Evaluation of Mathematics, ICT and Technology 2023-2024

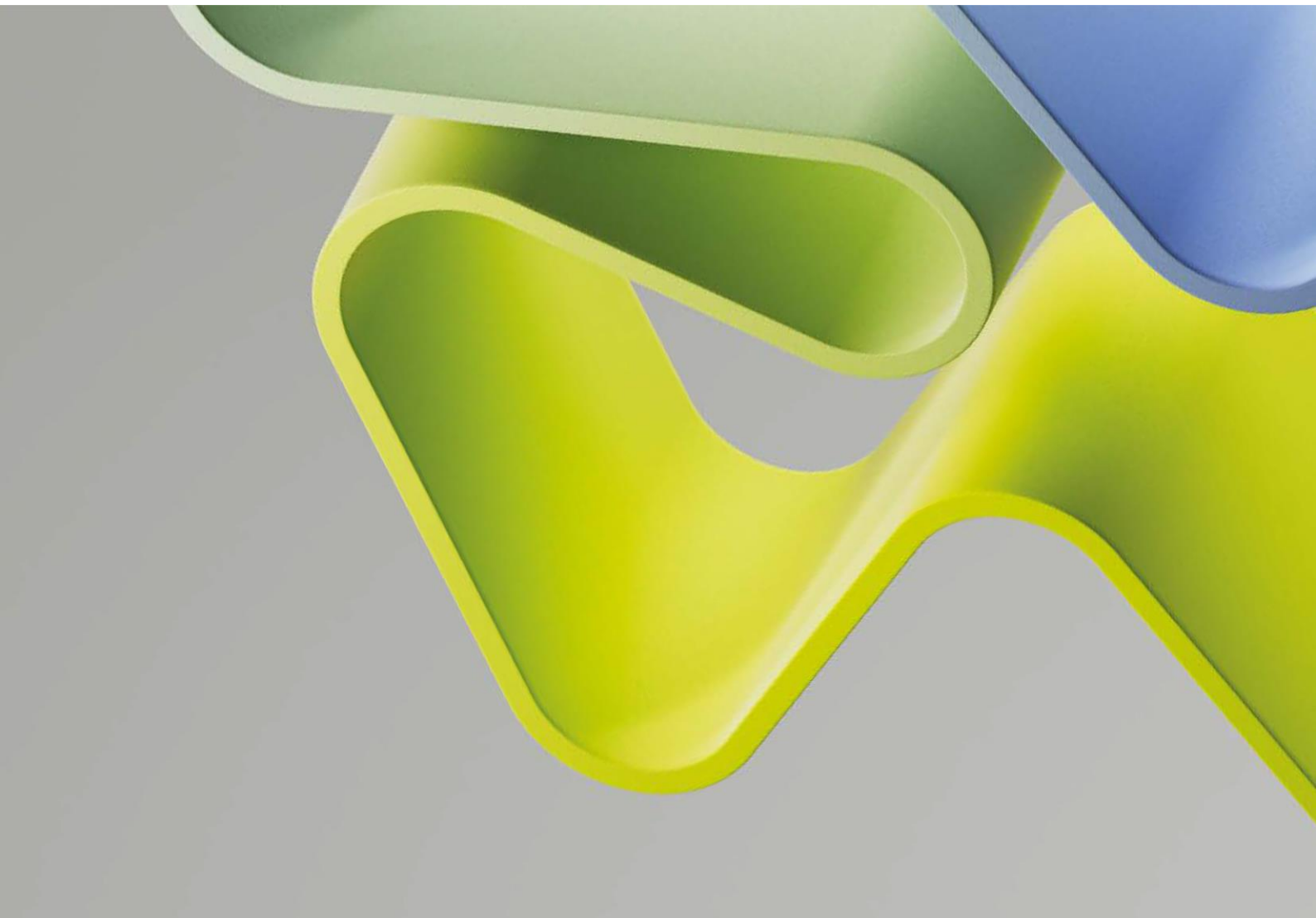
Evaluation Report for Administrative Unit

Administrative Unit: **School of Economics, Innovation and Technology (SEIT)**

Institution: **Kristiania University College**

Evaluation Committee Higher Education Institutions 2

December 2024



Contents

Statement from Evaluation Committee Higher Education Institutions 2

The members of this Evaluation Committee have evaluated the following administrative units at the higher education institutions within Mathematics, ICT and Technology 2023-2024 and has submitted a report for each administrative unit:

- Department of Computer Technology and Computational Engineering (IDBI), UiT The Arctic University of Norway
- Department of Automation and Process Engineering (IAP), UiT the Arctic University of Norway
- Department of Electronic Systems (IES), Norwegian University of Science and Technology (NTNU)
- Department of ICT and Natural Sciences, Norwegian University of Science and Technology (NTNU)
- Department of Information Security and Communication Technology (IIK), Norwegian University of Science and Technology (NTNU)
- Department of Engineering Cybernetics (DeptCybernetic), Norwegian University of Science and Technology (NTNU)
- Department of Information Systems (IIS), University of Agder (UiA)
- Department of Computer Science, Oslo Metropolitan University (OsloMet)
- Faculty of Science and Technology (REALTEK), Norwegian University of Life Sciences (NMBU)
- Department of Science and Industry Systems (IRI), University of South-Eastern Norway (USN)
- School of Economics, Innovation and Technology (SEIT), Kristiania University College

The conclusions and recommendations in this report are based on information from the administrative units (self-assessment), digital meetings with representatives from the administrative units, bibliometric analysis and personnel statistics from the Nordic Institute for Studies of Innovation, Research, and Education (NIFU) and Statistics Norway (SSB), and selected data from the National survey for academic staff in Norwegian higher education and the National student survey (NOKUT). The digital interviews took place in the autumn 2024.

The members of the Evaluation Committee are in collective agreement with the assessments, conclusions and recommendations presented in this report. None of the committee members has declared any conflict of interest.

