

Panel report Uppsala University's work on research infrastructures.

Introductory remarks

In the document Uppsala University: mission, goals and strategies, 12 December 2019, the university (UU) aspires to strengthen its position as a world-leading university. UU is characterized by a breadth of disciplines and a decentralized decision-making organization. It is a research-oriented higher education institution, where research and third cycle (doctoral) education account for more than 70 % of the balance-sheet. Six developmental goals are formulated for education and research at UU and 5 strategic priorities are outlined. One of these concern Infrastructures in education and research. It is indicated that strategy work and processes in research infrastructure (RI) will be strengthened and that more use will be made of existing RIs.

The self-evaluation reports were well prepared through strong participatory involvement of relevant stakeholders. The format of the reports followed a clear structure, and the Panel found the reports clear in the presentation of the current situation of RI operations, honest in the reflection of the status of the RIs and engaged in considering the future needs and developments.

During the visit to UU on 21.10.-23.10.2024, the Panel heard presentations by the leadership and the management, the directors of RIs, the heads of disciplinary domains (DDs), and the heads of the departments in 9 scheduled occasions and had a chance to interview the participating persons on RI matters. Upon its request, the Panel also had a chance to discuss RIs with selected members from the user community over lunch. The Panel had ample opportunity to reflect on the findings, and in a final session, on the last day of the visit, provided initial feedback to the UU management and the Q&R24 project group.

Altogether, the evaluation material and the discussions with the various groups were very useful, and the self-reflections were honest and thought-provoking. The Q&R24 project group has provided excellent assistance throughout the Panel's evaluation process.

Disciplinary Domain-specific comments

The **DD Board of Humanities and Social Sciences** (HUMSAM) instructed The DD's RI Commission (Commission) to prepare a proposal for the DD's self-evaluation of RIs.

The Commission prepared the self-evaluation report and completed it during a workshop with the deans from HUMSAM's six faculties. HUMSAM finalized the report on June 5, 2024.

The self-evaluation report is well-written and informative. HUMSAM is well-organized and clearly understands the current status of its RIs, as well as a vision for the future aimed at strengthening and continuing to develop their RIs.

The self-evaluation report submitted by the **DD of Medicine and Pharmacy** (MEDFARM) is well-written and provides a thorough overview of the organization and processes involved in managing RI issues. The Panel's impression is that the report offers an honest and transparent assessment of the domain's efforts related to RI. The report was prepared by a team led by the Vice-Dean for RI, reviewed by the RI Committee, and ultimately approved by the Executive Committee of the DD of Medicine and Pharmacy.

The **DD of Science and Technology** (TEKNAT) provided a self-evaluation report as was written by a working group for infrastructure and iterated with various members of the Faculty Board, where it was given its final approval. The Panel viewed this report as honest and to the point.

However, the Panels notes that the TEKNAT faculty has initiated the development of the RI vision and strategy, that will become available as a draft toward the end of 2024. According to expectations, this strategic vision should include a categorisation of current use and activities of RIs at the faculty into a portfolio that will be the foundation for future strategic choices. It will also contain a clear and transparent process for faculty co-funding together with a circular bi-annual plan for the review of the domain commitments. Although this strategy report will be important for the future discussion and choices at the faculty, the complete draft was not yet available for the Panel at the time of its review but it is essentially what was described in the self-evaluation under "Future visions and tentative action plan".

Observations and analysis

1. Strategies, policies and regulations for research infrastructures (RI)

Uppsala University overall

The report by the UU management was well done and each section also included questions posed to the Panel, which are tackled in the Panel report. Moreover, a comprehensive set of background material was provided including, e.g., documents on UU in brief, Missions and goals of UU, the Swedish research context, and Beginner's guide to Swedish Academia. With respect to future perspectives (section 12), the management awaits the results from the evaluation.

RIs are recognized as essential for cutting-edge research for UU to continue to be a highly ranked university. This is evident by the strong, albeit complex arrangements regarding RIs at all levels. In the last 5 years progress has been made such as the establishment of a decision-making process extending from a needs inventory and onwards. However, the reflection notes a lack of guidance of a university-wide strategy beyond general statements in the university's strategy document.

The RI Board has suggested a university-wide definition intended to lead to a better understanding of the hallmarks of an RI. However, there still is a **lack of common understanding of RI** that complicates decision-making on prioritisation

and funding. The list of RIs provided for the evaluation appeared to contain some items that would not fit a university-level RI definition and probably it also lacks some that should be included in the list. This pertains especially to the local RIs. This is not an issue unique to UU. Moreover, there is a need to discuss the process of financing the 50% of national RIs, including the life cycle of national RIs and the possible transition to regional or local RI if and when the techniques mature or are changed. Such clarifications should include the culture and heritage infrastructures.

Panel proposal: A shared definition of RI and unified mapping of the RIs across the entire university would be useful for further strategy work, including prioritisation and funding, and building visibility locally, nationally and internationally.

Disciplinary Domain of Humanities and Social Sciences

At the UU-level there is not yet a common definition of what constitutes an RI, and the university adopted the EU definition for the Q&R24 evaluation. Thus a shared understanding is lacking. The panel recognizes that fruitful discussions will take place in the RI board following the evaluation. In conjunction with the university-level, a common and shared understanding of what constitutes a local, national, and international RI must be high on the agenda for also HUMSAM and the Commission. This is necessary regarding what grants can be applied for, the financing of RIs, and the visibility and presentation of RIs on the UU web.

Disciplinary Domain of Medicine and Pharmacy

MEDFARM is well-organized in managing strategies, policies, and regulations for RIs. In 2020, MEDFARM launched a major project to align UU's strategies with the Domain's strategy, guided by an overarching vision for RIs: "Everyone working within the Disciplinary Domain has knowledge of and access to high-quality platforms, local and national research infrastructures." While this ambitious goal has not yet been fully achieved, it is clear that MEDFARM's leadership is strongly focused on advancing RIs for the benefit of its staff. For example, they have established a Vice-Dean for RI and have a well-organized RI Committee (FISK). Together with the University RI Board, this is seen as an effective platform for aligning MEDFARM's initiatives with the university's strategies as well as a forum for discussion and prioritization of cross-domain infrastructures, an issue that seems to be a challenge across the university.

Disciplinary Domain of Science and Technology

Science and Technology has long-standing enterprises. As such, UU has built a strong international reputation on visible and high-priority international projects. A good example is the high visibility of UU at CERN.

It often takes years, and sometimes decades, to fully exploit their scientific potential. In the past the strategy to join a RI has been relatively straightforward. Most of the RIs are handled at the DD level with a relatively modest support from the University level.

However, one of the future challenges of the DD is to establish a sustainable portfolio, together with a clear plan for managing existing RIs as well as to fulfil

future needs for new initiatives. This requires strategic considerations, and the Panel is very pleased to see that TEKNAT is developing the RI vision (2025-2029), which will be based on long-term commitments that fit in the portfolio.

