A pilot study on institutional conditions for interdisciplinary research at SLU

Jasmine Zhang and James Kurén Weldon

Swedish University of Agricultural Sciences, SLU
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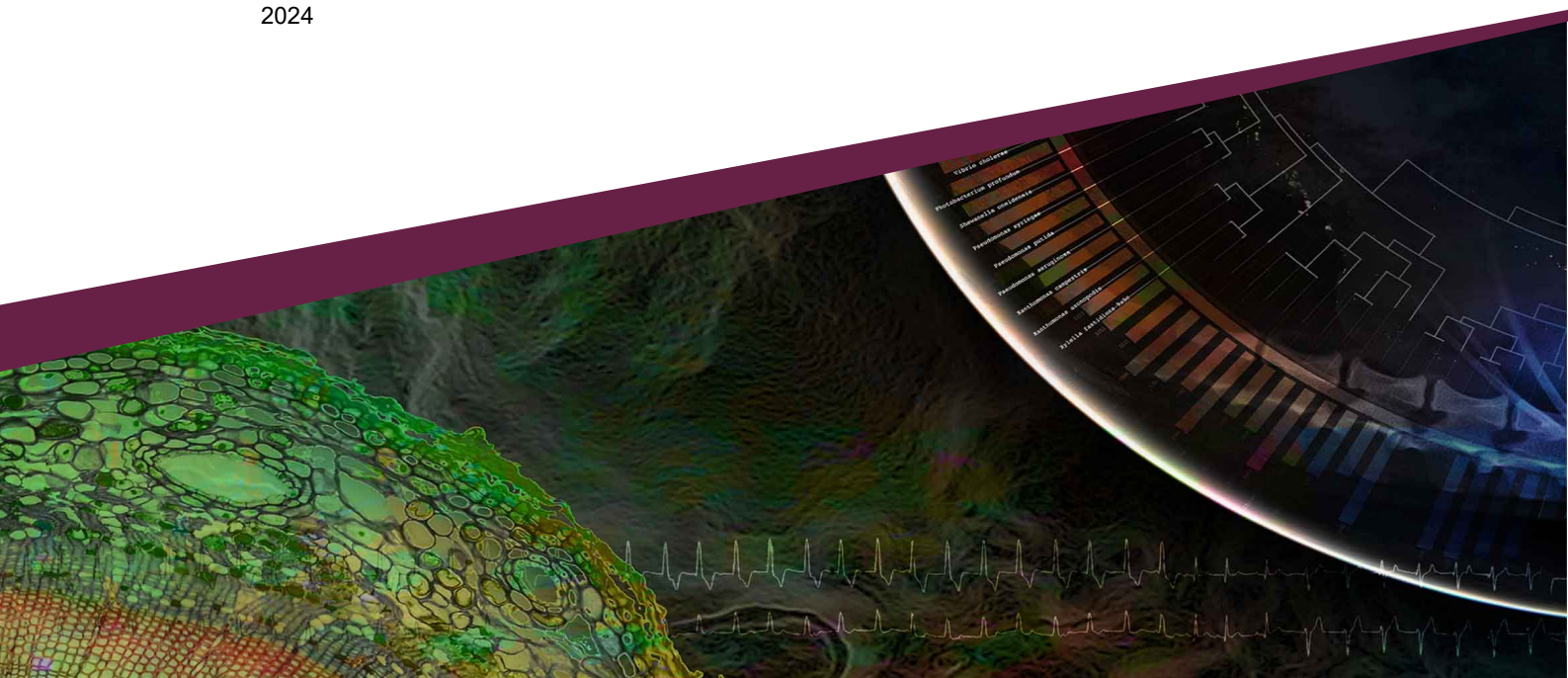

A pilot study on institutional conditions for interdisciplinary research at SLU

Jasmine Zhang, Swedish University of Agricultural Sciences, Department of Urban and Rural Development, https://orcid.org/0000-0002-7493-5867

James Kurén Weldon, Swedish University of Agricultural Sciences, Department of aquatic sciences and assessment, https://orcid.org/0000-0002-3802-4177

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Table of contents

Introduction

Interdisciplinarity has become more prominent in SLUs communications and activities in recent years, which can be observed through simple search of the SLU website. For the period 2013–2018 it gives 639 results on the keyword "interdisciplinarity" and 2018–2023 returns 2100 results, while for "tvärvetenskap" the earlier period gives 1540 hits compared to 5640 in the later period. Interdisciplinarity has been a key feature of SLUs Futures platforms, and this focus has been increased more recently by initiatives that aim at such as Interdisciplinary Academy (IDA). IDA is now on its third iteration of funding groups of researchers to work across disciplinary boundaries. Both authors of this report were participants to the first round of IDA and were asked to take on the task of investigating what are the institutional conditions at SLU for further developing interdisciplinary research. We have therefore conducted a pilot study on this topic.