The Evaluation Committee consisted of the following members:

Professor Jan Canbäck Ljungberg
University of Gothenburg

Professor Bo Wahlberg (Chair)
KTH

Professor Nancy Pouloudi
Athens Univ. of Economics and Business

Professor Alessandra Costanzo
University of Bologna

Professor Torsten Braun
Universität Bern

Professor Stefan Wermter
University of Hamburg

Description of the Administrative Unit

The School of Economics, Innovation and Technology (SEIT) is an administrative unit of Kristiania University College. Kristiania is one of the oldest private institutions of higher education in Norway, and SEIT is one of its four faculties established in 2019 after internal re-organisation. SEIT is a cross-disciplinary academic environment with active research within information technology, innovation, and economics. The collective background of SEIT's academic employees addresses a broad area of subjects, including computer science, software engineering, information security, data science, human-computer interaction, information systems, innovation, entrepreneurship, management science, organisational behaviour, and economics. In 2022, academic employees at SEIT consists of the total of almost 55 full time equivalents, with the share of 24.84 % women. Among academic employees, 76% hold a research position, while 24% hold a teaching-oriented position. SEIT are working actively to increase the share of women among academic employees. The largest success has been among associate professors (research), where the share of women has grown from 19% in 2019 to 30% in 2022.

SEIT has two research groups in scope of EVALMIT. The first, IDEAS Lab, studies technology-centred innovation processes in several empirical domains, aiming at increasing understanding of the dynamics of their emergence and evolution, and helping organisations harness the digital transformation wave. The lab offers free courses on a regular basis on topics like Python, XR, and AI. The second, the Behavior & Technology Lab (BTlab), conducts empirical studies within behavioural science, technology, and design to demonstrate changes in society and organisations. Their mission is to influence the impact of digital innovation on the individual, society, and organisations in a positive way. The lab contributes to the body of knowledge of several domains, including digital marketing, digital business, human-computer interaction, and user well-being. In particular, the lab elaborates on technological innovations and advancements while highlighting human actors in the midst of these environments. The lab has an extensive international academic network, and numerous master students write their master thesis connected to the research topics at the lab each year.

The strategy and goals of SEIT are closely related to Kristiania's strategy, which is to i) further develop research cooperation with business and industry and with other research institutions, nationally as well as internationally, ii) perform research and artistic work at a high international level, iii) contribute to solving great social challenges. SEIT has an action plan designed to support Kristiania's strategy. The action plan states the following:

SEIT aims to leverage its interdisciplinary expertise in technology, economics, and innovation to develop a clear research profile. The faculty will focus on sharpening its research and expanding its educational offerings. By 2025, the faculty aims to be well-known for applied research at the intersection of technology and business. SEIT will also develop its research activities within economics, innovation, and technology, with a particular focus on supporting the PhD programs and university goals. Furthermore, the faculty will continue to develop and increase publication and international collaboration by 2025, through targeted work with research groups, plans for applying for external funding projects, and running its own Ph.D. program.

SEIT has a strong research environment within information technology and is the host of one of Kristiania's two PhD programs (PhD in Applied Information Technology). In addition, SEIT contributes to the academic environment for the other PhD program (PhD in Communication and Leadership) at Kristiania. The PhD programs at Kristiania were established in 2022, and the contribution from SEIT to this establishment were substantial. Since the creation of SEIT

in 2019, there has been a strong focus on reducing the barriers between the different disciplines to become well-known for applied research at the intersection between technology and business. This work is ongoing. Furthermore, there is a strong focus on career development, especially towards the younger academic employees to ensure that SEIT holds faculty which can receive and develop the growing third cycle at Kristiania. SEIT deliver an academically relevant and updated portfolio of study programs within technology, innovation, and economics at all three levels (bachelor, master, and PhD).

Collaboration is an essential aspect of research. The lion’s share of academic employees at SEIT conduct parts of their research with collaborators outside SEIT and Kristiania. Most of the collaborations are on individual or research group level and not formalised. The school maintains strong ties with industry partners, ensuring that the education provided is not only academically rigorous but also aligned with the needs of the professional world. This industry-relevance is particularly crucial for master's and PhD students as they prepare for leadership roles and advanced research. All study programs at SEIT have an «industry council» appointed from relevant parts of the sector. The industry council gives the study program leader comments on important elements of development and content of the study programs that enhance the relevance of the programs. To further increase quality and expand networks, SEIT is working actively to increase the number of competitive external funded projects. By 2022, SEIT were involved in four larger externally funded projects. These projects contribute greatly to the development of the research at SEIT within their respective areas and increasing the number of PhD-students.

SEIT’s research on digitalisation of business systems, including supply chain management, supplemented with research on public procurement support the digital transformation of the public sector. Additionally, SEIT have, in the end of the evaluated period started building a research environment within health technology/AI on health data. The research at SEIT benefit from available Norwegian data sources including microdata.no.

Overall Assessment

The School of Economics, Innovation and Technology (SEIT) of Kristiania University College is an administrative unit that operates in two sites (Oslo and Bergen) and has grown substantially in recent years. It specialises in applied, interdisciplinary research in the fields of information systems and computer science. Innovation and economics are also areas of research interest, but at the moment are not clearly integrated in the unit's research orientation. The focus on applied research is aligned with the research strategy of Kristiania University College to be "a working-life university". This allows the unit to claim high relevance of its research to the needs of industry and work-life. As this research studies, *inter alia,* technology-centred innovation processes and technology-led changes in society and organisations, which have widespread impact on organisations and society, the administrative unit rightfully claims relevance for value creation in Norway. The close links with industry guide both its research and education activities and constitute a strength and differentiating factor for the unit.