2. Organisation and division of responsibilities for RIs

Uppsala University overall

The Panel noted the **complexity and fragmentation of UU's organization** and structure. The UU emphasizes its collegial manner of operation, which is highly appreciated by the community. This extends to the collegial way of operation of the DDs with their independent and often different ways of operations. This affects strongly policies and practices throughout the university, which are highly variable and individualistic, even to the extent that similar committees have different names in the different DDs. However, this may be a barrier for introducing change and building a university-wide vision and profile in RI.

Several recent **positive developments** have been installed or are in the planning:

- The RI Board is a new operation but already seen as needed to coordinate RI at the university level.
- A new Unit for research and collaboration will be established in January 2025; this will gather fragmented operations now scattered in the university. It will improve the visibility of the services and create synergies.
- Discussions are ongoing on various items (RI definition, fees, career track).

Operation of the RI Board is still new, so maturity of operation is not yet reached. However, uniformly the feedback was that the RI Board is needed and appreciated

The roles and the mandate of the RI Board are outlined but its effectiveness is not very clear beyond coordinating the VR-RFI needs inventory and applications. The Panel suggests that:

- Given the great responsibility of the RI Board it should be tightly connected to the university leadership, preferably chaired by one from the senior management positions with a strong university-level mandate; this could entail establishing a **new Pro-Vice-Chancellor's position with responsibilities in RIs and research more broadly**.
- The RI developments, both university-wide and at DDs, would benefit from a stronger role of the RI Board to develop and implement UU-level processes, rules and instructions.
- There should be a better anchoring of the RI Board towards the DDs and to the Vice-Chancellor with an aim to secure the flow of information from the RI Board to DDs and vice versa and to the highest leadership.
- There is a need to clarify what needs to be decided at UU-level, as there are many interests that are similar at all three DDs.
- The RI Board should include a member from the new Unit for Research and Collaboration. Moreover, the RI Board could benefit from an external member representing relevant stakeholders.

Disciplinary Domain of Humanities and Social Sciences

The DD of Humanities and Social Sciences (HUMSAM) is organized into six faculties and 32 departments. The faculties are of different sizes and are led by a DD Board. Each faculty has its own Faculty Board.

In 2022, the DD Board established the RI Commission (Commission) to process applications and prioritize calls for national infrastructures, propose financing, promote dissemination of information and competence building, monitor strategically important issues, and give expert advice. The Commission has five members, a Chair, three members from the faculties, and one student representative. The Chair of the Commission is also a member of the UU RI Board.

The Panel considers the organization well-functioning and has clear and transparent processes regarding applications for national infrastructures.

Proposals for new local and national infrastructures are based on a bottom-up collegial form, which the Panel respects.

Disciplinary Domain of Medicine and Pharmacy

MEDFARM has an effective and well-established organizational structure for managing various aspects of RIs. Strong institutional linkages across departments and organizational levels ensure the effective, secure, and sustainable development of RIs in both the short and long term perspectives.

The RI Board (FISK) serves as an advisory and preparatory body for MEDFARM's activities related to local and national RIs, led by the Vice-Dean for RI. Final decisions concerning local RIs are made by the DD Board at MEDFARM, chaired by the Vice-Rector. As detailed in the self-evaluation report, FISK has clearly defined responsibilities, including a comprehensive review of domain-funded regional infrastructures and an assessment of requirements for new regional RIs every three years. Importantly, FISK is also equipped to address emerging research needs or opportunities between these three-year cycles. Before the start-up of each three-years cycle, FISK discusses its routines and adjusts accordingly. This dynamic approach is acknowledged and supportive for the broad acceptance of the internal evaluation process.

Overall, FISK is a well-established, highly regarded and widely accepted collegial body for managing domain-specific RI. It demonstrates significant adaptability, with the ability to propose funding for both established and new RIs, as well as to recommend the decommissioning of existing ones. MEDFARM allocates substantial funding for RI, with FISK receiving 28.6 MSEK in 2024.

In addition, FISK is involved in preparing proposals for national infrastructures through a transparent and well-organized evaluation process. MEDFARM participates in several key research infrastructures, including SciLifeLab, it runs the Centre for In Vivo at Uppsala University (CFVUU), and manages jointly with Region Uppsala various clinical RIs, such as the Uppsala Clinical Research Center (UCR) and Uppsala Biobank (UBb).

Departments host the majority of RIs, employing the necessary infrastructure staff. This departmental responsibility is maintained throughout the infrastructure's lifecycle. However, during decommissioning, departments must independently manage the closure process, which can present both financial and practical challenges and even willingness to take responsibility for new RIs as mentioned in some of the interviews.

While MEDFARM has a robust internal structure and clear division of responsibilities for local and national RI management, there is a lack of a similarly well-defined framework for addressing cross-domain infrastructure issues, e.g. joint operations, different practices and user fees.

Disciplinary Domain of Science and Technology

The DD of Science and Technology consists of one Faculty with six sections, consisting of in total 13 departments containing 67 research programs. This implies that the DD Board and the Faculty Board are identical. The Faculty is well organised with separate advisory committees for education, research and collaboration. In addition, it contains an education board, science and technology support offices and various other boards and committees.

TEKNAT participates in close to 30 large international projects like ITER, ESS and IceCube. Further, three SRC national research infrastructures are hosted by Teknat, Tandem, SuperADAM and NBIS, as well as 16 where TEKNAT participates, like MaxIV and Myfab.

A number of these are (internally) supported by the FREIA laboratory and Ångström Workshop - for building instrumentation and accelerators. These programs form the backbone of the RI activities and are indispensable for construction and maintenance.

The Panel notes that the contributions to international RIs, with memberships in large international collaborations, are performed within the boundaries of UU. Typically, these are in the domain of particle physics at CERN or in astroparticle physics at IceCube, although other examples may exist as well.

Panel proposal: In the context of major international RI activities, it will be beneficial to team-up with partner Universities in Sweden to develop and coordinate a Swedish national-wide program. Within such a national program, responsibilities can be better shared and will increase the impact and visibility of Sweden. The installation of such national-wide programs is delicate and requires cooperation, with bottom-up and top-down coordination.

3. Support for managerial/strategic work on RIs

Uppsala University overall

The various groups that were interviewed by the Panel were happy with the administrative support that the RIs are receiving. The restructuring of the university-wide research support services is likely to further improve the services in terms of better availability and equal treatment of the different RI activities. HR policies and procedures regarding RI staff, procurement and strategic-level funding of RIs, harmonizing web pages and reach out for external users could all benefit

from coordinated central support. Moreover, a recognition of RIs that full-fill the criteria for university-level RIs will allow assessment of needs for support in an equal manner for all RIs.