Terminology

The terms used in this field are sometimes confusing. Here we follow the definitions used by SLU Future Food, "In multidisciplinary research the different theories, methods or approaches are used side by side, and in interdisciplinary research they are, at least to some extent, integrated. Transdisciplinary research is distinguished in its recognition and inclusion of other types of knowledge than scientific knowledge, such as practice and experience-based knowledge". In this report, our focus of study is interdisciplinary research, although some issues inevitably bleed into the other categories.

Background and study objectives

Interdisciplinary research (IDR) has been promoted by science policy and societal at large for decades now. Two logics are driving this promotion, that interdisciplinary research has higher potential to spark innovation and is more accountable when solving complex, real-world problems (Barry et al 2008). The logic of innovation stems through the interactions among scholars from different disciplines, where innovative methods can develop and lead to better solutions (Barry et al 2008). Strathern (2004) contends the logic of accountability is granted to interdisciplinary activities as they are seen as ways to break down barriers between science and society, creating greater interaction (Barry&Born, 2013, p.14). Highly entangled, the logic of innovation and the logic of accountability can lead to a unified and singular understanding and implementation of interdisciplinarity. For example, there has been much focus on the invention of new technologies and tools to achieve increased efficiency, precision, and accountability of scientific knowledge. Another image that derives from the logics of interdisciplinarity is that the economic requirements lead to a dissolved cultural autonomy of scientific research (Barry&Born 2013: 3). While these assumptions and logics are constantly debated over, they have established interdisciplinary research as a normative trend, which in turn reinforces these logics in scientific knowledge production. There is thus a risk of conducting interdisciplinary research for its name's sake (Barry &Born 2013).

In this context, it is important to examine how interdisciplinary research is carried out at various levels and how universities and other research institutions can better organise and facilitate interdisciplinary research with good quality. There is a limited body of research devoted to measurement of interdisciplinary research and when it does, it is often carried out at the scholar level or individual publication level. A few scholars have also studied assessment of whether universities and their institutional conditions and structures succeed in fostering interdisciplinary research (Leahey et al 2019). In this study we are interested in the latter perspective, which is more focused on institutional structures and conditions for interdisciplinary research.

In Sweden, as early as the 1970s there was discussion about how universities should structurally enable interdisciplinary research. Interdisciplinary research is often seen as boundary-crossing (Ellegård 1974; Sörlin 1986). But as it is pointed out by multiple scholars, there is an essential paradox of interdisciplinarity – the true interdisciplinarity can only exist when interdisciplinarity disappears (Elzinga 1995). Several structural and institutional factors that influence interdisciplinary research were identified in these earlier studies, such as conditions for researchers' employment, fragmentation of research time, limitation of funded research time, and discipline-based departmental structures at universities (Wallén

1974). Analysing structural conditions for interdisciplinarity, Engwall (2018) lists four factors that influence interdisciplinarity: disciplines, institutions, rewards, and funding. That interdisciplinarity is less likely to involve disciplines that are strongly integrated, hence strong departmental organisation structures do not encourage interdisciplinarity. Interdisciplinarity cannot be quality controlled by discipline-based evaluation and cannot grow when funding is concentrated and in the hands of scientific elites.

We find one study from Barringer et al (2020) that examines how universities' commitment to IDR is shown through structural organisation very useful here. Barringer et al (2020) point out that most universities leave the department-based structure intact when they put efforts into fostering interdisciplinary research, as this structure is entrenched and challenging to change (Hearn & Belasco 2015; Holley 2009). Therefore modification of such traditional structure shows extra commitment of universities to IDR as they are believed to "reflect a different and perhaps greater and more durable commitment to IDR than efforts to alter hiring priorities, collaboration patterns, and promotion and tenure guidelines" (Barringer et al 2020, p. 682), as it requires high levels of university decision making and central planning.

Leahey et al (2019) in another study point out that not all departments are disciplinary units, and not all research centres are interdisciplinary in nature. So, the question is – interdisciplinary to which extent and in which way? We need to take into account individual researchers, in particular early career researchers' experiences of research environment and conditions for pursuing interdisciplinary research (Enright & Facer 2017), asking whether "the practice of interdisciplinary research enables the creation of 'epistemic living spaces' that offer a secure foundation for the production of academic identity" (p.622).

It is in the context of this literature we ask the following questions:

- How do individual researchers experience institutional structure for interdisciplinary research at SLU – what enables it and what stands in the way?
- What institutional structures are there today at SLU for encouraging, supporting, and realising interdisciplinary research?
- What can SLU do more to improve structural conditions and show commitment to IDR?