The unit considers that its location in both Oslo and Bergen is an advantage, as it enables easy access to resources and offers collaboration opportunities with industrial and societal stakeholders for both faculty and students. The Evaluation Committee recognises the value of the strong links with local industry and of applied research but also recognises that the two locations may hinder the development of a cohesive research strategy within the unit. Indeed, in view of its recent growth, particularly in junior faculty, the administrative unit is still in the process of defining a clear research strategy. This is acknowledged in the self-evaluation report, that presents the development of a clear research profile as an objective. The need for a clear, cohesive research strategy is also reflected in the presentation of the two research groups evaluated (IDEAS and BTlab) that appear to have significant overlaps and not a well-defined scope. Instead, the two research groups that have been set up since the end of the evaluation period (SmartSecLab and AISE) have a clearer focus and agenda. The set up of these labs presents an opportunity for the administrative unit to review, evaluate and perhaps revise its organisation in research groups, with a set target of sharpening their focus and positioning, taking into account the research interests and potential of research staff. Such a review is expected to be helpful in building and presenting a clearer research profile. The administrative unit presents a flexible and developmental environment that should help as an enabler in this direction.

As Kristiania University College seeks guidance on the development potential at SEIT, a review and reorganisation effort can play an important role. The unit needs to strengthen its publication output, as bibliometrics analyses (EVALMIT Publication and citation analysis) show a low performance compared to other universities in the area of Mathematics, ICT, and Technology and ICT in particular. However, there is also evidence of high-quality research publications, following successful projects and collaborations with national and international partners. The administrative unit should take advantage of this expertise within the group and its collaborators to promote good practice and allow research staff to support each-other. The research groups can play a pivotal role in orchestrating such developmental efforts, while research seminars can also be used to support research activities across the unit. To enhance its developmental potential, the group should also strive to improve its gender balance. It is already taking steps in this direction which ideally should facilitate the recruitment of senior female researchers that can act as leaders and research models.

Because of its strong links with industry, the administrative unit produces research that is locally relevant. This has the advantage that it informs its teaching portfolio, providing study programs "that are needed". The unit offers several postgraduate programs. Master's

students are encouraged to publish their dissertations and work as research assistants in projects within the unit. Together with the growing PhD program of the unit, the effort to encourage and expand a research culture is visible and contributes to the research development of the unit. Additionally, locally relevant research provides opportunities for broader societal impact. The research unit considers one of its main societal contributions to be towards the digital transformation of services in the public sector. It would be beneficial for the research unit to think about disseminating information about its sectoral and societal contribution in concrete terms and with reference to national long-term plans. This would help the unit reach out more effectively to its stakeholders and expand current collaborations.

The Terms of Reference for the administrative unit is attached to the report.

Recommendations

The main recommendations from the Evaluation Committee to the School of Economics, Innovation and Technology (SEIT) are to:

1. **Develop a clear research strategy for the unit**
    - Develop a dedicated document presenting SEIT's research strategy to act as a compass for the development of the unit
    - Outline concrete plans (objectives, measures, KPIs) at the administrative unit level
    - Explore how the research stakeholders of the group can support its strategic objectives and contribute to an expanded research network, to support collaborations and funding. Leverage existing industry links, international partners, and consider expanding collaboration with government agencies and policy makers.
2. **Review research group organisation**
    - Consider how research is organised in the different labs, so that each lab has a clearly defined scope. Identify and manage overlaps and synergies between research labs.
3. **Develop a strategy for future growth**
    - Consider whether teaching needs may be aligned with the unit's research agenda, so that the hiring process can lead to a stronger research team
    - Continue to provide support for early career researchers; communicate these clearly to recruit high profile candidates
    - Take concrete actions to enhance gender equality, especially at the level of professor
    - Pursue further growth in PhD student numbers
4. **Pursue external funding and use of research infrastructures**
    - Invest on training on grant applications, especially for junior researchers, and on building research collaborations with experienced partners
    - Ensure regular staff and student training in the use of relevant research infrastructures
5. **Target high-quality research publications**
    - Continue working with national and international partners to target more high-quality publication outlets. Set more ambitious targets for publishing.
    - Provide support to junior researchers for increasing their research output (e.g., seed funding, enabling mobility, hosting high-profile researchers)

- Maintain the good practices of regular training and discussion on open-source use at the institution level.

6. **Build on industrial links to enhance research visibility and societal impact**
    - Present a clear link of the contribution of research projects to scientific publications on the one hand and to industry and societal impact on the other.
    - Utilise the administrative unit's strength in applied research and industry collaborations to promote high-impact research work
    - These recommendations aim to support SEIT in developing its research and its sectorial and societal impact.

1. Strategy, Resources, and Organisation of Research

The School of Economics, Innovation, and Technology (SEIT) was established in 2019 and is one of four faculties (schools) at Kristiania University College. The school is in the process of developing a clear research profile but aspires to be well-known for applied research at the intersection of technology and business. According to the self-assessment report, the unit currently comprises 55 full-time equivalent staff total (24.84% women), of which 76% research, 24% teaching. There are: 8,1 Professors (2,47% women); 23,8 Associate Professors (research) (30,25% women); 2 researchers (1 female); 1 post-doc (female); and 5 PhD students (1 female). The number of researchers in the unit has grown substantially from 9 in 2013 to 33 in 2021 according to NIFU and Statistics Norway's Analysis of research personnel. The total staff numbers differ from those reported in the self-assessment report. It is understood that part of this discrepancy relates to whether staff members have a research or teaching contract, but it is not clear if the rest of the difference reflects a growth in numbers since 2021, the reference year in NIFU, and 2022, the end of the evaluation period. In the interview with the Evaluation Committee, the administrative unit's staff provided clarifications for the number of PhD students, which has been constantly growing and is currently 18, of which 3 completing an industrial PhD. In view of the healthy growth in research staff, the unit should aspire to attract more PhD students in the future.