Disciplinary Domain of Humanities and Social Sciences

The Centre for Digital Humanities and Social Sciences (CDHU) provides RIs and researchers with technical support, data management issues, and digital skills. Furthermore, CDHU serves as an interface to UU's Research Data Support, the university library, and UPPMAX. The staff consists of five persons in administration plus 7-8 engineers. Besides its technical role, CDHU is also supporting national RIs, such as Swedigarch and InfraVis. CDHU has a vital role at HUMSAM for capacity building and technical services, but financing after 2025 still needs to be solved. CDHU has grown organically as "need appears."

Panel proposal: Given the critical role played by CDHU at HUMSAM, long-term financing must be high on the agenda. The Panel also suggests establishing a formal mandate and a clear managerial structure for CDHU. Furthermore, CDHU has taken a central position in working and interfacing with UPPMAX but needs a formal assignment. HUMSAM should also address this.

Overall, there is a need for further clarification concerning the roles played by the different RI support- and strategic bodies. The Panel recognizes the diversity of infrastructures at HUMSAM. However, this also calls for strategic work recognizing the various needs for local (or embryonic), national, and international infrastructures. It regards financing, support, and training throughout RIs life cycles.

Disciplinary Domain of Medicine and Pharmacy

The Vice-Dean of RI and FISK are administratively supported by the Research Support Unit within the Office of Medicine and Pharmacy, playing a vital role in the effective organization of research infrastructure. During the interview sessions, there was a clear appreciation for the quality of support provided. It was noted that MEDFARM is focused on fully implementing the iLab system, which will serve as a critical IT support tool. This system will facilitate practical tasks, such as order confirmations and billing, and support documentation related to usage and user identities and other key statistics - essential as background material for planning and strategic initiatives concerning RIs.

Disciplinary Domain of Science and Technology

The Panel has the impression that there is good mutual understanding between the DD and the overall UU activities. Adequate RI support is provided (or being installed) at the central level, that includes topics like Open Data, security and safety issues. HPS computing issues are being addressed and were put forward to the Panel with the trust that these are adequately considered.

From the National point of view UU is a strong brand and can be considered as the best in many areas of Science and Technology. The panel is impressed by the quality and diversity of activities in the DD, where UU takes a position it should cherish. However, at the international level, with large institutes in for example France or Germany, the situation is different. At that level it is difficult for a single university to stand out as international partner.

A good strategy for a number of RI activities in the DD will be the set-up of collaborations between universities at the Swedish National Level. There is a clear wish and need from the DD to start these national collaborations. Support from the central level is indispensable for this route, as a number of strategic choices together with practicalities need to be addressed. Not only does the central management of UU need to support these initiatives and actively approach university partners, also solutions at a more practical level have to be found. For example, the overhead costs for the running of RI's is calculated with different algorithms at the various universities in Sweden. This potentially hampers a smooth set-up for collaboration.

The Panel supports the initiatives toward the formation of national programs.

4. Adequate management processes of RIs

Uppsala University overall

The RI **prioritization processes** for national and international RIs appear to be well in place. However, assessing the needs across the DDs is considered challenging as well as deciding on funding of existing RIs and new needs. Much of the long-term RI funding appears dependent on the 50% funding from SRC, where external evaluation of applications is used in the decision-making process. Thus, concerns exist at university level on prioritisation locally and at the national level as they do not always match.

RIs have a **life cycle** extending from planning to operation and finally decommissioning. Most national and international level RIs are scheduled for long-term operation. This is the case also for several of the local operations. Flexibility is needed to be able to accommodate new RI needs and to fill gaps in RI services. Careful assessment of the proposals should take into account the possibilities of merging new needs with existing operations as well as avoid overlaps. **Decommissioning** is often part of updating an RI, and in some cases repurposing an RI, rather than closing the operation of the RI.

The Panel proposes that when assessing RI proposals, either existing ones or new proposals, that they could be categorized into groups of short-term needs (next 5 years), medium long-term needs (e.g. for the next 10-20 years) and very long-term needs (beyond the next 20 years). Such grouping could help in planning division of funding during the RI's life cycle between SRC, at the moment set to 50/50 for funded national RIs, the university and the DD. In those cases that decommissioning does take place, the costs related to such an operation should be considered and shared between the university-level and the DD level.

Disciplinary Domain of Humanities and Social Sciences

Establishing new national and international RIs is a collegial bottom-up process at the DD. The process is well-structured and transparent up to the point when applications are submitted to the SRC. Local infrastructures are also established through a bottom-up process, often due to funded research projects. This makes strategic planning of financing through their life cycles.

The Panel suggests that data managing plans (DMPs) may be necessary to recognize embryonic RIs and facilitate strategic planning and future financial needs.

Disciplinary Domain of Medicine and Pharmacy

As outlined under "Organization and Division of Responsibilities for RIs," MEDFARM has well-functioning processes, managed through FISK, for handling local research infrastructures. FISK also plays an instrumental role in the evaluation process for national research infrastructure by ranking MEDFARM's priorities. After approval by the Vice-Rector, these rankings are submitted to the RI Board and finalized by the Vice-Chancellor. Overall, the transparent management processes are regarded as adequate, respecting UU's strong collegial structure and based on a bottom-up approach initiated by the departments, which propose both new and ongoing research infrastructures. However, it is a competitive process as only approximately 20% of the highest score in the final evaluation are accepted.

Although the processes for managing domain-funded infrastructures are generally effective, a challenge remains with the prioritization process for applications to the SRC, which is viewed as overly labor-intensive. It is unclear whether adjusting internal processes could alleviate this issue.

Disciplinary Domain of Science and Technology

The life-cycle of the RIs and international memberships typically involves many years and surpasses often the timelines of the funding scheme of the SRC. After the period of hardware construction and installation, the era of exploitation at the RI deserves continuous and equal attention. Often this phase of the project is less visible and attracts less funding and the RI cannot be adequately exploited. Involvement of RIs with "very long-term needs" requires careful considerations to step-in, and stable funding for the many years of exploitation.

The Panel advises the DD to report cases where long-term funding is critical in a transparent way to the RI board with the aim to create awareness at the SRC, ideally with partner universities in Sweden.

5. Funding of RIs

Uppsala University overall

Needs for increasing the level of RI funding are evident. This includes diversification of RI needs as new fields are requiring RI support, especially in the Humanities and Social Sciences, and across the board needs for data handling and high-performance computing are strongly increasing. RIs are typically funded through several sources, and external competitive funding should be a mark of a successful operation. The need to more efficiently engage in international RIs and secure funding from the EU was identified as a clear goal for the future. User fees provide income for the RIs and the willingness to pay for the services can be considered as a sign of the quality of the services.

