasingly essential for APS's continued success.

Recommendations

- **Clarify funding structures and communicate framing factors.**
  Funding matters at the unit appear unclear, particularly regarding the performance-based funding system and the funding of doctoral students. It is important to hold discussions around these framing factors to ensure a shared understanding of common goals, and the actions required to achieve them.
- **Address the lack of research time for academic staff.**
  The current model of 0% allocated time for research and skills development for assistant, associate, and full professors is not applied uniformly across all faculties and departments. We recommend collaborating with others in similar positions to address and challenge this inequality. This is also a work environment issue, as staff are required to use their personal time to apply for research funding, while the unit remains highly dependent on external grants.
- **Improve career development opportunities for early-career researchers.**

At present, the financial capacity to systematically support the career development of early-career researchers within the unit is limited. We suggest that the faculty and university provide stronger support in this area, for example through targeted funding for postdoctoral positions.

The two last points are something IBL-APS need support from other levels of the university to solve.

Panel T Report

Introduction

This panel reviewed six units which, in different ways, are dealing with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared amongst the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the positions as professors.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded.Given such conditions, we conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university support such ambitions – for instance the making of research review publications in international or national research journals.

Research and the Research Quality

1) Relevance and novelty of the research topics covered by the evaluation unit

The unit closely integrates research with everyday educational practice, regularly discussing and operationalising "big ideas" in seminars and seeking ways to turn them into researchable questions. The unit aims to connect daily educational practice with complex societal challenges, striving for research that is both grounded and forward-looking. The integration of AI, computational thinking, and technological systems into education is seen as a pressing and evolving area. While epistemic shifts due to AI were not emphasised in self-evaluation materials, interviewees acknowledged that the focus of their work has evolved since then, and that AI's broader epistemic implications are becoming increasingly central to their agenda.

A key challenge is the declining interest and motivation among students to pursue science and technology. Understanding and addressing these trends—particularly through collaboration with teachers—is a major area of concern. As a relatively new and evolving subject, technology education presents numerous research gaps. A distinctive focus is placed on integrated STEM education, which is considered largely underexplored, especially in terms of classroom-based research. This area is viewed as having high potential for innovation and impact. There is a strong commitment to promoting equity and inclusion within STEM.

The unit also addresses diversity, segregation, and criminality in early childhood education, often engaging with political actors while navigating the challenge of researching politically sensitive issues in a non-political way. Educare is highlighted as a significantly under-researched area, especially in terms of social practices and informal learning in early years education. There is a perceived decline in children's reading interest. Research in this area explores social interaction and practices that might re-engage children with reading. The unit is contributing to foundational development, with a focus on both children and teachers.

Research extends beyond classroom settings to include everyday environments, such as children's commutes to school, reflecting a nuanced understanding of social interaction in varied contexts. The unit is actively seeking strategic funding, particularly for research on younger children's practices and Educare, including support for PhD and postdoctoral projects. Researchers are also trying to navigate and balance between stable research traditions and emerging questions, such as those introduced by rapid technological change.

Despite operating largely within a national focus, there is recognition that the unit could take a more ambitious and visible international stance. There is a recognised need to better articulate the practical relevance of basic research and to navigate the rapidly evolving epistemic landscape, especially under the influence of AI and political shifts. This diversity makes it harder to represent a unified thematic focus in documents like self-assessments. The unit emphasizes research that responds to societal needs rather than trends, with an ethos of relevance and long-term impact over short-term visibility.

2) Quality of the research output

The unit demonstrates a strong and evolving publication strategy that attempts to balance academic quality, visibility, and practical relevance. There is a clear strategic move toward publishing in high-impact, level 2 journals, particularly in international outlets. However, researchers also recognise that relevance to the field and audience sometimes outweighs journal rankings, especially in emerging or interdisciplinary areas where only level 1 journals are available. Given the unit's interdisciplinary nature, publication venues span a wide range.

Researchers are encouraged to target high-ranking journals, but senior scholars highlight the importance of field-specific visibility and strategic dissemination beyond just journal metrics. This includes publishing where colleagues and key audiences are reading.

Doctoral researchers are actively publishing and receiving support to navigate journal selection and submission processes. However, access to top-tier journals is acknowledged as challenging, particularly for early-career scholars. Within the AI field, researchers note that the rapid growth and saturation of the literature make it difficult to stay up-to-date or to get published.

The unit strategically engages with national centres and a visualisation centre to reach broader audiences, including educators and the general public. This includes the use of events, edited volumes, and practitioner-focused outputs.

Regular seminars serve as a space for strategic reflection on publication goals, journal selection, and peer support. The unit encourages both scholarly excellence and practical impact in its publishing activities.

3) Impact outside academia

A strong ethos of applied, socially impactful research is evident. Examples include: A collaboration with a comic book illustrator used in 1000 Swedish schools. Engagements with national science and technology didactics centres. Intentional adaptation of academic writing for teacher and practitioner audiences. Many researchers have backgrounds in

teaching, which drives a shared motivation to improve conditions for teachers and pupils through research.

The unit demonstrates a strong and deliberate commitment to ensuring that research has concrete impact beyond academia, particularly in educational practice and policy. Researchers across levels articulate a deep connection to the teaching profession, with many having backgrounds in education, which informs a consistent orientation toward practice-relevant research.

The unit's work is closely connected to teacher education and school leadership networks. Publications, including books by unit members, are widely used in teacher training programmes and are visible in school settings, signalling direct uptake of research outputs. Projects often include elements of collaborative knowledge production with practitioners. For example, efforts to co-author chapters with teachers and reciprocal dialogue in AI-related research demonstrate a mutual learning approach between researchers and educators.

Several scholars hold external advisory or policy-related roles, contributing to policy documents and national discussions. The unit sees participation in political and educational forums as essential to maintaining long-term impact and visibility.

While curiosity-driven research is valued, it is often intentionally framed within issues of practical relevance, especially those affecting teachers, pupils, and educational systems. This balance is not seen as a tension but as a productive convergence, with many researchers explicitly aiming to bridge the gap between theory and practice. Researchers consciously adapt their writing and dissemination to suit non-academic readers, including teachers. This includes both formal outputs and integration into doctoral theses that aim to speak to practice communities.

4) Strategies, priorities and future research plans

The unit's strategic orientation is grounded in pragmatism, internal cohesion, and steady development rather than high-profile ambitions. Interviewees describe a supportive and collaborative environment, with a strong focus on maintaining quality and sustaining what is already working well.

Rather than setting bold new goals, the unit is focused on consolidating its strengths. There is a shared sense that the unit has found a working formula, with increased publication output and improved quality, and no urgent need to change course.

The unit comprises two research environments with different creative strategies. The process of writing a unified self-evaluation report required compromise and synthesis, reflecting the reality that much of the work is done in parallel rather than jointly. While this creates a diverse and fertile research culture, it also makes unified strategic planning more complex.

The unit is strong across several areas but does not claim to lead in any single field. This broad and interdisciplinary profile makes it difficult to pursue a sharply focused strategic agenda, but it allows flexibility and responsiveness to a variety of research questions.

However, there is some uncertainty about how the unit positions itself in relation to other research environments, suggesting that external benchmarking and identity work may be areas for further development.

The respondents acknowledge that the self-assessment may underrepresent the unit's ambition and innovative capacity. Several interviewees agree that the unit is, in practice, doing highly original and impactful work but that this was not fully captured in the LiRE process. Modesty is described as a deliberate cultural posture, seen as fitting for the educational field, which is experienced as challenging and demanding. However, some express a desire for a more ambitious and proactive collective stance, suggesting that fragmentation and interdisciplinarity, while offering freedom and creativity, can also limit consensus and coordinated ambition.

There is a recognition of individual and sub-group ambition within the unit. Supervisors and researchers are described as pursuing big ideas, securing funding, and initiating new platforms and strategies. The culture of the unit appears to balance care and collaboration with academic drive. Rather than being constrained by internal structures, the modesty and consolidation-oriented tone of the self-assessment is portrayed more as a reflection of culture and process, not of actual limitations in research scope or aspiration. Bigger ideas have not been absent but may have slipped under the radar in the self-evaluation process, partly due to the unit's modest ethos, interdisciplinary complexity, and a focus on internal coherence over outward positioning.

Recommendations

As evident from the above, most aspects of research and research quality of the unit seem to be in good shape. As reviewers, we would encourage the unit to seriously attempt to take the next steps in its research development. The unit is, to cite one of the interviewees, good at "doing what it is good at". This is commendable, but in a long-term perspective possibly not enough to ensure continued development and growth. Leadership in international projects could be a good beginning.

Much of the motivation for the on-going research was based on immediate practical application. While this is positive in many ways, there is the risk of not taking enough time and ambition to pursue curiosity-driven and free research with potential for ground-breaking insights. As reviewers, we understand the practical ambitions but would encourage an intensified unit-wide discussion on possible shared wicked scientific problems to be pursued extensively and over long time.

Research Culture

The unit describes itself as a supportive, collaborative, and interdisciplinary environment, with early-career leadership and an open culture of sharing ideas and feedback. A key strength of the unit lies in its constructive, collegial atmosphere. Researchers support one another through seminars, feedback on writing, and help with funding applications. Early-career researchers benefit from active mentoring and a culture of openness and mutual care. The unit is led by relatively young research leaders, contributing to a dynamic and non-hierarchical environment.

1) Publication Strategies

The unit is committed to publishing in high-quality international journals across various disciplines, though challenges exist in fast-moving fields like AI where publication pressure is intense. Participation in conferences and peer networks is an important part of their work, with international dialogue informing publication strategies and research focus. Seminars are used to develop publication plans, and theoretical discussions often include conversations about publishing. These gatherings offer early-career researchers valuable insights into journal selection and manuscript revision.

2) Recruitment, Opportunities for Early-Career Researchers to Develop Their Originality and Independence

The unit offers a supportive environment for early-career researchers, especially doctoral students. PhD candidates describe the atmosphere as inclusive, respectful, and constructive, with active participation from senior researchers in feedback and mentoring. Seminar participation is encouraged and widely valued.

Doctoral students are given opportunities to present their work, receive detailed feedback, and attend international conferences and networking events. Supervisors' networks are crucial in enabling access to external research communities, and the importance of independent networking is recognised and supported.

However, it is also acknowledged that access to networks often depends on supervisory alignment, suggesting a need for intentional strategies to ensure all PhD students are equally supported in building independent research profiles.