During the evaluation period, the administrative unit comprised two research groups, (a) the IDEAS Lab, focusing on technology-centred innovation processes in different empirical domains, and (b) the Behavior & Technology Lab (BTlab), that conducts empirical studies within behavioural science, technology, and design to demonstrate changes in society and organisations. Two more labs have been established in recent years, the Smart Security Lab (SmartSecLab) and the Artificial Intelligence in Software Engineering (AISE) Lab; they were founded in 2022 and 2023 respectively. Staff members may belong to one or more groups. SEIT is a cross-disciplinary academic environment that places a lot of emphasis on empirical studies and applied research with societal and industry impact, in line with the Kristiania's strategy for becoming "a working life university". The administrative unit's faculty is keen on sharpening its research quality and impact. To this end, indicative good practices include regular (annual) appraisal interviews for all employees, the encouragement of regular research meetings and presentations as well as the collaboration with high-profile research centres in Norway and abroad, and the integration of PhD students in all research-related activities.

1.1 Research Strategy

The administrative unit's research strategy is in line with Kristiania's strategy for a "working-life university", particularly in relation to the development of research cooperation with business and industry. The reference documents for presenting the unit's strategy include the research strategy documents developed by Kristiania, the Strategy for collaboration with

work-life (document in Norwegian) and three documents where open science policy is made explicit. The research strategy presentation overall is presented in general terms. The ambition is that “the faculty aims to be well-known for applied research at the intersection of technology and business” by 2025. As transpired in the interviews, the staff aspire for Kristiania to achieve full university status and to be perceived as such. According to the self-assessment report, the administrative unit aims to “develop a clear research profile”, which suggests that it is still in process of thinking through the areas of research that it wishes to target. This is to a certain extent expected for a unit that is growing. It is also reflected in the recent establishment of two new research groups. It is certainly an area that the administrative unit needs to review carefully, so that there is a clear direction and a more concrete research focus.

Emphasis is placed on one of the central measures for achieving the overall goals, that is, the PhD programme in applied information technology that was established in 2022. The presentation of this measure is the most concreate within the administrative unit’s research strategy. The PhD programme can indeed serve as a vehicle for growth and increased research motivation for younger academic staff that can contribute to the development of the doctoral studies. It can also help support the aspiration for innovation and increased research output. By the end of 2022, SEIT had 5 PhD students. This number has since grown substantially, presently reaching 18 students, according to the interview with the administrative unit. This is a healthy number and can be increased further so that all senior research staff supervise at least one or two students; this would put the administrative unit at the heart of research development in Kristiania. It is also noteworthy that industrial PhDs are possible, although students are tempted to follow a career in industry and discontinue their studies. It is commendable that since its inception the PhD programme has been designed to encourage and promote inter-disciplinary work. Furthermore, PhD students are asked to present their publication strategy in their application. The unit focuses on integrating PhD candidates in established research networks, fostering a research environment that encourages research sharing through presentations and feedback. Staff publication strategies are discussed within the research groups. A complementary measure to support the unit’s research goals is the collaboration with other parties including Oslomet, Simula, SimulaMet and Sintef Digital.

Conversely, the academic staff hiring process is primarily driven by teaching needs. Even though the actual hiring process puts emphasis on research areas, research production and experience in securing external research funding, there is a risk for discrepancies between the teaching needs and research agenda of the unit.

Internal research funding during the evaluation period included a basic funding (annuum), one-year research projects by application, and short applications for collaborative research. However, the unit reported in the interview that internal funding stopped in 2022. This is an opportunity and a challenge to gain access to funding under more competitive conditions.

<u>Recommendations</u> to the administrative unit:

The Evaluation Committee recommend developing a dedicated document presenting SEIT’s research strategy; in addition to acting as a compass, this will also serve to showcase the importance of PhD research for the unit

The Evaluation Committee recommend preparing to address the lack of internal funding by investing on training on grant applications and building research collaborations with experienced partners

The Evaluation Committee recommend considering whether teaching needs may be aligned with the unit's research agenda, so that the hiring process can lead to a stronger research team.

1.2 Organisation of Research

The administrative unit comprised of two research groups during the evaluation period (IDEAS and BTLab), each having a designated leader with set responsibilities in line with the institution's guidelines. A research lab on AI has been recently (2023) added. All academic employees are expected to be active members of at least one research lab, taking into account their research interests and time allocated for research. Research time allocation, research leaves and mobility are clearly presented and reflected in the Employee Handbook. The academic unit strives to provide a dynamic and supportive academic environment. Yearly appraisal reviews and the collaboration of vice dean people and vice dean research appear to be critical success factors in this process. Each lab appears to have flexibility on how to organise research work and exploit collaboration with industry and other partners. One of the challenges is that the research groups have different levels of maturity.

In view of the institution's applied orientation, the unit facilitates education of master students while at the same time it leverages the experience gained by master students. This is accomplished by encouraging master students to engage with the research groups. Some students may be hired as research assistants, while 4-6 master theses become a publication of the student and supervisor team (see also Section 4 of the report).

The unit operates across two campuses in two different cities (Oslo, Bergen). The unit considers this geographical spread as a strength, particularly for teaching and industry collaboration, as both cities offer a lot of opportunities in the areas of interest. It is not clear, however, if this creates constraints for the cohesion of research strategy and the sense of identity of the administrative unit.

Recommendations to the administrative unit:

The Evaluation Committee recommend considering how research is organised in the different labs, so that each lab has a clear scope without losing the distinctive benefit of applied cross-disciplinary research.

The Evaluation Committee recommend continuing to provide support for early career researchers; communicate such measures clearly to recruit high profile candidates. Please also refer to the recommendation in Section 1.1 concerning setting priorities during the hiring process.