The Panel suggests that UU's own funding level for RIs should be assessed against the increased needs to fund RIs. The data and cyberinfrastructures should be developed further for all fields and in close connection with the national services. Moreover, the needs of new fields requiring RI should be recognized. Those RIs that

carry out long-term RI services should be recognized and targeted for long-term financial support. User fees should be developed as a source of funding across the board. The level should be carefully considered so that it will not deter users from the RIs. Altogether, the Panel suggests that the leadership, enforced by a new Pro-Vice Chancellor with research and RI responsibilities, and the RI Board should have a stronger role in university-level RI policies, prioritisation and funding.

Disciplinary Domain of Humanities and Social Sciences

Local RIs at HUMSAM are typically funded by external funders but faculties and departments also contribute. However, there are large variations in how this is done. Funding and co-funding are usually handled at the faculty or department level. However, national and international funding models are required to be characterized by continuity.

The Commission has an annual budget of 1 000,000 SEK since 2025 to fund RI development. The grant can be for two years. In 2024 twelve applications were received, and five applications received funding of 100,000 SEK each. The applications were heterogeneous with a mix of seed funding, bridge funding, and equipment support.

HUMSAM, the Vice-Chancellor and the Faculty of Arts contributed 7.5 MKR to the CDHU annually until 2025.

The Panel recognizes that HUMSAM needs more resources to fund infrastructures at the domain level, such as seed money or funding for bridging between periods of mainly external funding. Given the limited resources, the Panel finds seed money as an excellent strategy for nurturing local and embryonic infrastructures. The Panel suggests that HUMSAM explores if the amount could be increased. Seed money could also be used strategically, as indicated by the Commission, instead of being based only on applications.

As with MEDFARM, the same concern regards the difficulty in obtaining funding when a RI transitions from a local to a national RI. Secured support and financing from either HUMSAM or the university is essential.

The landscape for research in the humanities and social sciences is changing rapidly. The need for computational power (HPC), the use of statistical AI models, for instance, large models in natural language processing (NLP), and mass storage are growing exponentially. *In the Panel's opinion, the small amounts of available funding at HUMSAM for such investments are not viable and must be strategically planned and invested by UU.*

User fees as part of financing is currently less viable. HUMSAM infrastructures compile the information into databases, others establish open repositories for decentralized data infrastructures, while some enhance knowledge about digital research tools, digitalization, and data management. In the new landscape of Open Science, user fees for such infrastructures may be difficult, even though it is not incomprehensible.

The Panel proposes that researchers should include the use of RIs as a part of their grants. In that way, more secure and long-term financing of HUMSAM RIs and support functions such as CDHU can be achieved.

Disciplinary Domain of Medicine and Pharmacy

For 2024, MEDFARM has allocated approximately 95.2 MSEK for infrastructure funding, with 28.6 MSEK directed toward RI prioritized by FISK. National RIs co-funded by the SRC will receive 6.8 MSEK, while 7.7 MSEK is allocated to SciLifeLab Uppsala. A significant portion of the total infrastructure funding - 52.1 MSEK - supports CFVUU. This substantial allocation at the domain level highlights the high priority and importance of RIs, deemed essential for conducting competitive research in fields related to medicine and pharmacy. This funding emphasis at the domain level also enables strategic decision-making by the DD Board, facilitating the ongoing development of a top-tier, state-of-the-art infrastructure portfolio. However, some concern has been raised about processes to secure follow-up on funding and a lack of mechanisms for following up on FISK's recommendations.

MEDFARM has implemented a user fee system that covers approximately 50% of the costs for academic users, while industrial users pay the full cost. *The Panel fully supports this fee model, considering it crucial for maintaining current research infrastructure funding and as an indirect indicator of both demand for and quality of services provided to the research community. However, differing perspectives on the application and extent of user fees across the three domains create challenges for cross-domain funding of RIs. Therefore, establishing a shared understanding between domains is seen as essential for the future development and broader visibility of university-wide research infrastructures.*

Although this may fall outside the mandate of MEDFARM at UU, several interviews highlighted the challenge of securing short-term funding—typically in four-year cycles—for long-term RIs. Another issue raised was the difficulty in obtaining funding when a RI transitions from a smaller local initiative to a national RI. *The Panel notes that dedicated support from either the DD or the university might be essential to help prevent this “near-death experience.”*

Disciplinary Domain of Science and Technology

In 2024 TEKNAT allocated around 80 MSEK for RIs. This includes around 37 MSEK to RIs with the faculty and 20 MSEK for local RIs like UPPMAX, AddLife and WISEest.

Especially the long-term funding for exploitation causes a problem at the moment. The SRC only typically funds 50%, where earlier on KAW took a larger role. The support from the Vice-Chancellor is limited for the individual initiatives at the Department level. This implies that further prioritization of RI's and memberships in the DD will be needed. The planned strategic vision will have to reflect on the limited resources and make necessary choices.

The Panel also noted that the funding schemes of the SRC do not match the long-term challenges of many of the infrastructures at the DD of Science and Technology. These typically need support for a longer period than the four years (which is now effectively the horizon of the SRC programs). The DD and in some cases the UU need to step in to bridge the gaps in the case that a funding of a long-term RI's shows a gap. Strategic considerations at the DD are crucial for this

continuous support. The RI Board should be well aware of the considerations that will be made in the (planned) Strategic Vision and support the choices that will be made there.

For joint RI activities that involve parties outside the DD, i.e. national and/or international partners, the support from the UU is indispensable. The RI Board provides the platform where this discussion will have to take place.

Panel suggestion: A close connection between the RI Board and the DD will be needed to position the UU in this landscape of RIs, which is based on collaboration at national level.

6. Collaboration and coordination with regard to RIs

Uppsala University overall

Collaborations at the university level and between disciplines take place as well as with other universities and societal actors nationally and internationally. Reflecting its comprehensive disciplinary spectrum, UU has an extensive spread of RIs, especially in Natural and Technological Sciences and in Life Sciences. UU's RI Board acts as a university-level coordinator but planning and funding of RIs occur largely at the level of the DDs. This leads to overlapping activities and gaps, and lack of clear university-level prioritisation. Altogether, the RI activities appear to take place in silos formed by the DDs.

The Panel suggests that UU develops the RI Board towards a more strategic and unifying role. This includes identifying shared needs locally, building visibility, strengthening the national and international roles, and expanding the funding base of the RIs. The Board should also monitor the use of university-level and national and international RIs. Strategies targeting external users should be strengthened, including those from start-up and larger companies.

Disciplinary Domain of Humanities and Social Sciences

The DD hosts or participates in several national RIs where collaboration between areas occurs. These infrastructures, funded by the SRC are coordinated through their established consortia. Local infrastructures and their present and future users would also benefit from better coordination and sharing of experiences.