3) Quality of the PhD Training

The unit's seminar culture is strong and varied, including weekly research seminars, guest-led thematic series, and regular data sessions on young children's interaction. These provide valuable forums for scholarly exchange, theoretical discussion, and manuscript development, contributing meaningfully to the doctoral training experience.

PhD students benefit from links to a national research school, with opportunities to attend international courses, summer schools, and conferences—often financially supported by the

university. International engagement is further enhanced through the use of external opponents for dissertations and doctoral involvement in research networks.

4) Academic as well as Non-Academic Networks and Collaborations

The unit is highly engaged in both national and international networks. Researchers collaborate with colleagues across universities and disciplines, including through participation in the European Association of Science Teachers, national research centres, and external research schools.

Interdisciplinary collaboration is a notable feature, with connections to fields such as integration, death studies, indigenous education, and AI in teacher education. These networks support knowledge exchange and broaden the unit's research visibility. International engagement is further supported through conference organisation and leadership roles in academic associations held by staff members.

5) Research in Relation to Teaching

There is a strong and mutually reinforcing relationship between research and teaching within the unit. Many researchers teach in teacher education programmes and incorporate their research—on topics such as AI, technology education, identity development, and autism—directly into teaching materials and classroom practice.

Textbooks authored by unit members are used in teaching, and research seminars are adapted into learning activities. Researchers are actively engaged in reflecting on the integration of research with curriculum constraints, acknowledging tensions between research-based perspectives and national policy directives (e.g., in assessment or early childhood education).

Efforts are made to develop students' research literacy through reading seminars and discussions, though time limitations and curriculum structures can constrain depth. Educators promote critical reflection and present multiple theoretical perspectives, even when these challenge the prevailing educational policy discourses.

Recommendations

In terms of research culture, the panel was impressed by the unit. However, it seems as if not all the collaborative possibilities afforded by the two different research environments are fully utilized. As reviewers, we would encourage the unit to seriously attempt to collaborate on issues of interaction, epistemics and technology in everyday educational settings. There seems to be considerable potential for interesting work.

Conditions for Research

1) Organization

The recent administrative merger of two research environments is a significant theme in the self-assessment and interviews. While the merger is seen as largely administrative, it has practical implications for collaboration, identity, and workload. Researchers note that while interpersonal collaboration remains strong and often fruitful, the merger has required compromises and introduced boundary management efforts, particularly in defining and protecting disciplinary scope.

Despite efforts to function as a unified division, the two environments remain visible and distinct in daily practice, including in seminar participation and research alignment. Some collaboration emerges organically—through informal conversations or shared interests—rather than as a direct outcome of structural integration.

There is physical proximity, which supports networking and joint supervision across environments, but a perceived lack of formal opportunities for interaction. The division is described as operating like “two societies under the same roof,” which can offer interdisciplinary benefits, but also poses challenges in terms of cohesion.

2) Staffing

The merger has brought together diverse expertise and interdisciplinary strengths, reflected in cross-environment PhD supervision and collaborative networks. This enhances the breadth of research perspectives, especially for doctoral students engaged in interdisciplinary projects. At the same time, the organisational complexity reinforces the need for intentional coordination, particularly in relation to mentoring, seminar organisation, and strategic planning.

3) Funding

The unit maintains a balanced funding strategy, relying on a combination of faculty-level grants and increasing engagement with external project funding, particularly from national sources such as the Swedish Research Council. Interviewees report a growing culture of grant application, supported by internal seminars for proposal development, which are said to have improved in both quality and quantity.

However, there is awareness of potential vulnerability: while the current strategy is working, there is caution about relying too heavily on a single model of success. Decreasing project-based external funding and shifts in faculty funding patterns are identified as external pressures. The unit’s approach is described as one of consolidation, aimed at maintaining stability while gradually expanding international collaborations through a set of planned applications.

4) Research Infrastructure and Support Functions

Seminars, collaborative supervision, and proposal development sessions—function as important elements of the research infrastructure. These support peer learning, grant development, and interdisciplinary exchange. However, there is no explicit mention of centralised administrative or infrastructural support, and some researchers describe administrative demands as burdensome, particularly in relation to the merger.

Recommendations

The two environments in the unit could be much more integrated. This is recognized. However, as reviewers, we would recommend the research leadership of the unit to reconsider the importance of organisation and focus on providing support for the sparks of interest for collaboration found at the individual level. There is a risk of spending too much energy on administrative matters which possibly cannot be solved, rather than making sure research can grow and develop. A two-environment community can also work well enough, in our view. As for funding, we would strongly recommend the well-working unit to both level up its ambitions to international funding, and to begin the work of finding and establishing research collaborations with foundations and other non-governmental funding bodies.

Panel T Report: T3 IBL PeDi

Introduction

This panel reviewed six units which, in different ways, are dealing with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared amongst the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the position of professor.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded. Given such conditions, we

conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the ‘state of the art’ in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university support such ambitions – for instance the making of research review publications in international or national research journals.

Research and the Research Quality

Relevance and novelty of research topics: The unit is organised into six distinct research groups, each investigating and examining areas of educational importance: i) School Bullying Research Group; ii) Reading and Writing Unit; ii) Mathematics Education Group; iv) Classroom Management Research Group; v) Fiction as a Didactic Tool; and, vi) Challenging Emotions in Medical and Teacher Education Research Group. The self-evaluation and interview with senior research leaders indicated that each group had some capacity to respond to new research demands and to collaborate within the unit. Further, there are emerging, potentially strong, research links with research areas in other departments. In terms of novelty, each of the research groups were at different stages of development in relation to creating distinct identities as bases for high-quality research. The senior research leaders described the novelty of the unit in relation to work undertaken in the areas of classroom climate, school buildings (environments), and bullying in particular. Three of the groups focus on research topics that attend primarily to teacher education and their innovation was said to be in the areas of emotional stress, intervention research, and reading comprehension in relation to teaching mathematics. The junior researchers discussed the tool, LegiLexi, and its use in elementary and lower secondary school, as well as research into teaching for early mathematics. PhD students were also impressed by the variety of perspectives, theories and methods adopted in the unit.

Quality of research outputs: The unit maintains a high standard of scope and quality of research output. Overall, the bibliometric data indicates that the unit is productive, especially given the lack of research time allocated for some staff. There is a growing number of articles in international, peer-reviewed journals which is in line with their overall publication strategy. Nearly a quarter (24%) of the articles are published in Level 2 journals, and over a third (34%) of the articles include international co-authors. In addition, some groups emphasized the need to publish edited books and in outlets aimed at practitioner audiences. The senior research leaders commented on the role of citations and other aspects of research impact – these are important for two reasons; firstly, because the government allocation of Faculty funding is based on an analysis of bibliometric data by the Swedish Research Council, and secondly due to citation indexes being used in the majority of ranking lists. This means they are constantly balancing the tension between publishing textbooks (in Swedish) and research articles (in English) - this was echoed by all interviewees.

Research impact outside academia: This is a particularly strong area for the unit. Staff have extensive collaborations with the surrounding community, and this is often in partnership with researchers at other units/departments or universities, both nationally and internationally. The majority of these connections have been developed by members at the unit involved in practice-oriented collaborative research with schools and school staff. Interviewees mentioned collaborations with the Swedish National Agency for Education, Skolverket, and Friends (an anti-bullying initiative). They all agreed that the unit had found many ways in which to engage with the wider community. The PhD students also emphasised that they wanted their research to have an impact and make a difference to those involved in their work.

Strategies, priorities and future research plans: The self-evaluation outlined how the unit considers external funding applications, inter/national collaboration, and internationally recognised publications as their strengths. These areas are where the senior research leaders are focusing on future plans. For example, they have started exploring the possibility of working with philanthropic organisations in order to fund the implementation and/or dissemination of results from their research. Interviewees also discussed the importance of keeping in contact with other researchers to facilitate new research conversations, acknowledging how the role of ongoing research leads to new ideas for projects and collaborations of researchers inter/nationally.

Recommendations:

- The unit is successful in gaining external funding but there is a heavy reliance on these grants due to insufficient faculty funding. Additional internal funding is needed to remove some of this pressure and allow members of staff time to develop grant writing skills.
- In order to maintain, and build on, their high-quality research outputs, the unit could develop an explicit programme to encourage early career researchers to engage and become familiar with top-quality work undertaken by colleagues. Information also needs to be shared regarding the different types of research outputs so that researchers can make informed decisions about where to publish their work for maximum impact – for example outputs directed at an international audience, compared to practice-developing research aimed at practitioners.
- Many of the research projects being undertaken by staff and PhD students have the potential to influence policy in various ways. Steps should be taken to develop links with local, regional and national policymakers in order to develop pathways for impact in this area.

Research Culture

Publication strategies: Overall, current publication strategies are proving appropriate, according to the senior research leaders, and they have been successful in fostering international collaboration and scientific impact. An area they would like to focus on is an increase in publications co-authored with international colleagues and to target a greater range of international journals. There has been an increase in the number of open access journals approached, and this is also an area for growth. The senior research leaders stated that staff had the freedom to choose where they published, although they acknowledged that outputs in high-level journals were important to the unit. This was echoed by the junior researchers, although they were also aware of the importance of publishing for other stakeholder communities outside academia. This group, and the PhD students, recognised the tension between publishing in Swedish for the close-to-practice audience and producing articles in international, high-ranked journals, and said that they were supported in the unit with these decisions.

Recruitment: Recruitment of staff was said to be a challenge. Firstly, the senior researchers reported that it was difficult to find the right candidates with the requisite qualifications in the area needed – this is particularly the case for literacy and mathematics education. Secondly, if appropriate candidates are found, they are recruited to positions with full-time teaching loads which often results in attempts to recruit being withdrawn due to a lack of qualified applicants. This is not the case across the sector, so they are constantly competing with universities who offer research time as part of the

academic contract. It was said that teaching is always prioritised by the Faculty when planning new positions and this was also stated by the junior researchers who themselves were finding it difficult to find time to conduct any research. This situation necessitates existing academics taking on additional teaching responsibilities, thereby further limiting their time for research and for applying for external funding.

Opportunities for early-career researchers to develop their originality and independence: PhD students who have completed their studies are encouraged to apply for postdoctoral positions when these are available, as a way of supporting career development. However, given limited faculty resources, the opportunity to advertise these positions in areas that align with the research profiles of PhD students is rare. All of the PhD students interviewed expressed the wish to remain in academia after their studies, but the senior research leaders confirmed that, although a small number gained a position in competition at Linköping, most would move to another university. The junior researchers spoke about the lack of allocated time for research outside of external grants and that this was a problem for many early career researchers in the unit who were teaching 100% of the time. They went on to discuss how the support for this was restricted to writing applications for funding and that they drew on their own networks outside of the unit for support.