1.3 Research Funding

The main source of funding for SEIT is its students (71%). Nonetheless, the administrative unit has been active in attracting research grants. External research funding for the unit in 2022 was approximately 12 million NOK. The unit currently participates in four projects, two of which are funded by the EU and has participated in another four that have been completed within the evaluation period (two funded by the EU and two by RCN). The unit has a good mix of national and international funding, although the former provides double the income compared to grants from the EU. A little more than half of the national grants are provided by the Research Council of Norway, while most of the rest comes from industry. This is in line with the applied nature of research in the unit. The research unit could take further advantage of its excellent access to the local industry in both sites where it operates. It could also take advantage of the international collaboration of its staff members to pursue further funding from the EU.

The self-assessment report does not provide clear information on how the unit supports its staff in applying for funding in competitive programs.

Recommendations to the administrative unit:

The Evaluation Committee recommend fostering further international collaborations to maintain active participation in EU research.

The Evaluation Committee recommend providing support to junior researchers in applying for funding, also to compensate for the reduction in the internal funding available.

The Evaluation Committee recommend presenting a clear link of the contribution of research projects to scientific publications on the one hand and to industry and societal impact on the other.

1.4 Research Infrastructures

The administrative unit has access to relevant research infrastructures. According to the self-assessment report, these include microdata.no, AIKT/Uninett, Nettskjema, TDS (Services for sensitive data from UiO) and FactSet. These resources provide access to tools, platforms and data that can be exploited for research purposes. SEIT also uses the support of the Kristiania's library to find optimal ways of data management and participates in the Kristiania's "Information Architecture Project", which aims at digitalising research data, enabling a better overview of research topics and systemic access to databases. These resources are relevant to the needs of the administrative unit.

The self-assessment report states that Kristiania supports the FAIR principles, without providing further details. This makes it difficult for the Evaluation Committee to understand the extent to which these are well understood and followed. There is reference, however, to the use of SIKT's services to enable data sharing and offer support with data management (see also section 1.7).

Recommendations to administrative unit:

The Evaluation Committee recommend ensuring regular staff and student training in the use of relevant research infrastructures and the appreciation of FAIR principles in the context of the research carried out by the administrative unit.

1.5 National and international collaboration

The self-assessment report lists 8 instances of collaboration with national institutions and 5 instances of collaboration with international institutions. According to NIFU, more than half of the papers published by the unit in the last five years of the evaluation period have been co-authored with international coauthors, while the percentage of publications with national co-authors has risen in the last three years. Research collaborations are both formal and informal; research staff are encouraged to maintain and develop their external research network. It is clear that the aim of such collaborations is to help SEIT develop and enhance its research.

The administrative unit is part of Norwegian and Nordic networks (e.g., NORA, NORSI) and leverages these to create relevant networks for the PhD students. The unit also has collaboration with international partners, including highly ranked universities such as CBS. These collaborations are fruitful as the unit has publications, for example, in the List of Premier Journals of the College of Senior Scholars of the Association for Information Systems (Information Systems Journal, J. of Management Information Systems, Journal of Information Technology) and should invest in extending such good practice. Most of the unit's partners listed under national and international collaboration are academic or research

bodies, even though it is clear that the unit has strong links with industry and exploits these to support postgraduate and doctoral student work.

Recommendations to administrative unit:

The Evaluation Committee recommend continuing to work with national and international partners to target more high-quality publication outlets

The Evaluation Committee recommend utilising the strength in applied research and the collaboration with industry to promote high-impact research work

The Evaluation Committee recommend providing support to junior researchers for increasing their research output (e.g., seed funding, enabling mobility, hosting high-profile researchers as mentors).

1.6 Research staff

SEIT is a relatively young academic unit, established in 2019. It has grown substantially in size and currently employs 55 full-time equivalent staff. Of the research staff, 8.1 are Professors (research) and 23.8 are Associate Professors (Research). This is a good balance in seniority, although there seem to be no women professors (the actual number in the report is 0.2). As noted earlier, there were 5 PhD students in 2022, a number that has now grown to 18. Women are severely underrepresented (see also Section 3 of this report). According to NIFU, about half of the research staff have a foreign PhD degree. This is a healthy mix to ensure insights from different research traditions and is particularly relevant for an administrative unit that is still working on developing a clear research profile.

The self-assessment consistently reports a developmental environment, with yearly appraisal interviews, facilitated by the research groups. As noted earlier, research time allocation, research leaves and mobility follow the procedures outlined in the Employee Handbook and therefore are expected to be transparent to the academic community. It is clear that collaboration both with industry and academia, nationally and internationally, is encouraged. To ensure the applied research strategy of the unit is served, both an industrial background and a good research record are sought after in recruitment.

Recommendations to the administrative unit

The Evaluation Committee recommend the administrative unit strive for better gender balance, especially at the level of professor.

The Evaluation Committee recommend maintaining the good practice of recruiting staff with industrial backgrounds, as this contributes to the differentiation of the academic unit (as long as this is not at a cost of attracting senior staff with a strong research record, that can support the research growth of the unit).

1.7 Open Science

The policy for open science is in line with Kristiania's guidelines and the Norwegian national guidelines. The self-assessment report presents relevant guidelines, regulations, documents, and archives and illustrates commitment to open science. It also presents data ownership and data management points of reference. For example, employees are trained in GDPR and are advised to use SIKT's data management system. A lot of the relevant guidelines are included in the employee handbook. According to the self-assessment report, software engineering research in the unit is primarily published in open access channels, while research results are available in open-source software. The share of archived open access publications was rising steadily from 2017 onwards, reaching a percentage of almost

50% in 2021 and 10% gold open access, however, with a substantial decline in 2022. This decline is attributed to coincidence, but no further information is provided.

It is commendable that relevant information and training is provided regularly to academic employees. Recently, in 2023, Kristiania has established an open access fund. This should enable more publications to be available in open and gold open access.

Recommendations to administrative unit:

The Evaluation Committee recommend monitoring percentages of open access and gold open access, to encourage good practice

The Evaluation Committee recommend exploring the reasons for the decline in open-access publications in 2022

The Evaluation Committee recommend continuing the good practices in software engineering (open access publications, open-source software)

The Evaluation Committee recommend continuing the good practices of regular training and discussion on open-source use at the institution level.