RIs, especially those requiring HPC resources, are rapidly becoming more critical at HUMSAM. However, experience working with such resources varies widely. As already noted by the DD, organizing workshops, spreading good examples, and supporting less experienced users is a vital investment for UU. *The Panel recommends such a continued strategy.*

Disciplinary Domain of Medicine and Pharmacy

Due to the increased cost and complexity of RIs, there is a growing trend toward both local and expanded national and international collaboration, as a larger user base enhances conditions for long-term sustainability. MEDFARM recognizes significant potential for new national and international partnerships but currently relies on bottom-up, user-driven initiatives. This approach aligns with the collegial structure of UU and is entirely acceptable. *The Panel finds, however, that a clear*

strategic direction and support from the DD Board could further facilitate this development.

Within UU, internal collaborations - both within and beyond MEDFARM - are effective, with particularly well-established partnerships with the University Hospital. However, collaboration with TEKNAT is less developed, in part due to differing perspectives on user fees.

Collaboration with industry and other external institutions regarding the use of RIs varies by facility. For example, the experimental PET facility hosts numerous external users, the UU-led national SIMPLER epidemiological data infrastructure and the Biobank Sweden have users from all major universities, and the Uppsala Clinical Research Center is engaged in many clinical trials. In contrast, other RIs are mainly used by internal researchers.

The Panel suggests that increasing the focus on external users could enhance both the sustainability and visibility of these infrastructures, benefiting both MEDFARM and the industry.

Disciplinary Domain of Science and Technology

For a number of RIs in TEKNAT, collaboration is crucial at three levels: within the UU, on the national level and on the international level. The realisation of these should form the heart of the Strategic Vision that the DD will enrol.

First, it is sine-qua-non that the RIs of the DD are supported by the DD itself. This requires collaboration between various research programs, where needed. In some cases this also means the collaboration with the DD of MEDFARM (e.g. for SciLifeLab) must be fluent.

Secondly, collaboration at the national level will position Sweden stronger. The UU is in the position to initiate collaborations with other Universities in Sweden. Such a national platform is needed for a strong position of UU and other universities in Sweden in the international arena for these high-profile RI's (some of them located in Sweden itself). Setting-up these national collaborations require attention both bottom-up and top-down. The Nikhef partnership may be an inspirational model for these national collaborations.

Thirdly, for a number of international high-profile RIs, the UU (or more broadly Sweden) is a welcome and visible player with excellent reputation. These are RIs both in Sweden (e.g. MAXIV and ESS) and outside Sweden e.g. CERN. These initiatives require continuous attention and good project management with all international partners. Typically, long-term funding, as was mentioned already in the previous paragraph, remains a challenge.

7. Professionalisation and recognition of staff at RIs

Uppsala University overall

Complex RIs require highly skilled personnel that have the competence and motivation to develop the services at par with international development, thus serving the academic community in its needs for high-level research.

It is evident that UU lacks a clear career path for specialist staff who do not simultaneously hold an academic position. The negative consequences of this are clear, including the risk of losing the most qualified and essential specialists—an issue raised by several groups during interviews.

The Panel points to promising examples from other Swedish universities, such as Karolinska Institute and Umeå University, where career paths are implemented and could provide possibilities for UU.

The Panel suggests that the RI staff is better recognized in terms of their special expertise and that career paths are built with possibilities for advancing in their positions. The staff should be entitled to develop their skills through training opportunities, and services that require planning of experiments, interpretations of results etc. should be acknowledged as co-authorships.

Disciplinary Domain of Humanities and Social Sciences

HUMSAM, as well as UU as a whole, needs clear career paths for technical- and administrative personnel with an academic position. HUMSAM should develop processes that give full recognition to specialists and the scientific leadership of RIs. HUMSAM underlines the necessity of forming a national initiative to work out a system for merit evaluation.

Disciplinary Domain of Medicine and Pharmacy

Although the lack of a clear career path is not unique to MEDFARM, the domain faces a particular challenge, as many of these specialists are highly attractive to the pharmaceutical and biotech industries.

Disciplinary Domain of Science and Technology

TEKNAT faces similar issues for the career paths as those in MEDFARM. For example, the (engineer) specialists in the Ångström Workshop are also highly attractive to industries outside the UU. Although the academic environment brings benefits to this group of specialists, the Panel also suggest for this DD further attention for career paths for these specialists.

8. Use and accessibility of RI

Uppsala University overall

Many of the UU's RIs are presented at the web pages, albeit in a non-systematic manner. Clear descriptions, access information and prize for use should be available in a coherent manner. The interviews revealed that even the internal community is not fully aware of the RI possibilities present at UU. For external users, e.g. from industry, access information combined with help on how to plan experiments would be highly valuable.

The Panel suggests that the RI services are presented in a coherent and unified manner on the web. The structure should not reflect disciplinary silos but rather organised according to types of RI activities. Contact information should be made clearer and more open.

Disciplinary Domain of Humanities and Social Sciences

The visibility of HUMSAM for effective and increased use of its RIs is essential. However, many researchers still need to be made aware of which RIs exist. Also, methodological and data skills need to be improved, affecting a wider use of the infrastructures.

Seminars, or webinars, which researchers and students can attend, should be organized regularly. Besides information on available RIs, having researchers present their use of the infrastructure is an excellent way to go. HUMSAM should explore the possibility of presenting RIs as part of the regular curriculum at the master, and graduate levels.

The visibility of RIs is also linked to the definition of infrastructures at UU and how they are presented on the web. For HUMSAM, Clarin-ERIC is presented as an international infrastructure. As national RIs, Alvin, ArchLab, DEMISCORE, HumInfra, the National Language Bank, and Swedigarch. As local RIs: Gender and Work, Scandinavian Runic-text Database, and Uppsala Child and Baby Lab.

It became clear from the interview with the directors of RIs that many more RIs are hosted by HUMSAM or at the university-level but are invisible on the web. UU's Culture and Heritage was presented to the Panel as a UU-wide infrastructure that is not recognized by UU as such an entity on the web. This is an example of a still-needed communication for a common understanding of definitions that must be addressed.

The Panel indicates that UU and HUMSAM should be proud of their high-quality RIs. An important task is to review, update, and complement the information on the web. It should also be clear for each infrastructure contact details, how to access the RI, user fees, etc.

Disciplinary Domain of Medicine and Pharmacy

The visibility of MEDFARM's RI is essential for enhancing the use and accessibility of research resources within the domain. FISK and the Vice-Dean for RIs have begun efforts to increase the visibility of domain-funded infrastructures, an initiative which is acknowledged. Each RI is expected to have its own informative webpage on the department's site, which lays the groundwork for visibility.

However, during the site visit, it became clear that the overarching vision for RIs - "Everyone working within the Disciplinary Domain has knowledge of and access to high-quality platforms, local and national research infrastructures" - remains a challenge. A significant obstacle to achieving this goal is reaching a consensus on a definition of RI across the university. This lack of clarity complicates the presentation of a qualified and comprehensive list of MEDFARM's RIs.