Quality of the PhD training: The self-evaluation outlined ways in which PhD students are supported, including 'career conversations', aimed at helping them become aware of different career paths and support them in future applications. The majority of doctoral candidates write compilation dissertations, and those who submit monographs in Swedish are encouraged to publish at least one article based on their thesis once completed. The PhD students interviewed commented on the unit's research activity in specific areas (especially school bullying) as to why they had chosen to study at Linköping. All were very closely tied to their respective research groups and felt supported in their studies. They were also positive about the opportunities to teach. In terms of improvements, they mentioned that they had to complete too many credits alongside their research, and that some of the courses were time-consuming and repetitive. Finally, they commented on the lack of job security after their thesis.

Academic as well as non-academic networks and collaborations: The unit has many successful inter/national collaborations with researchers at other universities. In addition, the self-evaluation gives numerous examples of involvement in editorial roles and international alliances, such as the Transnational Collaboration on Bullying, Migration and Integration at School Level (TRIBES), Religious Identity, Bullying, and Wellbeing at School: A Transnational Collaboration (ORBIT), and the Nordic Educational Research Association, amongst others. The junior researchers stated that the ULF-projects offered opportunities for collaboration with teachers and pupils, and that there is internal funding available for disseminating research findings to schools. PhD student discussion focused on the need for more explicit and formal strategies for forming networks and collaborations during PhD study in order to help them bridge the gap between student and academic.

Equal opportunities and gender equality: This was an area where disagreement emerged between the groups interviewed. The senior research leaders seemed to be unaware of any issues in relation

to gender equality and equal opportunities in the unit and gave examples of how they approached this issue. However, the junior researchers felt that there was a difference between research groups, and between units, regarding responsibilities for teaching and the possibilities for research. The PhD students stated that, generally, the environment was very open-minded. However, it was also raised that, in some cases, senior male researchers were seen to offer more support to junior male researchers, whilst excluding junior female researchers from some opportunities.

Good research practice: Two areas of good research practice discussed in the self-evaluation and the interviews were in relation to i) funding and ii) PhD support. The senior research leaders discussed the lack of Faculty funding and how this could prevent some staff members from pursuing research opportunities. To minimise this risk, they support each other by sharing funding within the unit. It is also the case that the more experienced researchers informally share their insights on the process of writing funding applications with PhD students, forming an ongoing development process within the unit.

Research in relation to teaching: All those interviewed were confident in their use of research-informed and research-based teaching. The unit is responsible for many courses in teacher education, and teaching responsibilities tend to be allocated based on staff expertise where possible. There were several examples given of staff research being utilised within the teaching across courses and levels, and they plan to extend the reach of their research into relevant teaching programmes. The areas of research such as teachers' work, teaching and evaluation, classroom practices and interactions, social relationships and processes in schools, and student teachers' experiences in teacher education, have the potential to play an even larger role in the teacher education courses at Linköping University.

Recommendations:

- To build on current publication success, those with more experience should continue to encourage researchers at all levels to publish in a range of outlets as appropriate. This should include a focus on increasing the number of publications that involve international co-authors, and that are targeted at Level 2 journals.
- The unit has faced significant recruitment challenges which have had an impact on the research time of existing members of staff. Moving forward, new positions need to offer a more desirable balance between teaching and research time in order to attract suitable candidates. In addition, creative strategies are needed to consider how teaching can be organised to liberate time for research for existing staff.
- As societal impact is increasing in importance there is a need to use collaborations to ensure impact, and to keep track of the impact that occurs through collaborations. Consider developing impact policies that build on collaborations so that a broader understanding of societal impact can be shared across research groups and units.
- There is a need for a formal research mentoring system in which more experienced scholars have clear responsibilities in relation to junior colleagues. This would help maintain the motivation and professional development of early career researchers.
- Consider reducing the number of credits required alongside the research component of the PhD course whilst offering a greater range of modules so that repetition is minimized.

- There were tensions regarding equal opportunities in the unit. In addition to continuing the current vigilance in this area, and to ensure fairness and transparency, consider introducing an 'expression of interest' process for new opportunities, to avoid advantage being given to specific PhD students or junior colleagues.

Conditions for Research

Organization: Despite the focus on teaching and limited resources, the unit still manages to maintain a high-quality research environment, divided into six research groups. The Professors' Group meets regularly to discuss new research ideas, as well as how they can continue to work actively to involve research-interested staff in grant applications and smaller projects. The role of Head of Unit ('avdelningschef') changes every three years, while the research leader ('forskningsledare') does not change but is linked to one of the professorial positions. While there are overlaps between the research groups, the unit also has a common seminar series that strengthens cohesion within the environment, although the junior researchers reported that it was still a challenge to make everyone feel included.

Staffing:
The bibliometric data described a large staff group (n=70, 64.3FTE), including 33 Associate Professors and ten Senior Associate Professors or Full Professors. Within this group, there are several members who feel ready to progress to the next level. However, they also lose some staff to Assistant Professor and post-doctoral positions at other universities due to limited faculty resources. The junior researchers interviewed reflected on how the teaching load is heavy and sometimes 'unpredictable' and that they would like more time for research and collaboration with others. They also stated that there was an urgent need for more PhD students in the unit, although they admitted that the students they worked with were stressed about their future employment situation at Linköping.

Funding: All the research groups in the unit have a strong history of attracting external funding, especially the Swedish Research Council. There is also engagement in international projects, with funding from the EU and SIDA. In particular, there has been collaboration with the Nordforsk-funded Nordic Centre of Excellence, which provides a platform for further Nordic collaboration (with POP and KRIT). The plans for increased internationalisation are worthwhile and promising and could include a more consistent strategy for EU funding. However, the senior leaders said that they had to weigh up the amount of time it took to write an application for EU funding against the chance of success. The low level of core research funding constrains opportunities for co-funding and makes tough prioritisations necessary. The senior research leaders stated that internal funding for research is necessary, alongside having a fixed percentage of time for research allocated in contracts. Basic funding is provided to early career researchers to write bid applications.

Research infrastructure and support functions:
Interviewees at all levels described the unit (and respective research groups) as a supportive environment. In addition to general discussions and meetings, there is an internal review procedure where staff can submit research proposals for feedback. There is also a regular seminar series which

provides a platform for staff to present research. All of the PhD students had presented their work and were aware that it was an integral part of the course.

Recommendations:

- Senior research leaders (and those at Faculty/University level) should consider how teaching loads and timetables can be organised to create time for research, applying for grants and writing publications.
- Resource and staffing implications need to be foregrounded if they are to inform departmental research strategies. The outcomes of these plans should be evaluated annually, not simply to check targets are met, but also to consider the impact of environmental conditions in the unit from the implementation of the plans.
- Develop a strategy to enable those who may qualify for docent status to move to this career stage.

Concluding Remarks

It was a pleasure to visit the unit and speak with staff members and PhD students. I wish you the best with your future research funding and publication endeavours.

Panel T Report T4 PVL

Introduction

This panel reviewed six units which, in different ways, are dealing with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared amongst the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the positions as professors.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a

high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded Given such conditions, we conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university support such ambitions – for instance the making of research review publications in international or national research journals.

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Evaluated Unit's Name:

IBL.VL EDUCATION AND ADULT LEARNING

Research and the Research Quality

- Relevance and novelty of the research topics covered by the evaluation unit:

The IBL.PVL has the only professorship in adult education research in Sweden – founded in 1983 and has since 1990 national responsibility for research on popular education. The unit is also responsible for vocational training programs plus research on vocational education. To this is added that the Secretariat for Mimer – the national network for research on popular education – which is located at the unit.

To identify what is new and relevant, research in the unit is informed by their networks. Here it is the individual researcher that is identifying research topics and not the unit. The unit is considered to be nationally leading in research on adult education, lifelong learning, and vocational education, including higher vocational education. It is also highly recognised in international research in its field of study.

- Quality of the research output,

It was stressed by senior researchers that it is the knowledge contributions that matter in terms of research quality. To this is added the impact of their research for policy and practice. Considering the actual research output we put forwards the following statements:

First, the number of researchers working at the unit is rather small. Considering this, the number of publications is relatively high. Bibliometric data from LiRE does not tell us reviewers much about the research quality, since we are not informed by eventual knowledge contributions in the documentation that we have achieved. However, the share of publications in position 2 in the Norwegian list is a bit lower than 20 percent. Furthermore, rather few of the publications were possible to include in a web of science analysis. The IBL.PVL unit explains this in their self-evaluation with reference to the specific foci of their research, which we consider is a valid argument.

Second, considering their recognition in the research community and in numbers of publications, the Linköping research community has a clearly dominating position. However, there is for instance a network with research on adult education and economy as a theme which seems to be excluded by the networks that are prevalent in the unit. It could be a good thing for the unit to observe and to deal with arguments presented in this research.

Third, the IBL.PVL unit states in their self-analysis that they are not happy with the top steering of the university in terms of competition of funds by means of evaluation of publication quality. It can be argued that the IBL.PVL unit is working in a specific research

field with specific intellectual traditions and sources for publishing and must consider such societal relevance in their publishing. We agree with this statement but add that there is a set of journals that are indexed in for instance Web of Science that could be of relevance to communicate with in research on adult education and lifelong learning plus vocational education research.

- Research impact outside academia

This unit is regarded as highly important for adult education and life-long learning in Sweden and is having a solid impact with this task in several ways. They produce textbooks, work as a national centre for popular education (Folkbildning) and teach based on their research. Given this, the IBL.PVL unit seems to work rather well in contexts outside academia.

- Strategies, priorities and future research plans:

In their short comments on future research the unit put forwards that they will continue their successful strategi to achieve external funds which they will combine with using faculty funding for doctoral students and post docs in a pluralistic way. To this it is added that the unit will take national responsibility for further research in their already elaborated field of study, including search for EU grants.

To us, these seem to be reasonable strategies for the future. We also would like to point out that the unit should plan for approaching teacher education in terms of research as well as teaching – with a special emphasis on the teaching-research nexus.