2. Research production, quality and integrity

The administrative unit carries out cross-disciplinary research mainly in the area of information technology, including information systems and computer science, and to a lesser extent in the areas of innovation, economics and public procurement. Research in both information systems and computer science is defined and understood quite broadly. The research work in the unit is presently organised in four groups. Two of these groups, the Smart Security Lab (SmartSecLab) and the Artificial Intelligence in Software Engineering (AISE) Lab have been established recently, in 2022 and 2023 respectively. The other two groups, the Innovation and Digitalisation for Enterprises And Society research laboratory (IDEAS Lab), and the Behavior Technology Lab (BTLab) have been in operation during the evaluation period. In the self-assessment report, they are loosely associated with research in information systems (IDEAS Lab) and with research in computer science (BTlab). The two newly established labs are associated with research in computer science.

In reviewing different aspects of the self-assessment report, the Evaluation Committee finds that there is a lot of overlap in the research agendas of the different research groups. This follows from the overlap in the study fields of information systems and computer science. For example, in IDEAS Lab, members study technology-centred innovation processes, while the BTlab conducts empirical studies within behavioural science, technology, and design to demonstrate changes in society and organisations. Based on these descriptions, it is not clear whether any research project would fit within one group or the other. The newest groups seem to have been defined based on the specific projects that they manage and seem to have a more focused and clear research agenda. Research overlaps are not a weakness per se; in fact, they may allow an administrative unit to make most of its interdisciplinary make-up. Nonetheless, the Evaluation Committee would encourage the research unit to rethink its research organisation into groups. In view of its stated interest, in the terms of reference, to develop its research production and quality, and its intention to develop a clear research profile, a clearer definition of scope and a review of the overlaps in research interests across the labs would be beneficial. These could strengthen collaborations within the research unit and, with a clearer positioning, potentially contribute to stronger networks with similar or complementary research groups in Norway and abroad.

The recent EVALMIT publication and citation analysis in ICT shows that Kristiania University College is still quite weak in the number of publications. At the same time, the NIFU report shows that the unit has made significant contributions to top journals (see also Section 1.5 of this report) and therefore has a lot of potential in producing high quality research. The separate evaluations of the two research groups that follows further testifies the opportunities for improvements and growth in research quality.

In terms of its policy for research integrity, the administrative unit follows the guidelines, regulations and practices laid out at Kristiania University College. These are presented in detail in the self-assessment report and present the Research Ethics Committee, documents such as the “Ten commandments for sound research ethics” and guidelines that lay out responsibilities for sound research ethics, the mandate and duties of the Research Ethics Committee, and guidelines for reporting violation of ethical standards. The Research Ethics Committee also participates in the organisation of regular research ethics workshops that academic employees are expected to attend. Within the administrative unit, research integrity and ethics are also discussed in SEIT’s Research Forum. These measures and guidelines appear to be in accordance with national and international ethical standards and demonstrate a commitment to research integrity at the College level that is shared across units.

2.1 Research quality and integrity

As the self-assessment report alludes to, the lab's role in researcher training is particularly noteworthy. The junior researchers are actively involved across many projects, and it is great that they get exposure to research activity and publishing their work. The group have very prolific collaborators such as Copenhagen Business School and MIT although it wasn’t clear how these collaborations are working in practice. Overall, the funding income of the IDEAS lab seems to be quite low (2m NOK in the last 5 years), much of which comes from internal sources. The research group do state though that their funding strategy is on a ‘needs’ basis and may not ‘need’ higher amounts to do their research work. The research group do a very good job of publishing students’ work. To be more recognised in an international context there is a need for the staff to publish more independent work that is less reliant on students and to also aim higher in terms of publication outlets. The Evaluation Committee note how practical the research work is and how the projects certainly seem like they can have significant societal and industry impact. However, there was in some cases very little evidence presented in terms of tangible examples to allow the panel to determine this. The Expert Panel commended the lab’s emphasis on training and education to a broad public audience. Overall, the group will need to strengthen in terms of funding income, publication quality and explicitly demonstrate clear examples of industry and societal impact to compare strongly in an international context.

Research group The Behavior Technology Lab (BTLab) overall assessment

The BTLab at Kristiania University College has a team with expertise in digital marketing, digital business, human-computer interaction, and user well-being. Overall, the research is strong and gaining recognition. It has a decent publication record in peer-reviewed journals, with some question marks regarding the selection of outlets. It participates in programmes like The Aurora Mobility Program and has partnerships with institutions like Arcada University of Applied Sciences and the University of Reykjavik. The lab’s research has applications in industry and addresses societal challenges. The BTLab has made contributions to the fields of behavioural science, technology, and design. However, the lab has a skewed gender balance at senior levels and relies on basic and internal funding. It needs to attract more external funding to support research projects. Despite these challenges, the BTLab has a

research strategy, an interdisciplinary approach, and is commitment to education and mentorship. In conclusion, the BTLab has strengths and areas for improvement. It is working towards its research objectives. Addressing its weaknesses will help the lab to enhance its international reputation and make further scholarly contributions.

3. Diversity and equality

The self-assessment report acknowledges an underrepresentation of women in the administrative unit. There are no women in professor positions, and only 30% women in associate professor positions. Even though it is low, this latter percentage marks an improvement from the respective percentage (19%) in 2019. All researchers and postdocs are women, but the share of women that are PhD students has been changing over time. It is important that the department focuses on attracting female full professors, that could help improve gender balance at the leadership level of the unit and act as role models.

The self-assessment report provides links to Kristiania's (a) Action plan equality and diversity and (b) Gender equality report. The former presents the institution’s commitment to working continuously for diversity and equality. The latter shows underrepresentation of women at the professorial rank and pay gaps, which according to the report can be explained by professorial seniority.