MEDFARM has committed to a full transition to the iLab system for all local and national RIs within the domain. Once fully implemented, the iLab system will be a vital tool for reducing administrative workload. It will also provide a streamlined monitoring system for tracking user statistics and other key metrics, facilitating ongoing evaluation of the overall performance of the domain's research infrastructures.

Disciplinary Domain of Science and Technology

The usage of data and accessibility to international RIs often have their own set of rules, to which the DD has to comply. The various disciplines maintain their specific culture that depend on international agreements. Open data is getting more and more attention to allow access to data for non-members of the infrastructure.

In this environment, the challenge of the RI activities in TEKNAT is to disseminate these cultures and to communicate inside the UU. Of course, web-page information on the RIs is an essential starting point, and should be further enrolled. However, the Panel notes that for large international infrastructures, with sometimes hundreds or even thousands of authors, more internal communication inside the UU may be needed to fully grasp the way of working for these research infrastructures. *One suggestion on this topic is to organise topical meetings with the RI Board and with others, besides the web-based information flow.*

9. Use of RIs in education

Uppsala University overall

According to UU's Mission, Goals, and Strategies from 2019, "the university will strengthen its capacity to carry out concentrated, coordinated initiatives in education and research, particularly in the area of infrastructure."

High-end RIs are especially valuable for doctoral students and post-docs. To ensure that they are informed about the possibilities that the extensive RI system provides, regular courses and workshops should be organised.

The Panel suggests that the RI Board prepares a strategy for use of RIs in education. Such activities should be planned and carried out by the RI leaders and their staff in collaboration with relevant researchers. This planning could well include cooperation between RIs of different DDs. Part of this activity could take place on a regular basis, while also timely new topics are covered when technologies take leaps forward. A curriculum of the RI trainings should be developed with plans for a few years ahead.

Disciplinary Domain of Humanities and Social Sciences

Potential synergies between the use of infrastructure in education and research still need to be fully realized within the DD.

CDHU offers a range of courses and workshop activities that contribute to digital competence for students, researchers, and teachers. These activities are essential to HUMSAM, as their self-evaluations indicate the need for such competencies for many of its researchers.

The Panel suggests that these courses and workshops should be done regularly and explored if they could be part of the regular curriculum at the master's and graduate level.

Disciplinary Domain of Medicine and Pharmacy

Although MEDFARM expects domain-funded infrastructures to be accessible for educational use, there is currently no specific domain-level strategy to ensure this

access. Instead, it depends on initiatives from directors and staff within each infrastructure. Whether this approach is sufficient for effective follow-up remains uncertain, but improvements could be made, such as incorporating educational activities into iLab statistics.

Disciplinary Domain of Science and Technology

Also, in TEKNAT a solid domain-level strategy for access to educational use of infrastructures is currently not available. Students often are attracted by themselves to the scientific challenges that the research infrastructures address, but there is room for a more pro-active approach. The DD will benefit from a better connection of the infrastructures to the teaching. For example, an obligatory (or voluntary) tour around available infrastructures at the Bachelors-level will significantly increase the awareness for students that plan an academic career. The Panel further suggests to further include the RIs at the various teaching courses at the Bachelors- and Master level (insofar that has not been done yet).

10. Research data management

Uppsala University overall

Research using large sets of data is expanding to all fields. International and national developments pertain to ethical use and sharing of data, and storage, curation, computational analysis. Data management and storage is a prioritized area in digital operational development for the entire university. A new **Research Data Support Unit**, established in April 2024, will provide improved possibilities to develop the data RI. Moreover, linking with the national developments in e-infrastructure is part of the activities. Data experts are needed in all disciplines. In some areas highly skilled data expertise has already been set up, while new needs are emerging, e.g., in social sciences and humanities.

The Panel suggests that care is taken by the RI Board to provide unified support across the domains. The developments should follow the national and international developments in the area. Data experts are needed to provide discipline-specific support. It is suggested that these experts also form a university-level network to discuss best practices and solutions across the disciplinary borders. Also, the cost structure of data-based research needs to be solved.

Disciplinary Domain of Humanities and Social Sciences

HPC and Storage - In the future, HUMSAM anticipates an amplified need for high-performance computing (HPC), driven by an increased interest in digital methods, such as machine learning, large language models, and Big Data. Some research groups, like Computational Linguistics and Statistics, use computational resources at UPPMAX and NAISS. Still, the domain needs further work, such as implementing strategies, planning anticipated costs, training, and technical support.

FAIR - At HUMSAM, there is an uneven awareness of the implications of FAIR and open science. FAIR and Open Science require data management and repositories for storing, sharing, and linking data. The self-evaluation points to no obvious place

to collect, store, and share data at UU. *The Panel indicates that UU will need to address these issues.*

The Panel also notes that the purpose and demand for Open Science and proper data management (FAIR) needs to be communicated more effectively within HUMSAM. As part of this, data management plans (DMPs) are of crucial importance and should be a requirement. DMPs, if followed up by the Commission, would also help in strategic planning and meet expected future funding needs.

Sensitive data - Using sensitive data, often personal data, in research within HUMSAM is frequent, and a question for UU as a whole. Several national infrastructures see the need for a common platform for managing and analysing sensitive data.

The panel recognizes that UU holds a key position with UPPMAX and its Domain specialists for sensitive data within National Academic Infrastructure for Super-computing in Sweden (NAISS). The BIANCA-system (soon next version MAJA), developed at UPPMAX, is likely world-leading as a platform for a safe environment for sensitive data. BIANCA will be running until end of 2026. *The Panel suggests that HUMSAM should explore this facility fully, again calling for close collaboration between CDHU and UPPMAX.*

Moreover, the Panel suggests that UU should explore the possibilities to connect storage facilities with the platform, which according to expertise at UPPMAX is quite feasible.

Disciplinary Domain of Medicine and Pharmacy

As part of UU, MEDFARM supports the FAIR principles, which are embedded as essential elements in various national and international "Codes of Conduct for Research Integrity". At MEDFARM, responsibility for data handling lies at the departmental level, though it is unclear whether a follow-up system exists at the domain level to ensure proper data management and storage covering all types of research data. However, the self-evaluation report highlights MEDFARM's strong focus on the secure handling of sensitive data, including offering biannual courses for PhD supervisors on managing sensitive information.

Disciplinary Domain of Science and Technology

For TEKNAT, no specific points need to be mentioned separately here. International infrastructures typically have their own way of data management that most often is based on FAIR principles, designed by very skilled data experts. Also here, the Code of Conduct for Research Integrity forms the basis for an ethical approach to the data usage and interpretation. TEKNAT can provide the best practices and solutions on these topics and pro-actively present and discuss them in the university-level network on these matters.