Recommendations

As far as we can see the direction and culture of the research at the VL unit is working well. However, we consider the following recommendations to be worthwhile:

- **Recognise research nets and nodes outside current networks:** We recommend that the unit has a closer look at research outside their own networks, for instance research in economic and business studies to capture and discuss, perhaps criticize these studies and their implications for adult education. This is also a good thing in order to sharpen arguments and to improve objectivity in research communication.
- **Broadening publication strategies in scientific journals:** The unit should have a closer look at the number of international journals that are presenting research on adult education, lifelong learning and vocational education.
- **Identify more relevant publication sources:** The unit should look for additional journals – for instance in the Web of Science – in order to identify relevant intellectual traditions and research front an also to communicate about their research contributions.

Research Culture

- Publication strategies

The IBL.PVL unit is active and publishing in international journals that are considered to be relevant for their research. The researchers also stress the importance to publish in Swedish and to develop teaching-learning materials, given the unit's tasks and position in Sweden

- Research seminars:

In all interviews the research seminars at the IBL.PVL are regarded as important, open, and well-functioning in terms of quality assessment of ongoing research, supporting conversations as well as in output of finalized doctoral theses.

- Recruitment

There is a male dominance in professor positions. However, having a look at the recruitment of post docs and doctoral students who are predominantly females, this picture will change after some years. The way to use faculty resources seems to be very reasonable. To our opinion it is a good thing that the unit has a recruitment strategy that is as open as possible.

Given research focuses on the department and the importance of recruiting researchers, it seems to be a good thing to improve relations to teacher education both in terms of research and teaching. It would be important to develop this idea for the unit as well as for the faculty and department.

- Opportunities for early-career researchers to develop their originality and independence

According to the self-analysis the IBL.PVL unit seems to be very open in its way to deal with the opportunities for young researchers to put forwards their research interests in applications etc. However, it is important to consider ongoing governance of research funding and competition to get funding as tasks to dela with in order to support research independence.

- Quality of the PhD training

It was argued by researchers at all levels that their doctoral education has a very good quality in the making of autonomous researchers. The doctoral education culture is regarded as good, and so are the seminars and the opportunities to go to conferences. There are some criticisms concerning courses in quantitative analyses but that is due to the subject and not to the design of courses.

- Academic as well as non-academic networks and collaborations

Given the IBL.PVL unit's self-analysis it is highly active in academic networks and journals in their field of study, for example in ESREA, the European association for research on the education of adults, with its networks and journals, and Nordyrk which is the Nordic network for VET which also has a journal with its editorial office located at the unit. The PVL unit is also responsible for the Mimer work in popular education and doctoral schools financed by the Swedish Research council. To our understanding such collaborations are of importance for the research quality at the unit. This is further underlined by doctoral students who are engaged in this networking, for example in editorial work in journals. (Talk with doctoral students about their experiences of this!)

Our conclusion is that the collaboration aspect is very well treated by the unit.

- Equal opportunities and gender equality

Based on the interviews our conclusion is that there is an awareness of such issues at the unit, which is important given the present unequal distribution of gender over positions.

- Good research practice

The research seminars are regarded as well functioning in their giving of collegial support, But the competition for research funds is regarded as a threat to the collegiality at work. We also noted a criticism of the legal department which was argued to be more supportive to the university board than to the researchers at the unit.

- Research in relation to teaching

The teaching – research nexus is important for the unit in planning and carrying out teaching as well as in initiating research. Presented was producing books for teaching, having researchers as teachers. It was also mentioned that conflicting arguments were presented in teaching.

Recommendations

- **Increased involvement in teacher education**; It would be a good thing if the unit was involved more in teacher education, given their competences in adult and vocational education which is of relevance for teacher education.
- **Systematic research reviewing:** The unit has already good competence in doing research reviews. It is recommended that such reviews are carried out systematically considering their different fields of study and published in relevant journals. Such reviews should also serve as texts in teaching.
- **Reconsider the LiRE-25 criteria for research quality**; Furthermore, we recommend the LiRE25 to consider that criteria for research quality in terms of citation impact etc. are often in conflict with quality in terms of knowledge

contributions as a basic criterion for research, and the importance the unit gives to professional and societal relevance in their research.

Conditions for Research

A problem in the organization is increasing administrative tasks and lack of trust in the organization. The unit is rather small and has ambitions to become larger. To increase tasks in, for instance, teacher education is considered as a way to do so.

The unit has been very successful in terms of external funding. There are ambitions to achieve EU-funding – which actually seems plausible, given ongoing international networking and publishing. A problem is the instability that is connected to funding, including the competition for funds within the faculty based on decisions by the university board.

Research infrastructure is here related to long term funding, library, networking and the journals researchers at the unit is working with. Financial means are important here.

There seems to be some issues considering the Grants office, the legal department, and the communication unit in terms of adaption to the unit's need or in terms of relevance, while support provided by international office, the IT unit and the library is important and works well. A stated problem concerns the overload of administrative tasks.

Recommendations

Given observations presented above we give the following recommendations:

- **Improve the stability in funding** in order to improve research and research planning and to counteract competition for funds that might be negative for cooperation and collegiality at the unit.
- **Support strategies for increased EU-funding**: Given the international recognition of the IBL.PVL unit it could be a good thing to prepare for developing applications to the European Commission. Important here is the making of significant research problems and developing international networking in relation such problems as well as insights in the criteria for research that is at work there.

Concluding Remarks

The unit has an important and highly recognized position in its field of study on adult education and vocational training.

- Given this, it would be a good thing for the IBL.PVL unit **to analyse the intellectual and social organization of this field** to strengthen it and to further develop research cooperation and communication with the research community and stakeholders.

Panel T Report

Introduction

This panel reviewed six units which, in different ways, are dealing with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared amongst the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the positions as professors.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded. Given such conditions, we conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university support such ambitions – for instance the making of research review publications in international or national research journals.

Evaluated Unit's Name:	IKOS.HKR History, Arts and Religious Studies/ DISA

Research and the Research Quality

Relevance and Novelty: DISA's collective focus lies within a broad understanding of subject didactics, in the social sciences field. The research approach appears primarily praxis-driven. This aligns closely with teacher education programs, particularly in geography, history, civics, and religious studies/sciences. Additionally, there is research of an interdisciplinary nature and an interest in exploring didactics beyond the classroom environment. Research topics are shaped by the individual preferences of both researchers and doctoral candidates. LiU's interest in artificial intelligence (AI) has sparked initiatives that connect education with emerging technologies, such as avatars. This area is still in its early stages and needs additional interest to develop further.

The research seems to have relevance for schools, teacher education, and even for cultural heritage institutions. It is difficult to determine whether it is innovative, but in a Swedish context, the research field is underdeveloped in several of DISA's areas of interest, such as the connection between the social studies (SO) field and outdoor education, cultural heritage, as well as the interdisciplinary perspective on sexuality and teaching within civics. The research also has potential connections to AI and avatars.

Quality of research output: It is difficult, based on the available data, to assess either the quality or quantity of the research output. This is largely due to the fact that the data provided does not correspond to the evaluation unit as a research environment. This issue does not appear to stem from the unit itself but from the central data provided, which has not been tailored to extract information relevant to the research environment. The unit has primarily secured external funding through foundations and trusts but has a few projects funded by the National Heritage Board and the Swedish Institute for Educational Research, either as the main applicant or co-applicant. These projects have involved individual researchers from DISA.

DISA largely appears as a PhD environment and seminar-focused community. As a whole, the environment has not been successful in attracting external research funding. Given the limited number of senior researchers in the environment, this outcome is not particularly surprising. There is ongoing and continuous work, including by junior researchers, to submit applications collaboratively. There is a clear ambition for DISA's research to have an impact beyond academia, with a cultivated interest in practice-oriented research. The museum

connection is one way to achieve this, as is securing funding, although the primary focus remains on schools and teacher education.

Currently, efforts are primarily driven by individual initiatives—it would be beneficial to elevate these to a more collective level and unify the work. Some attempts have been made in this regard, but they have not gained much momentum.

Recommendations

- **Enhance efforts regarding applications and publication strategies**. In addition to the foundation provided by formative seminars on article writing and application workshops, there is reason to further develop strategies due to the significant need to increase the number of publications and external grants. Opportunities to consider include systematically involving doctoral students in application writing at an earlier stage. There is a smaller group of researchers who regularly write applications. Establishing an external group of national and international researchers to act as reviewers and provide support during the application process could be beneficial.
- **Explore opportunities to identify shared research foci**. Several researchers within the environment could collaborate on applications around common topics. While such collaboration already exists to some extent, it can be more strategically developed to create a more profiled DISA environment, where specific topics, perspectives, or methods are prioritized during a defined period.
- **Linking doctoral projects to senior research**. To more clearly profile DISA and achieve a larger critical mass around established research topics, it is reasonable to direct doctoral projects towards such topics, without compromising the students' independence.

Research Culture

Publication strategies: There is a lack of supporting data for a detailed review of publication rates. The number of publications appears modest. A significant proportion of publications are in Swedish, which is justified both by tradition and by its practicality in relation to the focus and target audience of the research. However, the unit has expressed a desire for an increased proportion of publications in English. The strategy includes offering participants seminars to develop skills in article writing and providing support during the production process. Additionally, there is a focus on junior researchers who are on their way toward qualifying as associate professors (docent). The expectation is that this will lead to increased publication rates. Researchers note a tension between expectations for academic publications and the practical demands of subject didactics for schools and teacher education.

Recruitment – Opportunities for early-career researchers: The unit's clearest strategy at present is to increase the number of researchers qualified as associate professors (docentkompetenta). This is made possible by channeling resources from DISA into the career development of junior researchers. However, conditions for junior researchers appear challenging, as there is a lack of support from the disciplines and departments. It does not seem that DISA is in a position to influence recruitment to increase research-based subject didactics in this way.

Quality of PhD training: The doctoral program established by DISA and PASL is small but vital for the environment's development and stability. Doctoral students express that they are part of a well-functioning program and appreciate the interdisciplinary environment.

Academic and non-academic networks and collaborations: There are several examples of national and international networks. These mainly seem to stem from researchers' individual contacts and research orientations. Such networks are important, not least because they provide researchers with access to scientific depth in an interdisciplinary environment with a broad range of topics. However, the environment would likely benefit from further developing collaborations with other subject didactic environments within the social sciences field, both for doctoral students and researchers.