Within this context, the administrative unit states its strong intention to advertise positions internationally, encourage women to apply, ensure gender balance and diversity, and other related measures. Important aspects of the plan for greater gender balance are measures related to personal professional growth. These include the preparation of plans for competence promotion for women in academic positions and ensuring that all employees have concrete work plans and follow-up interviews. These are potentially high-impact measures and therefore it would be useful to make these more concrete (for example, by setting timelines for their implementation and allocating resources for doing so) and monitor their impact on gender-related KPIs in the short and longer term.

4. Relevance to institutional and sectorial purposes

The study program portfolio of SEIT consists of 23 programs, including 16 bachelor programs, 6 master programs, and one doctoral program, engaging 3200 students in total (2022 numbers). About 550 students participate in online programs. This high percentage shows that the administrative unit is building on the tradition of the institution to provide life-long learning. The programs are developed in collaboration with industry partners (all study programs have an industry council) to ensure relevance and consider sustainability goals as part of their learning outcomes and focus on applied innovation and technology. The programs suffer from significant drop-out rates – according to the self-assessment report, 72% of master's students and 41% of bachelor's students complete their studies within the standard timeframe. Based on the interview with the administrative unit, it seems that this number may be partly due to offers of employment before the students complete their degree.

The administrative unit reports that it aims to increase the quality of research, even if this at the cost of the number of publications. Since the establishment of SEIT in 2019, the number of publication points per academic employees has fallen slightly from 1.86 to 1.33. The target of the unit is to have more level 2 publications. While this is not a very ambitious target, the Evaluation Committee believes it is realistic as it takes into account the different levels of maturity of research-active staff and the primarily applied type of research

conducted by the unit. In the longer term, as the cohort of PhD students increases and the PhD program matures, and as the unit broadens the scope of its research engagement, more ambitious goals can be considered.

Staff are encouraged to participate in public debates and receive training on how to better communicate and disseminate their research results. Staff and students are encouraged to adopt an interdisciplinary approach and to participate in international programs and networks. For students, internationalisation is also enabled by student exchange programs. Master students are encouraged to engage with the research groups and may be hired as research assistants. Each year, 4-6 master theses become a publication of the student and supervisor team.

The strong collaboration with industry is a persistent theme in the presentation of the administrative unit's research. This is complemented by the objective of creating an entrepreneurial environment. In this vein, in order to support innovation and commercialisation initiatives from students, SEIT hosts two student incubators, one in each of its campuses. It also has a collaboration with an incubator at OsloMet and Potsdam Transfer to expand commercialisation competences. Finally, Kristiania has been active in developing the innovation district Punkt Oslo and serves on its board. Punkt Oslo is an initiative to promote innovation and entrepreneurship in the capital.

5. Relevance to society

The administrative unit contributes to the Norwegian Long-term plan for research and higher education primarily by focusing on applied research in collaboration with industry and by providing study programs "that are needed", as stated in the interview with the unit. According to the self-assessment report, SEIT's research focuses on sustainability and digitalisation. However, the way in which the unit contributes to the overreaching goals of the national long-term plan is presented in generic terms. The administrative unit claims a contribution to the digital transformation of the public sector and research on integration of AI in system engineering. While this is a strong claim, the two impact cases provided make aspects of this contribution concrete. As detailed below, the impact cases are of high relevance and confirm the unit's commitment to applied research. Therefore, it would be beneficial for the research unit to review in concrete terms how it serves national long-term plans. This would help the unit in disseminating its societal contribution more effectively to its stakeholders.

The relevance and contribution to society is presented in the self-assessment report in line with UN Sustainable Development Goals (SDGs). Most relevant are SEIT's contribution to online study programs and life-long learning, efforts to support women in IT, innovation related to the use of AI in fault detection software and research scrutinising green washing. Finally, SEIT is a part of the Earth4All project, a consortium that develops scenarios for reaching a sustainable world.

5.1 Impact cases

Comments to impact case 1: Be-Insight

The Be-Insight research project aims to facilitate automated ticketing. It is funded by the Norwegian Research Council and constitutes a collaboration amongst Kogenta, Kristiania University College, Ruter AS and Nordland County Council. The project uses and combines various technologies to accurately determine the position and movement of mobile phone users, so that they travel "ticket-free". The benefits of this project include improved trip flow,

passenger experience and analysis of passenger behaviour. The project has led to an AI module to be implemented in Kogenta SDK for public traffic optimisation and travel behaviour analysis used by all Ruter metro trains in Oslo and by all SL busses in Stockholm, Sweden. The project has been disseminated to the public in news presented by the project partners and the mass media. In addition to its impact in industry and society, the project has led to a number of research publications, some in high impact scientific outlets including IEEE Transactions on Intelligent Transportation Systems and IEEE Intelligent Transportation Systems Magazine.

The Evaluation Committee finds that this is a relevant and important impact case, in line with the administrative unit's expertise and interest in applied research. The impact case description notes that the Be-in, Be-Out (BIBO) automated ticketing model gives operators "a mountain of data which they can use to analyse usage patterns, optimise route planning and so on" without compromising individual privacy. This is a part of the impact case that is very important and needs to be presented explicitly.

Comments to impact case 2: AI-Based Automated Testing of Web/Enterprise Applications

This software research project aims to use AI-techniques to develop automated techniques to detect faults in software systems, in particular for web and enterprise applications. The impact case description notes that the research has been carried out by the Artificial Intelligence for Software Engineering (AISE) Lab. This Lab has been established in 2023, after the evaluation period, but the project has started in 2016 under the leadership of one of the administrative unit's professors that was hired at the time. The research project was first funded by a NFR project (2 postdocs) and currently by an ERC Consolidator Grant (3 postdocs and 4 PhD students). This research has led to tangible results. The most prominent is the EvoMaster open-source software tool prototype. The tool has been adopted by large companies collaborating with the research unit (e.g., Meituan and Volkswagen) as well as by engineers around the world. In addition to its impact in industry, the project has led to a notable number of research publications (more than 30), about half of which are n high impact scientific outlets at Level 2 in the Norwegian system, such as ACM Transactions on Software Engineering and Methodology (TOSEM). The research project is ongoing.