Materials and Methods

The materials and methods we base this report on include two parts. First, we searched internally at the SLU website and SLU publications for records, documents and activities related to interdisciplinarity (in English or Swedish). We focus here on what we considered to be the key findings rather than attempting a comprehensive review of all material found. Some important points that emerged from these contributed to the second part of our materials and methods, through informing the questions in a survey where we asked individual researchers at SLU about their experiences with IDR and suggestions for improvements. Throughout the process we were particularly interested in the following points:

- Activities aimed at the whole of SLU, rather than smaller departmental initiatives
- Contributions to the development of institutional conditions at SLU that favour interdisciplinary studies
- Collaboration and interaction with other interdisciplinary initiatives at SLU that lead to strengthened interdisciplinary competence within SLU
- Collaboration and interaction with interdisciplinary initiatives at other universities

Survey

A survey using the Netigate platform was made, consisting of three parts. First part includes basic information including participants' past experiences and future plans to collaborate across disciplines and institutions. Second part is about participants' opinions (agree or disagree, 1-5) on factors that may encourage them or hinder them from pursuing interdisciplinary research. Final part gives participants space to write in a free text box what they think SLU should improve in advancing interdisciplinary research, from their own perspective. The survey was sent out directly to 168 people who are part of the IDA Teams channel and was advertised in the Future Foods newsletter and website, and all were encouraged to spread it freely to others who may be interested. The full survey can be found at https://doi.org/10.6084/m9.figshare.28750163.v1. We received 33 full responses after two weeks, which can be considered a reasonable success rate. It is important to point out that those who responded are a self-selecting group rather than a representative sample, so some caution should be exercised in interpreting the results.

Results of review

The “Evaluation of Quality and Impact at SLU” report, often referred to by its Swedish abbreviation KoN (Glynn et al., 2018) shows that interdisciplinary research was already a high priority for SLU in 2018; and the 2023 overview of Swedish Higher Education and Research confirmed that the direction of further developing interdisciplinary research is seen as strategic and important. The SLU Futures platforms were a major development, and another important area is the launch of, and experiences from the Interdisciplinary Academy (IDA) project.

KoN report (2018) identified areas for investigation on institutional conditions for interdisciplinary research

The expert reviewers highlighted that SLU's Future Platforms and similar thematic platforms have significant potential to enhance internal collaboration and engage researchers in interdisciplinary sciences. They also pointed out the need for stronger academic leadership, improved pathways to prevent vacancies in key academic roles, and the resolution of organizational structures that may obstruct interdisciplinary efforts (p9). In the assessment design section, aspects of interdisciplinarity were included as part of the assessment for “Scientific Environment and Leadership” which includes “how the unit worked to maintain a creative and intellectually vigorous and productive research environment”. (p18) which relates to academic networks and collaborations.

One of the characteristics of strong units in terms of their scientific quality is the combination of both breadth and depth – that the breadth does not compromise depth. This is, however, not put in relation to their interdisciplinarity. Rather it was pointed out for the lower scored units that “a broad and not very clearly defined research profile as well as lack of commonly agreed strategies or concepts” were observed as the factors (p.24). In the future, it will be interesting to create correlations between the two, to see how interdisciplinarity results in breadth and depth, and whether they compromise each other.

Factors identified for less strong environment and leadership (which may impact the potential for interdisciplinarity) were: unstable leadership situation, e.g. vacant professorial chair, impending retirement of the current professor, lack of cohesion and collaboration between scientists within a unit, skewed age balance, small group size (p.25). However, it is difficult to know how these factors relate to interdisciplinarity specifically.

The report identified that “the need for SLU to strengthen the social sciences...is a critical factor to develop a full sustainability portfolio.” and we might add this is also a crucial factor for interdisciplinarity within SLU, which has traditionally been dominated by the natural sciences. However, this seems to be

somewhat mixed with transdisciplinarity and societal impacts, as SLU's connections with societal partners and industries are mentioned, and to brand SLU as a sustainability leader dealing with societal challenges are brought up as a vision/goal. (p.35).