Equal opportunities and gender equality: The ratio between men and women is difficult for the unit to influence independently. The focus on associate professor qualifications (docentsatsningen) may, over time, lead to a more balanced distribution of senior supervisors. The major challenge for equal opportunities is the structural conditions junior researchers face in establishing themselves. Many express that pursuing a research career requires significant unpaid work, which likely creates situations where many teachers do not have the opportunity to engage. This may lead to imbalances based on both gender and age.

Recommendations

- **Strengthen the publication strategy.** As the self-evaluation indicates that some research is more suited for Swedish channels, one approach could be to identify theoretical and methodological contributions that are relevant also to an international audience. Efforts should also be made to develop networks that introduce doctoral students and junior researchers to co-authoring with researchers from other national and international institutions at an early stage.
- **Continue with a joint research program**: explore opportunities to develop a profiling area for SO-didactics—methodologically, theoretically, and in terms of research focus—and link doctoral students to such profiling.

- **Engage and train colleagues in subject didactics as a research field.** Examine the need and interest for structured seminars to introduce subject didactics as a research field to subject colleagues, facilitating movement between disciplinary research and subject-didactic research. Also investigate the need and interest for deeper knowledge in subject-didactic perspectives among those already participating in DISA's activities.
- **Maintain and nurture the positive seminar and unit culture.** Do not take the strong and inclusive seminar and unit climate for granted. Continue to actively support and develop this culture in various ways.

Conditions for Research

Organization and funding: It required some clarification to understand DISA's organization. It is a research environment primarily organized around subject-didactic research with connections to teacher education and the social science subjects taught in schools. There is some basic funding available, mainly to finance doctoral students and research leadership. However, the funds intended for research leadership have instead been directed toward efforts in docent qualification. Researchers who choose to join DISA do so based on their interests.

DISA appears primarily as a doctoral and seminar environment. This serves its purpose in maintaining a smaller doctoral environment. Through collaboration with PASL, a continuous doctoral environment is upheld, which is essential for sustaining ongoing subject-didactic research and serves as a foundation for the qualification of supervisors. The seminar is also appreciated by participating researchers and educators and is perceived as valuable support. Both doctoral students and junior researchers emphasize that DISA is central to their research identity.

However, the environment seems to struggle with expansion. DISA is a small and thus vulnerable environment. Building docent competence is a wise strategy, although it appears to rely on funds not being used for research leadership. The allocation of resources seems to make it difficult for smaller environments to grow.

Staffing: The data provided by the LiRE25 organization was not adapted to the unit, which might indicate a lack of clarity within LiU's research strategic leadership regarding how they understand the conditions under which research environments of DISA's character operate. The bibliometric data provided was not adapted to the unit, which indicates a lack of clarity regarding what constitutes a research environment. The research leader is central as the only professor and docent-qualified individual in the environment. Apart from hiring doctoral students, the environment relies on attracting interested teachers but does not seem capable of influencing the recruitment of new staff.

- **A crucial aspect is increasing the number of researchers**. There may be a need for a strategy to involve more teachers/researchers who teach in the social studies (SO) area. Since resources are limited, such a strategy needs to involve various disciplines and departments. Such collaboration should be based on the principle that those conducting the education also bear a responsibility for ensuring that it is research-based.
- **Consider implementing a formal research mentoring system** where experienced scholars have clear responsibilities towards junior colleagues. This could help sustain the motivation and professional growth of early-career researchers.
- **Seek collaboration among other subject-didactic units** and researchers within LiU to build partnerships that can support knowledge development, improve research grant applications, test profiling ideas, and create constructive dialogues with relevant faculties on how the subject-didactic environment at LiU can be strengthened.

Concluding Remarks

- There seems to be a lack of an ambitious strategy for subject didactics at LiU. Researchers within subject didactics all have extensive teaching responsibilities. The fundamental continuity of subject-didactic research is largely upheld by doctoral students. There are certain subject-didactic environments that have grown through their own initiatives, but it is difficult to see a unified vision for using subject didactics to provide subject teacher education with a scientific foundation.

Panel T Report

Introduction

This panel reviewed six units which, in different ways, deal with educational research at Linköping University.

Our review is based on documentation provided by the LiRE25 team, a five-day visit to Linköping University plus Zoom meetings in February, March and April. Though this report is based on the work of the whole review team, we divided the main responsibilities for interviewing and note-taking for each unit within our team. During the visit to Linköping, we had three sessions of interviews – senior researchers, junior researchers, and doctoral students or post docs, for each unit. In sum we carried out 18 interviews – each 45-60 minutes in length – with the participation of 46 Linköping researchers in total.

Each set of interviews was based on the specific self-evaluations and documentation from each unit and constructed to cover the given evaluation areas; (a) research and research quality, (b) research culture, (c) research conditions, and (d) general observations. We took detailed interview notes which were shared among the team. To this were added team reflections after interviews, considering the research by the units and the review design.

Considering the documentation, we lacked information on time given – not by means of competition – for research, for instance in the positions as professors.

General Observations that go beyond the specific evaluation units

The research presented to us appeared to be carried out in interesting areas of high societal relevance. During our visit we met researchers that seemed to work collaboratively, sharing resources and supporting each other in different ways. We also got the impression that there was a strong seminar culture and shared responsibilities in terms of presenting and questioning statements, working with research proposals, text outlines etc. A general impression from our meetings with our Linköping colleagues was that they were committed to do research and to cooperate in these matters. Furthermore, we noted that there was a high level of coherence in statements about the research and research cultures presented by researchers belonging to different levels of the evaluated units.

However, we also got the impression that many researchers, especially junior colleagues in the units, are working under rather harsh conditions. They talked about very limited and unstable research conditions in terms of research resources and faculty funding. This seems to include strong demands to submit research applications with only a small chance of getting funded Given such conditions, we conclude that those units currently successful at gaining basic funding are unlikely to be motivated to risk the time and effort involved in submitting larger grant applications (e.g. EU funding). This leads to an associated issue concerning staff progression, in that smaller units (or Research Groups) struggle to expand their staff numbers due to the lack of external (or Faculty) funding available. This can result in a shortage of promotion opportunities, increasing the risk of staff attrition. This is also reflected by the interviewees in their concern about recruitment difficulties, where lack of resources for research is regarded as a problem.

To our understanding, these unstable research conditions are a barrier to developing international research collaborations and applying for research funds to, for instance, the European Council or Horizon funding.

- Thus, it is our recommendation to increase stability in resources for research, and in supporting opportunities for research cooperation in relevant ways – for instance by a well-functioning Grants office – in scaling up research and in the development of international research programs.

An important aspect of the research review concerns criteria that are used in determining research quality in LiRE25, in terms of citation impact and hierarchization of research journals. The researchers often stated that such criteria are irrelevant due to the nature of their research. We consider such statements about research publishing as valid, given the current fields of research.

- Thus, we recommend that Linköping University adjust its criteria for research quality – for instance in relation to the Coalition of Agreement for Research Assessment (CoARA).

Matters of research gaps and research relevance – societal, scientific and/or professional – were presented and discussed in all sessions. Based on the interviews and self-assessments we got the impression that professional relevance, for example how to design teaching or solve matters of social relations in schools, was in focus for most of the research teams.

- Thus, we recommend that matters of scientific relevance, such as knowledge contributions to the research community, should be emphasized more in research applications, and in research communication strategies.

We also noted that research mapping and reviewing were not at the top of the agenda for research in several units. This is a way to identify and present scientifically relevant problems and research approaches.

- Thus, in more specific terms we recommend the units systematically carry out research reviews where they consider the 'state of the art' in relevant scientific domains to identify demands for knowledge contributions and innovative research.

We also recommend that the university supports such ambitions – for instance the making of research review publications in international or national research journals.

Evaluated Unit's Name:	IKOS.KLS Communication, Literature and Swedish, IKOS.SAROS Swedish as a Second Language, Rhetoric and Language Support

Research and the Research Quality

The research within the unit has a variety of projects and directions, and the research topics covered by PASL are all relevant to the field. Even though the number of active researchers is limited, both senior and junior researchers as well as PhD students are involved in research topics that are breaking new ground with potential of having impact in subject-specific fields related to language and literature. Areas about literature in education are stronger both in relation to the number of researchers and research quality. The topics of literature discussion and historical and double perspective (language and literature) can be highlighted since these have been funded by external research grants (UTFORSK and VINYL). PASL's research output within areas such as English as a foreign language and Swedish as a second language is more limited, even though a smaller project has been funded by the ULF-initiative. In particular, the junior researchers and PhD students express a notion that the relevance and signs of quality of the research is about whether it is valued and requested by teachers and teacher educators. This focus, together with the fact that the limited access to research funding, risks early researchers' chances of establishing themselves as researchers in the field. This fact also makes the research unit vulnerable. The unit has a need for more senior researchers and securing the possibilities for early career researchers to be able to merit themselves in research output, supervision of doctoral students and taking on assignments as scientific experts in different contexts.

The group struggles with having time to conduct research, apply for funding, as well as publish results. This is visible in relation to the fact that most of the publications are connected to externally funded projects and linked to senior researchers within the unit. There is a focus on publishing book chapters and in a few journals on publication level 1 on the Norwegian list. Applications to high stake research funders (VR/UVK and

Skolforskningsinstitutet) are being made and there is an awareness of the need for more systematic support around application processes in order to secure external funding. Also, applications for more "low hanging fruit" (f e regional and ULF) funders could be highlighted. The question of quality relies to a certain extent in what way early career researchers are able to conduct research and be included in senior researchers' projects, applications, and publications. Over time, these possibilities have been quite limited within the unit, partly because of lack of time for research, and partly because of few senior researchers within the unit. Recently efforts have been made to work strategically and systematically on building a robust research environment, for example by increasing the collaboration with DISA The evaluation panel finds the idea of merging PASL with DISA as a way of strengthening the two units in many aspects.

The research within the unit has practical relevance, and especially among early career researchers' emphasis has been to publish mainly in popular scientific journals and book chapters in textbooks. This has been noticed by national in-service training initiatives, which could be described as a sign of impact outside academia. Considering the conditions for research with limited funding and active researchers, the impact of the unit's research on outside academia can be described as big.

Recommendations

The ambition of the research unit is to grow and develop sustainable strategies for good research quality as well as impact outside academia. However, considering the limited funding available, priorities need to be made. A recommendation for the next step is to identify central issues including prioritized research areas of the unit. Also, working towards a merger with DISA is regarded as a possible way of creating a greater critical mass, as well as increasing the number of senior researchers. In turn, this could establish a robust supporting research environment for early career researchers and open new opportunities for joint publications and research projects. Strategies for writing applications for getting external funding are crucial for the development of the unit.