The Evaluation Committee finds that this is a relevant and important high-impact case in the field of Search-Based Software Engineering (SBSE), that capitalises on the expertise and leadership of one of the administrative unit's professors and reflects the practice-oriented strategy of the unit.

Methods and limitations

Methods

The evaluation is based on documentary evidence and online interviews with the representatives of Administrative Unit.

The documentary inputs to the evaluation were:

- Evaluation Protocol that guided the process
- Terms of Reference
- Administrative Unit's self-assessment report
- Administrative Unit's impact cases
- Administrative Unit's research groups evaluation reports
- Bibliometric data
- Personnel and funding data
- Data from Norwegian student and teacher surveys (only for HEIs)

After the documentary review, the Committee held a meeting and discussed an initial assessment against the assessment criteria and defined questions for the interview with the Administrative Unit. The Committee shared the interview questions with the Administrative Unit two weeks before the interview.

Following the documentary review, the Committee interviewed the Administrative Unit in an hour-long virtual meeting to fact-check the Committee's understanding and refine perceptions. The Administrative Unit presented answers to the Committee's questions and addressed other follow-up questions.

After the online interview, the Committee attended the final meeting to review the initial assessment in light of the interview and make any final adjustments.

A one-page summary of the Administrative Unit was developed based on the information from the self-assessment, the research groups' evaluation reports, and the interview. The Administrative Unit had the opportunity to fact-check this summary. The Administrative Unit approved the summary without adjustments.

Limitations

The Committee judged the information received through documentary inputs and the interview with the Administrative Unit sufficient to complete the evaluation.

List of administrative unit's research groups

Institution	Administrative Unit	Research Groups
Kristiania University College	School of Economics, Innovation and Technology (SEIT)	The Behavior Technology Lab (BTLab)
		The Innovation and Digitalisation for Enterprises And Society research laboratory (IDEAS Lab)

Terms of Reference (ToR) for the administrative unit

The Rectorate of Kristiania University College (the Rectorate) mandates the evaluation committee appointed by the Research Council of Norway (RCN) to assess School of Economics, Innovation, and Technology (SEIT) based on the following Terms of Reference.

Assessment

You are asked to assess the organisation, quality and diversity of research conducted by SEIT as well as its relevance to institutional and sectoral purposes, and to society at large. You should do so by judging the unit's performance based on the following five assessment criteria (a. to e.). Be sure to take current international trends and developments in science and society into account in your analysis.

a) Strategy, resources and organisation
b) Research production, quality and integrity
c) Diversity and equality
d) Relevance to institutional and sectoral purposes
e) Relevance to society

For a description of these criteria, see Chapter 2 of the mathematics, ICT and technology evaluation protocol. Please provide a written assessment for each of the five criteria. Please also provide recommendations for improvement. We ask you to pay special attention to the following aspect in your assessment:

The administrative unit SEIT has grown significantly the last few years, in particular when it comes to young faculty members. Hence, the Rectorate ask the evaluation committee to pay special attention to the development potential at SEIT when it comes to research production and research quality.

In addition, we would like your report to provide a qualitative assessment of SEIT as a whole in relation to its strategic targets. The committee assesses the strategy that the administrative unit intends to pursue in the years ahead and the extent to which it will be capable of meeting its targets for research and society during this period based on available resources and competence. The committee is also invited to make recommendations concerning these two subjects.

Documentation

The necessary documentation will be made available by the mathematics, ICT and technology secretariat at Technopolis Group.

The documents will include the following:

- a report on research personnel and publications within mathematics, ICT and technology commissioned by RCN
- a self-assessment based on a template provided by the mathematics, ICT and technology secretariat

Interviews with representatives from the evaluated units

Interviews with the SEIT will be organised by the evaluation secretariat. Such interviews can be organised as a site visit, in another specified location in Norway or as a video conference.

Statement on impartiality and confidence

The assessment should be carried out in accordance with the Regulations on Impartiality and Confidence in the Research Council of Norway. A statement on the impartiality of the committee members has been recorded by the RCN as a part of the appointment process. The impartiality and confidence of committee and panel members should be confirmed when evaluation data from SEIT are made available to the committee and the panels, and before any assessments are made based on these data. The RCN should be notified if questions concerning impartiality and confidence are raised by committee members during the evaluation process.

Assessment report

We ask you to report your findings in an assessment report drawn up in accordance with a format specified by the mathematics, ICT and technology secretariat. The committee may suggest adjustments to this format at its first meeting. A draft report should be sent to SEIT and RCT]. The SEIT should be allowed to check the report for factual inaccuracies; if such inaccuracies are found, they should be reported to the mathematics, ICT and technology secretariat within the deadline given by the secretariat. After the committee has made the amendments judged necessary, a corrected version of the assessment report should be sent to the Rectorate of Kristiania University College and the RCN no later than two weeks after all feedback on inaccuracies has been received from SEIT.

Appendices

1. Description of the evaluation of EVALMIT
2. Invitation letter to the administrative unit including address list
3. Evaluation protocol
4. Template of self-assessment for administrative unit (short-version)

The Research Council of Norway

Norges forskningsråd
Besøksadresse: Drammensveien 288
Postboks 564
1327 Lysaker

Telefon: 22 03 70 00

post@forskningsradet.no
www.forskningsradet.no

Publikasjonen kan lastes ned fra
www.forskningsradet.no/publikasjoner

Design: [design]
Foto/ill. omslagsside: [fotokreditt]

ISBN 978-82-12-04175-2 (pdf)