The report also noted the marginalisation of social sciences within interdisciplinary projects, where they are often brought in (too) late in the process. It emphasised the need to support social sciences and humanities researchers, encouraging them to develop their own initiatives rather than being subsumed under natural sciences projects, with the goal being to help these disciplines build a strong, independent presence within IDR (p.39). This aspect is relevant both for the scientific quality of research and for high societal impact, and integration of the social and the natural sciences. Several panel reports emphasized that interdisciplinary projects, where social and natural scientists are equal partners from the very beginning of research initiatives, will have higher potential for societal impact (p48). The report recommended "Promote the integration of social sciences and natural sciences. Ensure that interdisciplinary initiatives are developed on equal terms." (p53)

The SLU Future Platforms are recognised in the report as effective initiatives for fostering interdisciplinary projects. However, expert reviewers noted that research groups are not fully utilizing these cross-faculty structures. The review panels highlighted these strategic initiatives as valuable but underused opportunities, suggesting that improved internal communication and a more bottom-up approach are necessary to enhance collaboration and engagement across faculties. (p.39)

The panel "Nature and Society" recognized SLU's strategic goal to promote multidisciplinarity and interdisciplinarity but stated "SLU is still very much on a learning curve… Strategic actions within SLU are needed to ensure that UoAs with a social science profile have sufficient resources in order to contribute to interdisciplinary work. Only then can the really interesting interdisciplinary questions be formulated." They recommended that SLU examine the processes by which the social science Units of Assessments (UoAs) are incorporated into the scientific and outreach programs in the agricultural, biological, forestry and veterinary sciences. This is necessary to avoid situations where social sciences and humanities become "add-ons" during project planning in order to formally meet demands for multidisciplinarity." (p.42-43)

Perhaps the most widely quoted section of the report describes SLUs high level of engagement with society and connections with industry and other stakeholders as a "golden egg". This clearly points to the existence of a high potential for inter and transdisciplinary work, the challenge is to foster this potential in the best way possible.

Future Platforms

The Futures platforms (forest, food, health, and urban landscapes) are central to SLU's interdisciplinary engagement. Explicitly interdisciplinary and transdisciplinary, the platforms are intended to leverage the strengths of SLU's wide focus and extensive co-operation with stakeholders outside academia (the "golden egg" mentioned above). They aim to develop interdisciplinary methods of working in identifying research questions relevant to society and providing scientific support for meeting current and future challenges. The importance of the Futures Platforms lies in this potential to link academic research and concrete solutions for society – by promoting collaboration across disciplines, new insights and innovative practices can be fostered that can address real-world problems. The platforms can serve as a link between academia and wider society, ensuring that research outcomes are relevant and applicable to current challenges.

To try and meet these ambitious aims, the four platforms organise events, seminars, and other meeting places (e.g. the annual two-day residency at Philipssonska gården in Strängnäs), and offer seed funding and co-financing for interdisciplinary projects. The Futures platforms have organised numerous events to foster interdisciplinary discussion and cooperation. Future Food and Urban Futures came together to organise events under the Futures Lab label covering their overlapping areas of interest and also collaborated on the Future Foods project which explored the systemic relations of food systems and urban development and their role in the transition to sustainability. Noteworthy of late is the engagement in Living Labs (real world situations where stakeholders can together test and develop solutions to complex challenges), such as SOIL (Social Innovation Living Lab) in Malmö that brings together Malmö university, SLU, Lund University, Region Skåne, the city of Malmö and the Form & Design Center.

The Interdisciplinary Academy

Funded by the NJ faculty and SLU Future Food and partly inspired by the example of the Pufendorf Institute at Lund University, the IDA initiative launched in 2022. Each year interdisciplinary groups of researchers are funded for 20% of full-time for 8 months to work on their projects. Focused on scientific problems or themes which require several scientific disciplines to approach, groups must include researchers from at least two different branches of science (natural sciences, social sciences, engineering sciences, humanities, etc.), and all should come from different departments at SLU. By directly funding interdisciplinary work, this initiative is currently an important way in which the conditions for such collaboration are shaped at SLU. A majority (58%) of those responding to our survey had either applied to or participated in the IDA.

Projects funded by IDA have so far covered a diverse range of themes, from landscape multifunctionality, and futures for agriculture (2022-23), trade-offs and scale in natural resource management, and food production in rooftop greenhouses (2023-24), to an exploration of restoration for present and future generations (2024-25). The project has clearly led to an increase in collaboration across subject and departmental boundaries, and while there has not been a specific demand for outputs in terms of publications (to allow exploration without undue pressure) it has led to several scientific articles and applications for external funding to allow continued collaboration in IDR projects. It is notable that there are two possibilities found at the Pufendorf Institute but not under IDA - funding under a fellowship programme for inviting international collaborators to participate in themes, and a two level application process covering both more developed Themes and an incubator option for developing new ideas that could lead to research funding (called Advanced Study Groups).