11. Quality assurance of RIs

Uppsala University overall

It is noted that most of the large RIs have well-developed quality assurance systems. The RI Board addresses quality assurance aspects especially in the case of prioritisation for external funding of RIs.

The Panel suggests that feedback on RI services is gathered regularly from the user community and used as a basis to improve the services. The quality assurance system may be part of large national/international RIs. Monitoring the quality of operation and obtaining feedback from users should also take place in the case of local university-level RIs. An overview of the quality assurance of the RIs is the task of the RI Board.

Disciplinary Domain of Humanities and Social Sciences

Quality assurance of RIs is to be followed up at the departmental level as part of their regular quality work. According to the self-evaluation, this needs to be monitored systematically.

International and national infrastructures have an evaluation system, but the local infrastructures depend on the departments.

A follow-up, or hearing, would benefit both the Commission and the RI. A half-time hearing will allow the RI to present their work and current status. The Commission will be able to monitor the progress, give advice, and, if necessary, give extra support. Experience from other areas, such as The Bank of Sweden's Tercentenary Foundation (Riksbankens jubileumsfond), shows that the receivers of funds highly appreciate such a process. Economic follow-ups can remain at the departmental level.

The Panel suggests that the Commission should implement a follow-up system when financing comes from the university (i.e. seed money, bridge money).

Disciplinary Domain of Medicine and Pharmacy

MEDFARM's procedures for evaluating, prioritizing, and funding research infrastructures in a three year-cycle approach appear to be an effective, though indirect, way to ensure consistently high quality in domain-funded research RIs.

The Panel suggests that a full implementation of the iLab system could complement the funding process by providing statistics on various quality-related parameters, including user statistics and potentially user satisfaction.

Disciplinary Domain of Science and Technology

Evaluating the QA of RIs often consists of two parts. First, the frequent internal QA assessments within the DD is an essential part to guarantee the high-quality contributions to the research infrastructures. The DD has proven again and again that these high standards are met.

Secondly, the QA of the international infrastructures are monitored via international procedures. These procedures critically assess both the quality and timelines of deliverables of UU to the RIs. The international reputation of the UU,

from the TEKNAT, is very high. This shows the high expertise and strong commitments of the DD to the high-profile infrastructures.

12. Future visions and tentative way forward for RIs

Uppsala University overall

The self-evaluation by the management does not include sections on opportunities, visions and action plan. The UU management decided to leave these areas open for feedback from the Panel, recognising that the three domains have different needs and conditions, making it harder to agree on a joint approach.

Disciplinary Domain of Humanities and Social Sciences

The Panel commends the strong commitment by HUMSAM and the Commission to develop their RIs. Funding, support, and competence building are high on the agenda. Visions and ways forward are clear from the self-evaluation:

- Increase the Commission's budget and resources regarding expertise, increasing the ability to act strategically.
- Clarify the division of labour and the long-term financing of CDHU.
- Competence building across the Domain regarding RIs, data management, FAIR principles, and Open Science.
- Improve and strengthen synergies between RIs in education and research.
- Clear lines of communication between the Commission, the faculties, and the departments.
- Give the Division for Research Support clear directives about their responsibilities vis-à-vis infrastructures.
- Promote cross-domain collaborations.
- Support the departments regarding Open Science, establishing DMPs, data management, technical support, etc.

Disciplinary Domain of Medicine and Pharmacy

MEDFARM's vision for the next 5 to 10 years is to continue supporting access to modern, high-quality RI, including the maintenance of a highly qualified support staff. The domain will remain focused on refining its well-established, transparent evaluation process for RI, based on a bottom-up approach. It will also work to strengthen collaboration with various funding and preparatory bodies across the domain.

The domain aims to continue its current operations with minor adjustments, recognizing the broad acceptance and effectiveness of its existing systems for managing research infrastructures.

Panel suggestion: While the long-term, primarily bottom-up strategy has proven effective, the Panel indicates that MEDFARM may benefit from refinement. Incorporating the strategic perspectives of the Domain Board and Vice-Rectors on priority areas where RI might be needed could further strengthen efforts to maintain MEDFARM's and UU's top international rankings.

Disciplinary Domain of Science and Technology

TEKNAT is currently developing the RI vision (2025-2029). The Panel expects this vision to contain long-term strategic planning of RIs (including memberships of

international RIs) that further builds on the excellent international reputation of UU. The Panel notes that the portfolio will have to fit within the boundaries of the DD, and most probably a number of the international memberships will have to be reconsidered in cases where the community support is small. The past has shown that the DD is very capable to organise these issues.

There are a few cases that need special attention from the UU, outside the DD, as they have a sizeable (national) political component, e.g. ESS and MAXIV. Whereas these impressive international infrastructures are prestigious and located in Sweden, the plans for exploiting the scientific potential of these infrastructures require further attention. This concerns not only UU but involves all universities in Sweden that are active in Science and Technology.

The Panel suggest that UU, as one of the largest Universities in Sweden, takes this responsibility and initiates a national discussion on this topic. UU will be able to take the lead and coordinate a national program to put the Swedish scientists at the forefront of the immense potential that these infrastructures will offer.

Summary

Strengths

Uppsala University overall

- RIs are recognized as absolutely essential for cutting-edge research for the university to continue to be a highly ranked university. This is evident by the strong (and complex) arrangements regarding RIs at all levels.
- A major strength is the size of the RI ecosystem at the university in total which enables UU to be a strong RI stake holder nationally and internationally if coordinated appropriately.
- Recent developments in terms of the RI Board, headed by an Advisor to the Pro-Chancellor, the new Research Data Support Unit (established in April 2024) and the forthcoming Division for Research and External Collaboration (by January 2025) are important in strengthening RI policies and operations.
- Prioritisation of RI proposals to be submitted for the national RI calls works well.

Disciplinary Domain of Humanities and Social Sciences

- HUMSAM is well-organized and clearly understands the research needs of infrastructures.
- The newly established RI Commission is essential in strategic planning, financing, advice, and support.
- HUMSAM hosts or participates in several national RIs, which promote competence building, methods development, and research across disciplines.
- The DD also benefits from collaboration with international infrastructures such as HUMINFRA, DARIA-H, SWE-CLARIN, CLARIN-ERIC.

- CDHU provides competence building, technical skills, and support to researchers and infrastructures.

Disciplinary Domain of Medicine and Pharmacy

- MEDFARM has well-structured and transparent models and processes for prioritizing and funding RIs, both within its domain and in relation to national infrastructures managed by the Research Infrastructure Board. These models are widely accepted and supported within MEDFARM.
- MEDFARM has established effective coordination among various funding and preparatory bodies, including FISK, SciLifeLab, CFVUU, and Uppsala University Hospital, along with the University Medical Board Executive Committee.
- MEDFARM has appointed a Vice-Dean of Research Infrastructure. Additionally, MEDFARM benefits from a dedicated, service-oriented, and knowledgeable research infrastructure specialists and administrative staff.