Research Culture

Within the unit there is a shift from monographs and book chapters to compilation theses and articles. However, a majority of the publications reported are still book chapters and articles are published in a few selected journals (level 1 on Norwegian list), which implies a potential to strengthen the research output via publication channels. The evaluation panel's impression is that the major target groups for the publications are teachers and teacher education in a Swedish context and that this is an active choice by the unit's researchers. Since LiU's system for allocating internal funding promotes peer-reviewed articles in high

ranked international journals, there is a risk for a tension between what is expected and valued from LiU and what the unit sees as their main channels of communication.

The publications are written by a limited number of researchers working within projects funded by external research grants, which give evidence of the importance of achieving external funding for the unit. Junior researchers have collected empirical material (f e in relation to their own teaching) and have drafts to publications, but no time to finish this work. The strategy to allocate time (30%) for the professor to help and support junior researchers with writing and publishing is a way of dealing with this challenge. A potential development area for the unit is to explicitly support publishing strategies for junior researchers including a bigger variety of journals (also international and high stake), as well as looking for more opportunities to co-publish with other researchers internally and externally.

The evaluation panel's impression is that the atmosphere within the unit is open and permissive. Central to the work within the unit are the collegial seminars where feedback is given on ongoing research projects. A yearly getaway where strategic questions can be discussed is also important, even though researchers with 100% teaching in their positions could find it difficult to be able to take part in these activities. In any case, the seminars and the getaway have an important function as a meeting point as well as a support for career development of the researchers in many aspects.

PASL faces a number of challenges connected to recruitment. Presently there are few senior researchers which limits the opportunity to i.e. supervise PhD students. The organizational structure is one since the Faculty of Education and Behavioral Sciences doesn't operate as a faculty. Another challenge regarding recruiting is the fact that applicants choose other universities when finding out about the conditions with no allocated time for research in the positions. However, this is not the case in relation to PhD students where there are many applicants for each position. The working conditions for researchers seem to be of concern for PhD students when thinking about a future within academia.

The subject-specific research within PASL has a close link to the academic disciplines, and collaboration also takes place between researchers at PASL and other research units at LiU. International collaboration is limited to a few researchers within the unit. Including more researchers and PhD students in the existing networks as well as building new collaborations can therefore be described as crucial for strengthening the research quality of PASL. As mentioned earlier, there is a potential to increase collaboration internally with DISA to create a more dynamic research environment focusing on subject-specific issues. This could

be a strategic move in order to face the announced changes regarding teacher education in the near future.

Recommendations

For the development of the unit, recruitment of senior researchers is crucial. Researchers within PASL struggle with getting more time for research (internal and external funding). However, despite a unanimous view regarding major challenges with the lack of funds for research, the workplace appears attractive to the researchers already employed. At the same time external recruitment seems difficult. To take the next step, more people within the unit must take a more active part in research activities. Also, the unit needs to use available funds strategically to build the environment from below by qualifying younger researchers and approach PhD students close to dissertation. Producing joint applications for funding appears crucial (including f e postdoc positions) as well as implementing an explicit publication strategy.

Conditions for Research

PASL focuses on literature and language education, and the core group consists of approx. 10 researchers including senior and junior researchers as well as PhD students. It has been running since 2010 and has had notable growth during the last couple of years, partly because of the possibility to hire PhD students on a regular basis (PhD school). However, in order to get stronger, the unit has a need for more senior researchers, especially in the field of language studies. It is also important to secure the possibilities for early career researchers to be able to merit themselves in order to make it possible to take on assignments such as supervising doctoral students and scientific experts in different contexts.

Even though there is a complicated organizational structure, the unit has found ways of overcoming this in everyday work. Also, the department is big, and the unit experiences lack of visibility at departmental and faculty level and the research leader puts a lot of effort into the important work of raising consciousness of PASL's work.

The funding of the unit is primarily used for PhD positions. The coordinator and the professor have altogether about 50% of the time of a full position for management and support for junior researchers with writing and publishing. The evaluation panel considers supporting early career researchers as crucial for the sustainability of the unit as well as an important factor for growth. By making an explicit research program or vision (see above), priorities can be made in relation to this. Presently the unit's research infrastructure is concentrated and organized around the collegial seminars and a way to expand this

resource could be to link and build together these activities with similar activities within DISA. Moreover, action could be taken to increase the possibilities of increasing the ULF initiative as a funding opportunity for the unit.

Recommendations

In order to take the next step, strategic decisions have to be made. Here, identifying central research issues and areas would help to make priorities. To strengthen and develop the unit, collaboration with other subject-specific research groups (f e DISA) could be increased. This would enable possibilities of allocating more funding as well as transdisciplinary cooperation with researchers at all levels that will benefit research activities. Establishing a more visible subject specific research area within LiU, could also increase possibilities of gaining internal funding, including ULF funds.

Concluding Remarks

PASL can be described as an emerging research environment with potential to grow. However, there seems to be a lack of an ambitious strategy for subject didactics at LiU. Researchers within subject didactics all have extensive teaching responsibilities. The fundamental continuity of subject-didactic research is largely upheld by doctoral students. There are certain subject-didactic environments that have grown through their own initiatives, but it is difficult to see a unified idea for using subject didactics to provide subject teacher education with a scientific foundation.

Panel U Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of: Panel Chair, professor emerita Katarina Eckerberg, Political Science department at Umeå University, associate professor Thomas Budde Christensen, Head of section for sustainability, cities and planning at Roskilde University, Denmark and Dr Margareta Groth, Head of department, Department of Engineering Sciences and Mathematics at Luleå University of Technology.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. The panel highly appreciates the clear structure and instructions from the LiRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU.

The self-evaluation was comprehensive and enlightening. The interviews were conducted based on questions prepared after reading and discussing, within the panel, the self-evaluation and the data-reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in all the interviews and we also saw that the answers during the interviews supported the self-evaluation report. When there were factual questions on a general LiU-level, these were asked to the LiRE25-support-organisation that provided swift answers.

The evaluation unit assessed in this report is Environmental Technology and Management (ETM at IEI).

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The evaluation panel has read carefully and discussed the written documents. Since we talked to a limited number of the unit's employees during the three interview sessions, we assume that other opinions and perspectives might also exist. This is a limitation to our evaluation – especially with regard to assessing research culture.

Concerning research impact, the bibliometric data was extensively documented in the reports we received, but we were to a less extent provided with data about societal impacts of the research. We regret this, especially when evaluating this specific unit. One of its research strengths is its impressive amount of applied research projects involving co-innovation with societal partners and delivering societal impacts to the benefit of private companies and public authorities. We are also worried that the lack of attention to societal impacts in the evaluation documents reflects a managerial bias towards bibliometric indicators in research evaluation and strategies in general but hope that it is not the case. This could be a general concern for the entire university. One remedy might be using AI for collecting and summarising other forms of impact.

We also found that the capacity to develop new research projects with societal partners is somewhat limited by the low support from LiU Grants Office in formulating judicially stringent contracts with such partners. We therefore recommend that the administrative support becomes more agile and flexible to the needs of the research units. Similar needs were voiced for wider communication of the research.

We noted in the introduction by the LiU Vice-chancellor the existence of the four profile areas 2024-2027 where we see this research unit well fitting into two of them, namely Material Science for Sustainable Technologies as well as Societal Transformations.

Recommendations

For the university management:

1. Develop systematic ways to measure, evaluate, communicate and reward societal impacts from research.
2. Build capacity for responding to the bottom-up needs for administrative support in LiU's Grants and Communication Offices.

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

Research topics are highly relevant both from societal and academic perspectives. The research topics furthermore support the overall strategy of the LiU including several of the profile areas for 2024-27.

On the bibliometric side, the unit performs excellently with high scores in all the key bibliometric indicators: 36% share of articles in level 2; 14% of the articles published in Top 10% journals; field-normalized citation rate 1.1; and 55% international co-authorship. The research unit should also be appraised for its highly multidisciplinary approach combining multiple research traditions and disciplines in applied research projects with clear societal impacts.

Many years of research in the combination of biogas systems with the concept of industrial symbiosis has made the research unit internationally renowned with an array of research projects, frequently cited scientific articles and standards development with companies and agencies. A core strength of the research unit is its vigorous collaboration with the surrounding society (primarily private companies and municipalities) and the societal impacts achieved from these endeavors. The emphasis on applied research supports the university strategy and provides access to, and basis for success in generating external research applications and grants. The unit's impact-oriented research strategy has historically been a huge success with a staggering 120 research projects being executed during the reporting period plus involvement in another 50 with other lead partners. During the reporting period the unit also experienced a strong increase in external funding from 22 million SEK in 2018 to 43 million SEK in 2023. Very impressive!

There is an opportunity for this unit in seeking EU funding. We believe that the research unit is a very attractive project partner in European projects, given its extensive networks and proven ability to create societal impacts. A stronger international profile could also generate an even higher share of international co-authorships and serve as a foundation for international recruitment (senior level). Also, supporting PhD students and junior staff to develop their international networks, via longer stays abroad, contributions to international conferences etc. could foster further international collaboration.

The Draghi report identifies standardization as an important way to implement research results into industry and society in a systematic and rapid manner. This unit is skilled in

engaging in standardization activities and has been instrumental in developing and institutionalizing a new standard for circular economy.

Recommendations

For the unit:

1. Pursue internationalization more systematically: Use existing strength (extensive networks with private companies and public authorities) to attract more EU funding – especially Horizon Europe pillar II.

For the faculty management:

1. Reconsider the resource allocation model to better support units with high research performance and societal impacts in a transparent manner.
2. Support and encourage internationalization, especially applications for EU funding.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

The research unit has a backbone of very experienced senior researchers that secures continuity and stability in the group. We find that the research environment is both innovative and supportive. Researchers across sub-groups experience a productive research culture characterized by flat hierarchies, strong collaboration and mutual learning. Senior researchers are available and supportive to early-career researchers. The feed-back culture is sound and productive. Early-career researchers are encouraged and supported to collaborate with societal actors in line with the research strategy of the unit. Additionally, there is a fruitful collaboration and knowledge exchange between subgroups at all levels.