Education

The level at which interdisciplinary research first becomes relevant is an interesting (and open) question. Must one first acquire expert knowledge within a domain before co-operation with experts from other fields? Or should some element of interdisciplinarity be included at the level of bachelors, masters, or PhD studies, and if so, when? A report on interdisciplinarity and education at SLU was written in 2022 (“Systemperspektiv och tvärvetenskap i SLU:s utbildningar”). The systems perspective in the title involves the interconnections between components within a system, emphasizing holistic understanding rather than reductionist analysis. The report suggested that more practical fields like architecture or urban planning more naturally incorporate systems thinking compared to traditional academic disciplines, and that SLU's decentralised structure—with diverse programs spanning natural sciences, social sciences, and humanities—necessitates tailored approaches for each course or program. A follow-on workshop at the SLU educational conference (“På kurs och tvärs”) was held in 2023. These discussions suggested that context is important, and that programs and courses need to be considered separately, with more clarity needed around the meaning and purpose of interdisciplinarity in different contexts.

SLU currently offers a course in interdisciplinary practice as part of the Master's programme in sustainable development and the Master's programme Sustainable Food Systems, which could be accessible to more students if also offered as a standalone course. There is also a Master’s course on interdisciplinary perspectives within Agricultural Science. No course specifically naming interdisciplinarity was found at PhD level. Aspects of IDR are present in many courses that do not specifically name it, for example the subjects named in the 2022 report that naturally adopt a systems perspective, or others that try to

systematically relate course content to the UN sustainable development goals. Whether interdisciplinary perspectives should be integrated into a range of other courses, or focussed on in specific courses, it seems that there is potential for expanding the offerings and increasing awareness of IDR amongst the next generation of researchers, particularly at PhD level.

Results of the Survey

Here we present some selected results from the survey. The full survey with results can be found at https://doi.org/10.6084/m9.figshare.28750163.v1.

Experiences of interdisciplinary research

Close to half (42%) of the participants have applied to IDA before, and almost all answered that they would apply to IDA in the future, indicating some of the ones who had applied would like to apply again. It is noticeable that respondents are not evenly distributed among different faculties, with NJ employees taking up to 61% of all respondents. It is interesting to note that survey respondents were generally somewhat established and experienced as researchers (Fig. 1) while early career researchers were not really represented here. Nevertheless, regardless their career stage, all respondents indicated some interests in working in interdisciplinary teams, and majority (72%) have either led or worked in interdisciplinary projects. We asked those who answered that they had previous experience in interdisciplinary research who they collaborate with, there seems to be an even distribution of answers on "same department but different disciplinary expertise", "different department but same faculty", "another faculty and different discipline" and "someone outside SLU", with the last answer slightly stick out. This shows that respondents have done interdisciplinarity on different levels hence have different experiences. But it does not tell us how each of these collaborations is chosen in relation to which structural conditions.

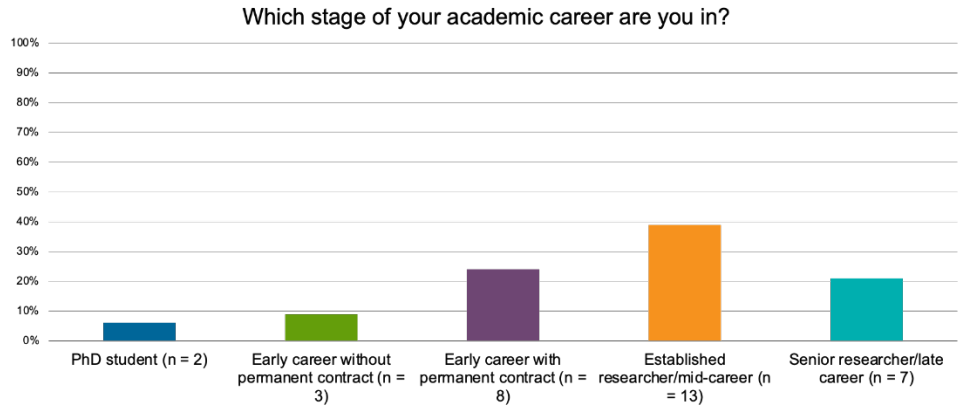

Figure 1

However, in connection to this question, we also asked who people would consider working with in interdisciplinary projects with similar options. Greater enthusiasm was linked to greater distance, with contacts outside SLU being most desirable. The result shows that while people are generally positive about

collaborating across differences, there are small amount of unwillingness or hesitation in collaborating within the same faculty or within SLU, and higher unwillingness in collaborating within the same department. In contrast, almost all (with one exception) were enthusiastic or very enthusiastic about collaborating with people outside SLU. The free-text answers point out that the current SLU structure does not do enough to encourage collaboration with researchers from other universities, which can be partly what the respondents expressed wish for here. We therefore note this as a space for future improvement. At the same time, as the question formulated in a way that collaboration beyond SLU could also be with non-academic partners, or researchers from similar disciplines, this desire does not necessarily relate to the desire to advance interdisciplinarity. Neither does it say much about how different institutions within SLU have encouraged or discouraged such collaboration, as it might look very differently depending on whether it's societal partner or academic partner outside of SLU, for different faculties and departments.