Disciplinary Domain of Science and Technology

- TEKNAT has a long and strong tradition in initiating, constructing and operating RIs, that follow strategic planning. As a result, UU plays a highly visible and strong role in many high-profile RIs.
- TEKNAT has an excellent internal base for RI's, supported by the Ångström Workshop, with strong research prioritizations.
- TEKNAT provides UPPMAX as a UU-wide resource for parts of the HPC and storage needs.

Weaknesses

Uppsala University overall

- Strategic work on RI is mainly done in silos which hampers the possibilities of reaching both the full domain specific strength as well as cross-domain strength of the RI ecosystem at the university.
- An overall RI strategy is missing.
- Limited central RI funding as well as limited central RI funding on domain level decreases the possibilities in strategic RI investments in terms of new establishments but also in terms if bridge-funding to rescue important RIs with lack of funding temporary.
- The link between UU leadership and RI work is not sufficiently empowered.

Disciplinary Domain of Humanities and Social Sciences

- Limited resources for funding and co-funding of local and national infrastructure.
- There needs to be a shared understanding and acceptance of the definition of RI.
- Internal visibility and knowledge regarding local and national infrastructures.
- External visibility of the domain RIs to attract international researchers and external funding.
- An uneven awareness regarding the classification of research data and FAIR and Open Science implications.

- There is no trusted research environment to collect, analyse, store, and share data at UU, along with implementing the principles for Open Science.
- HUMSAM and the other disciplinary domains need more apparent career paths for research infrastructure staff.

Disciplinary Domain of Medicine and Pharmacy

- MEDFARM has, like the other disciplinary domains, a challenge concerning a broader internal and external visibility of the RIs.
- MEDFARM has a very strong collegial culture and relies heavily on bottom-up input for decision-making. However, this approach may not always be the best way to implement changes within an organization.
- Both MEDFARM and the other DDs lack a clear career path for RI staff.
- Cross-domain collaboration is often a challenge due to different practices, e.g. user fees. A shared understanding between domains is essential for the development and broader visibility of university-wide RIs.

Disciplinary Domain of Science and Technology

- At the moment the overall long-term strategies and policies for RI at TEKNAT are unclear. The Panel looks forward to the planned Vision on RIs by TEKNAT.
- The long-term life-cycle planning (including decommissioning) of RIs is in some cases missing. Uncertainties for stable funding requirements.
- The domain-specific structure and processes for RIs can be further refined. In some cases, a structure at the national level will be advantageous.
- There is relatively limited EU financing of RIs in the DD.

Reflections and recommendations

Uppsala University overall

- TEKNAT and MEDFARM have long-standing practices in RIs; in HUMSAM the RI needs are now strongly developing (but also include some long-standing examples such as the conflict project) with data and computational needs growing strongly.
- Building vision, ambition, world-class recognition, including RI activities, could benefit from more unity and harmonization.
- In developing its joint strategy for RIs the Panel suggests that several overarching needs are tackled at university-level, including
 - a shared common understanding of the definition of RIs, and implementing the university wide RI definition in all domains to simplify strategic RI work,
 - increasing the visibility of the RIs (both internally and externally),
 - developing digitalization and data handling, which includes a university wide trusted research environment to enable secure analyses and storage of sensitive data; this environment could integrate tools to enable the researchers to follow the FAIR principles over the life cycle of data,
 - establish a university wide career-ladder for RI staff; this should align with e.g. SciLifeLab,

- implement a standard user fee system to simplify cross-discipline collaboration, and
 - develop monitoring and feed-back practices.
- The organization with three domains creates silos and the different practices make it difficult to build and agree on joint operations and cross-border usage of RI.
- UU should actively promote the RIs to attract international researchers and research funding. This work needs to be coordinated between the domains and the central level.
- UU should clarify the roles of the various operations and streamline and harmonize some of the processes – here the RI Board should have a coordinating mandate.
- Also, UU should consider building Hubs over similar/overlapping RIs, even across DDs.
- Moreover, the Domains should secure follow-up processes of their funding of the RIs.

Disciplinary Domain of Humanities and Social Sciences

- Secure financing and a clear mandate for CDHU
- Increase the visibility of RIs, internally and externally
- Competence building and knowledge of RIs for researchers, master- and graduate-level students
- Communicate a common understanding of definitions of RIs
- High priority must be placed on setting the arena for open science, data management (FAIR principles), and sensitive data management. This requires competence building, technical tools and support, juridical issues, and cultural change.
- Establish a clear career path for RI staff.

Disciplinary Domain of Medicine and Pharmacy

- Adjust the internal procedures for calls for national RIs to reduce the demand for resources and the time allocated by staff.
- Establish more coherent processes for cross-domain collaboration, including agreements on issues such as user fees.
- Initiate a cross-domain working group to develop suggestions for improving both internal and external visibility of RIs.
- Contribute to establishing a clear career path for research infrastructure staff across Uppsala University.
- Establish a working group to create a more seamless cross-organisational RI collaboration with the regional health care in terms of data access and shared computational power.

Disciplinary Domain of Science and Technology

- Develop and formulate a long-term infrastructure vision and portfolio.
- Increase the visibility of TEKNAT, UU and Swedish research infrastructures by pro-actively collaborate at a national and international level. Involve the RI-board to initiate a national platform.
- Establish clear processes for managing existing investments, future needs and calls and recordings related to research infrastructure.

- Increase external financing of research infrastructures at TEKNAT.
- Establish adequate e-infrastructure within TEKNAT.
- Create career paths and opportunities for training of research infrastructure staff and further connect the research infrastructures to teaching.

Reflections on the similarities and differences between evaluation units within the panel – what to learn from each other?

All DDs are actively engaged in RI activities, MEDFARM and TEKNAT having longstanding practices and substantial funding while in HUMSAM the RI needs are at a strongly growing stage with needs to increase their RI funding.

All disciplines are facing growing needs in data handling and e-infrastructure. Here, coordinated actions at the university-level and nationally are encouraged.

MEDFARM has well developed practices in monitoring RI use through the iLab system and in charging the users for work with the RIs. Implementation of these practices also in the other domains could help to unify the university's RI services as well as facilitate cross-disciplinary access to the RIs.

Developing the vision for RI policies and activities should be coordinated at the university level. At the DD level such planning is somewhat uneven, but the TEKNAT could serve as a good example for all.

The researcher support is not unified across the domains. Data experts are needed to provide discipline-specific support, but UU researchers would gain from a more unified support based on e.g. a university-level network to discuss best practices and solutions across the disciplinary borders.

The DDs appear to have robust internal processes, but there is a lack of a similar well-defined process for addressing cross-domain infrastructure issues, e.g. joint operation, planning of new needs and user fees.