Whereas the extensive growth in external funding is an enormous success, it is also associated with a risk, as senior permanent staff increasingly become locked into externally funded research projects with reduced time for nurturing cohesion and academic citizenship in the unit. During the reporting period external research grants steadily increased, and doubled between 2018 and 2023, while faculty grants only increased somewhat between 2018 and 2019. In the long run the low proportion of faculty funding creates a risk of reduced learning between research projects, silo'ed sub-groups, reduced mentoring of early-career researchers and lack of group level innovation and creativity. We see two potential ways forward: a) to invest more faculty funding in the unit, prioritized for group cohesion, and/or b) to prioritize hard among and within external grants to ensure available time to nurture group cohesion.

The evaluation panel received somewhat mixed signals regarding the seminar culture when asking about attendance and frequency of research seminars, indicating a need to revitalize and nurture seminar structures, formats and culture.

Most PhD students are female (83%), mid-career researchers are almost 50/50 male/female, but full professors are primarily male (86%). Pathways towards improved gender balance could include senior level female role-models and focused effort to keep talented early-career female researchers in the group. We recognize a new female head of division as a positive role-model. Additionally, more female guest professors could be invited to stay with the group for a period.

A small concern though is raised about the reliance on too few publication outlets (JCLP and Sustainability), where a more diverse publication practice is recommended.

Recommendations

For the unit:

1. Prioritize cohesion: Make sure that the success with external funding is not deteriorating core academic functions and research culture.
2. Consider pathways towards a better gender balance among senior staff (full professors), e.g. invited guest professors
3. Nurture the seminar culture
4. Diversify publication outlets (journals)

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

The organizational structures, with four research units and the biogas center, are well-functioning and support the research activities in productive ways.

The unit is challenged by increasing amounts of external research funding and a university funding model that only to a very limited degree awards the unit with increasing faculty funding. This will have long-term negative influence on the research environment (described above) and a negative influence on the unit's ability to co-finance research grants to secure future growth in external funding, especially with longer term EU funding.

Interview sessions also indicated some ambiguities with regard to the expectations and economic conditions for early- and mid-career researchers. Mid-career researchers experience pressure to secure external funding in line with the traditions and norms in the unit but also voiced that the exact expectation is unclear to them. Additionally, since many staff are hired on contracts funded by external grants, resources (time) to develop research applications is unavailable. As the mid-career researchers are the future, their work conditions are important for the future viability of the unit. In particular, incoming PhD

students and postdocs find it difficult to navigate in the Swedish system and would benefit from more systematic career planning (which would also support the Swedish ones).

We also noted that the Swedish name of the unit is less relevant to reflect its scope of research and education than its English equivalent, something to think about for the future.

Recommendations

For the unit:

1. Prioritize supporting early- and midcareer scholars in developing competences and skills to apply for external funding and improve their conditions for doing so.
2. Improve career planning, especially for international PhD students
3. Consider revising the Swedish name of the group to better reflect the scope of the unit's research.

For the faculty management:

1. Analyze and evaluate the funding situation and consider increasing faculty funding to a) maintain cohesion, core functions and research culture within the unit in a growth situation and b) support mid-career researcher's developing research applications.
2. Acknowledge and reward societal impacts and networks created by research activities and projects. Build metrics to measure and evaluate societal impacts and use these actively in strategic decision-making alongside traditional bibliometric indicators.
3. Support career planning across relevant faculties, especially for international PhD students.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

We see a very strong and well-functioning research unit that is an important asset for the university. The unit performs excellently on bibliometric indicators, has a huge and increasing portfolio of external research grants, and delivers substantial societal impacts.

However, the success of the unit in terms of attracting external funds also comes with a risk that we believe the management should react upon for the long-term viability of the unit. The funding system is an essential part of the challenge in two ways: a) the vast increase in external funding threatens the internal cohesion and core functions of the unit, b) mid-career researchers need support to develop their own portfolio of external funding.

Panel U Report

Introduction

A brief presentation of the panel, the panel's way of working, and the research area(s) that are included in the panel's commitments.

The panel consisted of: Panel Chair, professor emerita Katarina Eckerberg, the Political Science department at Umeå University, associate professor Thomas Budde Christensen, Head of section for sustainability, cities and planning at Roskilde University, Denmark and Dr Margareta Groth, Head of department, Department of Engineering Sciences and Mathematics at Luleå University of Technology.

The panel has carefully studied the material, has had digital meetings before the evaluation to discuss ways of working, roles in the evaluation and structure for the planned work. The panel highly appreciates the clear structure and instructions from the LiRE25 team, the well-planned schedule for the whole period, including online introductions and the administrative support before and during the evaluation week at LiU.

The self-evaluation was comprehensive and enlightening. The panel asked for clarification on the organizational structure, and this was provided. The interviews were conducted based on questions prepared after reading and discussing the self-evaluation and the data-reports. We prepared questions for each academic group to receive input from different experiences. We appreciate the open atmosphere in the interviews. When there were factual questions on a general LiU-level, these were asked to the LiRE25-support-organisation that provided swift answers.

The evaluation unit assessed in this report is the TEMA M Environmental Change.

General Observations that go beyond the specific evaluation units

Present observations and recommendations regarding your overall impressions from all evaluation units evaluated by the panel as well as regarding department, faculty- and/or university management levels.

The evaluation panel has read carefully and discussed the written documents. Since we talked to a limited number of the unit's employees during the three interview sessions, we assume that other opinions and perspectives might also exist. This is a limitation to our evaluation – especially with regard to assessing research culture.

Concerning research impact the bibliometric data was extensively documented in the reports we received, but we were to a less extent provided with data about societal impacts

of the research. We regret this, especially when evaluating this specific unit. One of its research strengths is its impressive multilevel societal impacts achieved from research activities – from kindergartens to the UN – including co-production of knowledge and policy advice. We are also worried that the lack of attention to societal impacts in the evaluation documents reflects a managerial bias towards bibliometric indicators in research evaluation and strategies in general but hope that it is not the case. This could be a general concern for the entire university. One remedy might be using AI for collecting and summarising other forms of impact.

Another concern that was raised is that the unit's capacity to develop new research projects with societal partners is somewhat limited by the low support from LiU's Grants Office in formulating judicially stringent contracts with such partners. We therefore recommend that the administrative support becomes more agile and flexible to the needs of the research units. Similar needs were voiced for wider communication of the research.

Recommendations

Recommendation to the university management

1. Develop systematic ways to measure, evaluate, communicate and reward societal impacts from research.
2. Build capacity for responding to the bottom-up needs for administrative support in LiU's Grants and Communication Offices.

Evaluated Unit's Name: TEMA.tema M Environmental Change

Research and the Research Quality

Observations and analysis related to the following topics: 1) Relevance and novelty of the research topics covered by the evaluation unit, 2) Quality of the research output, 3) Impact outside academia, 4) Strategies, priorities and future research plans

There is no doubt about the academic and societal relevance of the research topics for the unit. Through their interdisciplinary research they impact policy decisions on all levels, local, national and international. The combination of natural sciences, social sciences and humanities contributes to both the quality and novelty and is perceived by the panel as part of the LiU DNA. The research connects directly to LiU's profile area Societal Transformation.

The articles in Nature and Science are noteworthy and contribute to an extremely impressive publication record. In the self-evaluation there is self-reflection regarding international co-authorship and the panel supports these ambitions. The international co-authorship is higher than the LiU-average and the altmetrics where the group is mentioned in policy documents is a sign of impact outside academia. Also, the publication record with companies is much higher than the average for Faculty of Arts and Sciences. The impact outside academia is extensive, shown by engagements within global institutions, such as the IPCC and IPBES, national advisory bodies such as the Swedish Climate Council as well as public agencies at national, regional and local level.

The research and the research quality, both at present and in the future, is nurtured by the interaction between academic ages and areas. The seminar culture at the unit was discussed with all groups at the interviews and was found open and supportive. However, there seems to be a post-pandemic effect where the seminar culture is not as strong as earlier. Given that learning is a research area in the group, there are opportunities for innovative and creative development of formats and methods for academic interaction.

The strategies, priorities and future research plans revolve around the unit's ability to be at the forefront of research and education that is critical for the coming decades, and where the unit has the potential to become an even more important actor for sustainable solutions. Their priorities in their SWOT focus on securing more long-term stable funding to enable the unit to provide necessary knowledge and solutions. We fully agree with this observation.

Recommendations

To the research unit:

1. Revive and develop the seminar culture at the unit. Clarify and communicate expectations, usefulness and ways of contributing to the seminars to and for all

academic groups. Develop innovative and creative formats and methods for academic interaction.

2. Acknowledge and reward societal impacts and networks created by research activities and projects. Build metrics to measure and evaluate societal impacts and use these actively in strategic decision-making alongside traditional bibliometric indicators. Introduce routines for this reporting to the LiU scientific archive as suggested in the self-evaluation.

To the faculty management:

1. Reconsider the resource allocation model to better support units with high research performance and societal impacts in a transparent manner.

Research Culture

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Publication strategies, 2) Recruitment, Opportunities for early-career researchers to develop their originality and independence, 3) Quality of the PhD training, 4) Academic as well as non-academic networks and collaborations, 5) Equal opportunities and gender equality, 6) Good research practice, 7) Research in relation to teaching.

Our most important observation is that all members of the units that we met seemed to really enjoy working at the unit and at LiU. The collegial and collaborative atmosphere and the willingness to support one another was mentioned explicitly many times, especially by doctoral students and younger researchers.

The research culture is characterized both by trust and open communication, following academic norms and regulations, as well as the more implicit traditions and ways of working. There are clear ambitions for the structure and culture for PhD-studies, seminars and networks. We see that there can be improvements in the internal transparency for the younger staff regarding how the unit is run, not because there are misconceptions but because they just don't know. A clarifying effort could be instrumental in securing future success in managing careers for the younger staff. This training will increase their ability to independently form research questions, networks and projects.

Recommendations

To the research unit:

1. Be clear on vision and strategy for the unit. Ensure that the senior management will involve all the staff at the unit in that work. When forming strategies, applying for funding and other strategic activities – strive for inclusion of different academic ages to enhance the cohesion in the group.

2. Recognize, preserve and develop the existing collaborative atmosphere in the unit, especially senior researcher's support and willingness to answer questions from younger researchers.
3. Dedicate time and effort to increase internal transparency, especially regarding organization and money flows.
4. Train young researchers in strategic decisions and prioritizing work. This would help enhance individual academic motivation and mitigate stress.
5. Invest in career planning for PhD students and young scholars. This would be beneficial for their future research development at LiU and beyond. It is a recommendation for both the unit and the university management.