Opinions on support and obstacles for IDR

We asked individual researchers to rate how much they agree or disagree with statements that indicating structural conditions that are either supportive or discouraging for interdisciplinary research. Several of the statements are related to wider cultural norms on how interdisciplinary research is valued in the context of academic career development, on different levels such as individual, group, institutional, university, and societal levels. Through the rating we wish to get a sense of how these values on various levels may correlate or collide.

On the levels of society (necessity to solve complex issues, social impact of research), group (networking), and personal development (curiosity, relevance for learning and developing), there was clear agreement that interdisciplinarity is important (Fig. 2).

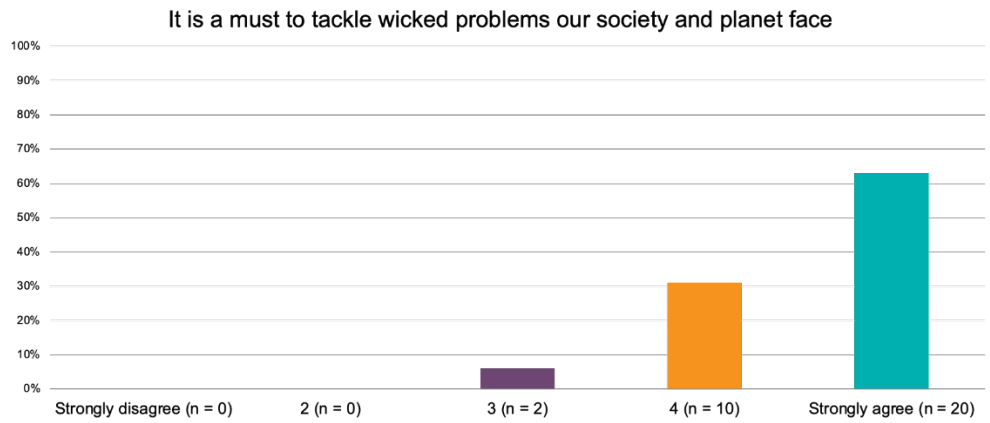

Figure 2

On the levels of faculty/department, university, and academic sector, however, the results show a more complex picture. For instance, more than half (63%) are either uncertain or disagree that interdisciplinarity is a must to get funding, and very few (16%) believe that interdisciplinary research helps them to get employed or promoted (Figure 3). Likewise, very few (15%) feel doing interdisciplinary research makes them recognized or respected at the institutional level.

Looking into the potential hinderances behind people's hesitation towards interdisciplinarity, it is apparent that relevant skills or resources to gain relevant skills are not a big problem (75%), while the need to gain those skills still exist. Neither is the ownership of data or idea a big concern for most of the respondents, though 19% agreed that giving without getting back could be a risk.

Answers were ambiguous when it comes to evaluating how much is it worth to spend time on interdisciplinary research (fig.4) and the pattern shown here correlates to the respondents' perceptions on how interdisciplinary research is valued in recruiting and promoting processes (fig.3). Here one can suggest that institutional structures demonstrating clearer recognition of interdisciplinary research in employment and promotion procedures would move the rating towards more positive end. Two other questions that relate to individual perceptions on how interdisciplinary research contributes to their personal academic career, in terms of productivity in publishing and creating a certain research profile, have received mixed response. More than half (71%) of the respondents do not think interdisciplinary research reduces their productivity, while slightly less (68%) is certain that their research profile can maintain focused when doing interdisciplinary research. But both answers indicate that while there is a worry that research productivity and focus can become distracted by interdisciplinary research, individual researchers' experiences here are supporting a more positive effect of IDR on their personal academic career. Putting this indication in relation to figure 3 and 4, we may think that institutional structure support can take form in giving more weight in employment and promotion processes to researchers' publications that resulted from interdisciplinary collaborations.