Conditions for Research

Observations and analysis related to the following topics (choose those that are most relevant for the particular evaluation unit): 1) Organization, 2) Staffing, 3) Funding, 4) Research infrastructure, 5) Support functions

An important condition for excellent work within this field is strong laboratory facilities. The labs within the unit are well kept, flexible, functional and instrumental in facilitating world class research. It is excellent that the unit also collaborates with other strong laboratory units at the university, as well as utilizing national large scale research infrastructure such as MAX IV. We acknowledge the importance of being able to fund research engineers to keep the lab running. To maximize the usefulness of the lab, we suggest that the laboratory operations are more clearly included in the unit's strategies.

Staff wellbeing and performance is another important condition for success. During the interviews the stress level of the staff was raised several times as an important area for improvement. Stress is common in academia but cannot be accepted in the long term. Academic stress is often connected to uncertainty in funding, and we believe that this is part of the problem. We therefore suggest the faculty re-evaluate the distribution of faculty funding for this exceptionally successful group. A closer connection between research and education could be a way to also mobilize additional resources.

Recommendations

To the research unit:

1. Develop a separate laboratory strategy or include it in the research strategy for the unit. We recommend that the strategy includes ideas for funding research engineers and funding of new instruments.
2. Continue to address stress levels by sharing ideas and experiences between employee groups.

3. Evaluate opportunities for stronger integration between research and educational activities that can create several positive outcomes.

To the faculty management:

1. Analyze and evaluate the funding situation and consider increasing faculty funding to reward and maintain momentum in the unit's excellent research and societal impacts.
2. Acknowledge and reward societal impacts and networks created by research activities and projects. Build metrics to measure and evaluate societal impacts and use these actively in strategic decision-making alongside traditional bibliometric indicators.

Concluding Remarks

Please feel free to add observations and recommendations that lie outside the three areas listed above.

We see a very strong and well-functioning research unit that is a flagship for the university, with a global impact. The unit performs excellently on bibliometric indicators, has a strong external research portfolio, and delivers substantial societal impacts, also internationally.

The continued success of the unit is however dependent on predictable faculty funding to match external funds, to support both high quality researchers and laboratory facilities. Such funding is particularly important for enabling the younger staff to develop and contribute to innovative and impactful research.

Panel V Report

Evaluated Unit: IEI.MLU Malmstens

Introduction

Malmsten operates within the transdisciplinary field of furniture studies, integrating knowledge from crafts, design, technology, and cultural history, with applications in both industrial production and everyday designed living environments. The panel, comprising Gunnar Almevik, Katarina Bonnevier, and Jonas Olsson, has reviewed Malmsten's performance data and self-evaluation relating to research, and conducted interviews with academic staff during a two-day site visit on 10-11 June 2025. The conclusions are presented in this report. The panel has focused on recommendations and Malmsten's potential and the conditions necessary for developing a high-quality research environment in the field of furniture studies.

General Observations that go beyond the specific evaluation units

Malmsten celebrates its 25th anniversary as part of Linköping University, yet it still lacks the capacity and resources to fully meet standards for research. The institution is renowned for its long-standing and high-quality bachelor's programmes in cabinetmaking, furniture design and upholstery, but it is currently unable to offer students a postgraduate pathway through master's or doctoral studies. While Malmsten's staff possess a high level of professional expertise, fewer than 20% hold a PhD. Resources and attention are primarily directed towards the undergraduate programmes, and the institution's identity is strongly rooted in its educational mission. Under such conditions, expecting robust research activity to emerge is unrealistic. However, there are good opportunities to develop a research environment at Malmsten, provided that certain decisive steps are taken in the right direction.

Nevertheless, Malmsten offers an indispensable contribution to both industry and society through deep material knowledge, sustainable solutions, and advanced craft skills, an asset from which Linköping University could greatly benefit. With appropriate resources, strengthened integration, and strategic collaboration across the university, and with initiatives anchored in the academic community, this potential could form the basis for future excellence in research and development. Which, in the larger perspective, could have a sustainable impact, informing the posibilities of a viable future society.

Research and the Research Quality

Malmsten's vision and emerging ideas for future research themes are highly relevant and show strong potential. A few staff members are engaged in research and development work, often published and of high quality, but these activities are typically conducted outside of their formal employment at Malmsten. While these projects address central topics within furniture studies and demonstrate the transdisciplinary potential of the field, drawing on artistic, craft-based, social, and historical perspectives, they rarely involve Malmsten's broader academic environment, colleagues, or infrastructure. As a result, they do not yet contribute to fostering a sustainable research culture within the institution.

There is a clear desire within the organisation to develop a shared vision that involves all staff and guides project prioritisation. The idea of Malmsten as a cohesive environment encompassing education at all levels, research, and collaboration is well-founded. Relevance to students, industry, and society remains a core ambition.

Recommendations

- Develop a clear and inclusive research strategy that aligns with Malmsten's identity, educational strengths, and transdisciplinary scope.
- Ensure the research strategy emphasises relevance to students, the furniture industry, and societal needs in line with the UN's global goals for sustainable development, EU legislation and research agenda and Nordic cooperation.
- Cultivate research activities that grow directly from the existing educational practice, ensuring relevance and feasibility. Use educational settings strategically as platforms for research development, linking course content, student projects, and research initiatives.
- Increase awareness and use of non-traditional research outputs (NTROs), including film, 3D models, and interactive media, to better support Malmsten's signature craft-based, sensory, and embodied knowledge.
- Integrate themes of repair, reconstruction, and restoration, topics of increasing relevance in society, more fully into Malmsten's educational programmes, not only in upholstery but also in design and cabinetmaking, and within the proposed master's programme (see below).
- Build research themes around existing strengths and societal relevance, including:
  - Care, repair, restoration and maintenance.

- Sustainability, circular design, and re-innovation (e.g., CNC using reclaimed material).
- Craft philosophy and intangible cultural heritage, as well as policy for designed living environments and Malmsten's perspective on small scaled local production and sustainable procurement.
- Contextual design: exploring spatial, cultural, and material dimensions of furniture and interiors, and resonance of craft industries and initiatives in spatial planing of municipalities and regions.
- Second-cycle furniture, healthy material use, and design addressing abelism and ageism (e.g., children's interaction with designed environment).

Research Culture

Malmsten currently operates with limited integration within Linköping University being a satellite campus. Its visibility as a research environment is low, which limits opportunities for internal and external collaboration. Contacts with the university's research support services have been sporadic, and staff members express uncertainty about how to navigate funding systems, initiate partnerships, or develop applications.

However, Malmsten holds significant untapped potential: it is an attractive research partner with a strong brand and recognised expertise. The school's capacity as a craft laboratory and test bed for sustainability solutions offers unique opportunities for interdisciplinary research and collaboration. The craft pedagogy at Malmsten is inherently research-oriented. Ongoing activities, such as the integration of craft with digital manufacturing, the use of healthy materials, and children's interaction with designed environments, are at the forefront or have significant potential for advancing the field. Initiatives like guest researchers and artist-in-residence programmes further demonstrate pioneering work. Realising this potential requires clearer strategic direction, institutional anchoring, and increased support for research development.

Recommendations

- Encourage collaborative research practices, both internally and externally.
- Foster internal collaboration to anchor ongoing research within Malmsten's environment and academic culture, with joint publications, teaching materials, and collaborative research.
- Strengthen collaboration with Linköping University's home department and technical faculty, particularly in areas such as material laboratories, sustainability, and

innovation, as well as developing further collaboration with the philosphical faculty (i.e., gender, history and cultural studies).

- Promote campus development projects and networks to foster strong and resilient relations with local and regional community and administration.
- Continue with and enhance the framework for national and international guest researchers and artist-in-residence programmes. Explore also possibilities for externally employed doctoral students (samverkansdoktorand).

Conditions for Research

Malmsten currently lacks a formal bridge between undergraduate education and research, as no master's or doctoral programmes are offered. This structural gap limits opportunities for building a sustainable academic environment that integrates teaching and research. There is a strong case for developing a dedicated master's programme in *Furniture Studies*, designed with an international, interdisciplinary and research-oriented profile. Such a programme could help create the critical mass needed for long-term academic engagement in both education and research.

The teaching staff holds deep material and craft expertise, but few possess doctoral qualifications. Many work part-time, leading to fragmented roles and limited continuity. Although the junior lecturers (adjunkter) show promise in pedagogy and research, they lack adequate institutional support to develop scholarly output. Student's thesis remain underutilised as a source for research collaboration and development, and the inclusion of themes such as repair, reconstruction, and restoration, today only visible in upholstery, offers further potential.

An external advisory board could support strategic development and connect Malmsten to broader networks in academia, industry, and cultural institutions, in Sweden, the Nordic-Baltic countries and internationally.

Recommendations

- Develop a research master in Furniture Studies with a broad, interdisciplinary, and international profile to bridge the gap between undergraduate education and research. To ensure a critical mass of students (e.g., 15 to 20) and make creative use of available facilities, the pedagogy should be student-centred and research-driven, combining dedicated courses, exchange programmes, and project-based learning tied to active research. Cross-faculty collaboration within LiU would support broad recruitment and enable diverse career paths for postgraduate trailblazers in Furniture Studies.

- Establish a clear pathway to doctoral studies within Linköping University, in an initial phase particularly for part-time lecturers (adjunkter). Explore the possibility of combining part-time roles in education with doctoral training, as well as career development positions such as associate senior lecturer.
- Encourage all staff and provide structured support, time allocation, and collaborative frameworks to develop scholarly work, building on Malmsten's strategic plan, individual competence plans, and measurable goals (such as funding applications, conference participation, publications, learning resources, and project collaborations).
- Form an external advisory board or reference group to guide strategic development and foster national and international connections.

Concluding Remarks

Malmsten possesses a unique identity and strong brand within the field of furniture studies, with valuable assets in craftsmanship, material knowledge, and sustainability-driven design, in Sweden, in relation to our Nordic-Baltic neighbours as well as internationally. Its potential as a national and international research hub is substantial but currently underutilised due to structural, strategic, and organisational limitations.

Strengthening Malmsten's integration within Linköping University, supporting the development of postgraduate pathways, and cultivating a culture of research embedded in educational practice will be key to unlocking this potential. With the right investments, in people, structures, and strategy, Malmsten can evolve into a vital contributor to transdisciplinary research in design, craft, and material-based sustainability. For the benefit of Linköping University, for Sweden and not least for Malmsten itself.


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