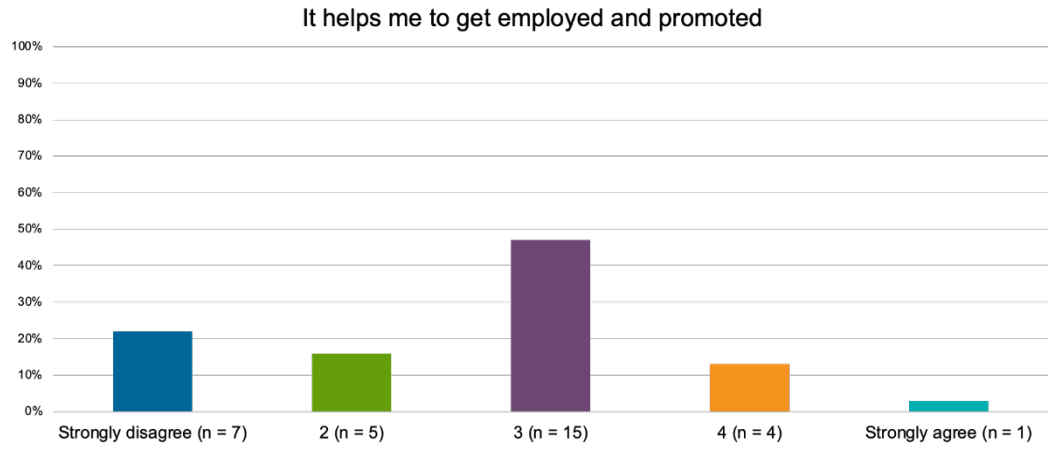

Figure 3

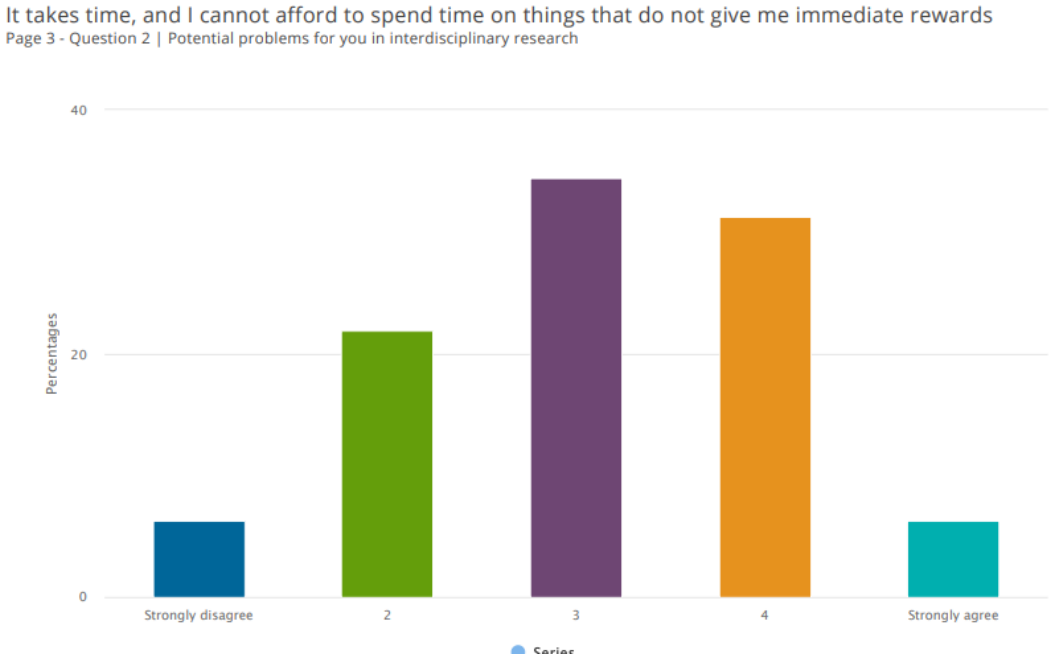

Figure 4

Yet still, we need to highlight the answers that expressed strong views on potential hinder of IDR. For instance, there is 32% responded “strongly agree or agree” that interdisciplinary research makes their research profile less focused, and it is a potential problem. 38% of respondents expressed “strongly agree or agree” that the leadership at their institutes does not show concrete support for IDR (Fig. 5), and 29% experiences lower productivity prevents them from doing more IDR. These views mean that the perceived negative impacts of IDR are tangible in individual researchers’ consideration. Institutional structures can therefore work with such negative impacts purposefully.

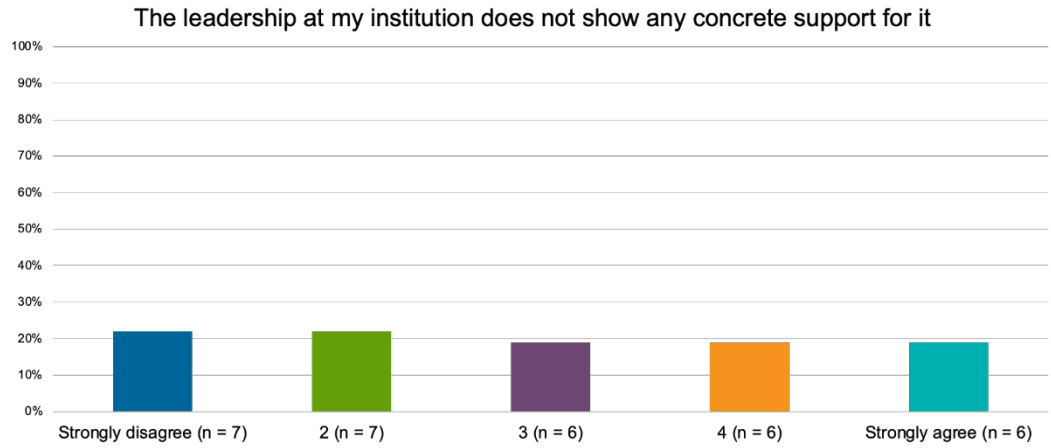

Figure 5

We also asked for any comments in a free text box, and these also reflected the perception that interdisciplinary research is important and rewarding but this is not necessarily reflected in career impacts.

When presenting these survey results at an IDA seminar in September 2024 some interesting points were raised in the discussion that are worth noting here, although we cannot answer them all in this report.

- How can individual IDR efforts be integrated into the system?
- How can lessons learning in them be disseminated?
- Time, funding, and the perceived value of IDR in career progression were mentioned as key obstacles for developing IDR at SLU.
- Should PhD education include more interdisciplinary courses?
- Should documented experience of IDR be a condition for employment for some/more positions?

Discussion and concluding recommendations

Our results show that despite the support shown, challenges remain for interdisciplinary research at SLU, and several institutional factors that support or limit the potential for interdisciplinarity are identified and suggestions are made to improve the conditions.

While the survey results must be interpreted with caution due to a small sample size, there seem to be doubts among individual researchers that the current SLU institutional condition provide secure employment conditions for trying out interdisciplinary research. Respondents were concerned that methods of measuring, evaluating and meriting research outputs may not sufficiently value IDR when it comes to career progression. Given the express focus on IDR at SLU and in many recent funding calls both in Sweden and internationally, it is open to question whether these fears are grounded in current conditions or reflective of the earlier low recognition given to IDR. Perception may become reality if researchers are hesitant to commit to IDR projects, or these attitudes may simply reflect a lag in the current focus on IDR in calls filtering into the wider research community.

We identified several SLU initiatives (most obviously the Futures Platforms and IDA) which clearly demonstrate SLU's commitment to promoting and developing IDR. Alongside the practical aspects of these initiatives such as support for IDR though funding, their high profile sends an important message to SLUs research communities that IDR is valued and worth pursuing. Nevertheless, the persistence of career concerns around IDR indicate that more could be done here.

We find that efforts that come from both within and beyond traditional structures can be important indicators to evaluate whether current university structures are supportive of IDR. It is thus worth taking these indicators as future development focus:

- Within the traditional department-based structures:
  - Funding internal seed grants for research that cuts across units or faculties
  - Modifying human resource policies and guidelines concerning recruitment or promotion and tenure – interdisciplinary research should be something desired or required in job applications, asked about in job interviews
  - IDR needs to be visible and valued at institutions on a daily basis
  - Social norms about interdisciplinary research must change, from something that is often seen as interesting but likely a career hinder to something desirable or even almost obligatory

    - Minimise the gap between rhetoric and reality – interdisciplinarity is perhaps proclaimed more than it is done
    - Support from leadership at all levels – IDR valued in career development talks, salary talks and actual outcomes.

- Beyond the department-based structures:
    - Allocating physical space for interdisciplinary collaboration
    - Creating other 'functional units' to support interdisciplinary teams
    - Creating new interdisciplinary structures such as interdisciplinary departments or research centres
    - Modifying existing structures to make them interdisciplinary (adding new sections to an existing department to broaden its competencies for example)
    - A formal or informal system at SLU (technically and culturally) for finding competence and skills from other disciplines by researchers who are willing to collaborate.
    - Greater role in education – both teachers and students gain here
    - Consider what kind of interdisciplinary collaboration is being supported– both short term projects and long-term development solutions are needed.

Many of these measures are currently being applied to some degree, while others are more challenging. Particularly modifying existing structures such as departmental boundaries would be difficult, although we note that some existing departments are inherently more interdisciplinary than others as a result of earlier mergers or changes (one example being the Department of Aquatic Sciences and Assessment).

This report has a limited scope and should be seen as a pilot study indicating areas to focus more deeply on in future. In this context we would also encourage specifically considering other perspectives in future studies – what are the structural factors influencing the possibilities for successful engagement in IDR at different career stages, for different genders, and for those coming from various disciplines, as one size fits all solutions may not be appropriate.

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Appendix - survey results

Fore detailed survey questions and results, see Figshare:
https://doi.org/10.6084/m9.figshare.28750163.v1