Evaluation of Mathematics, ICT and Technology 2023-2024
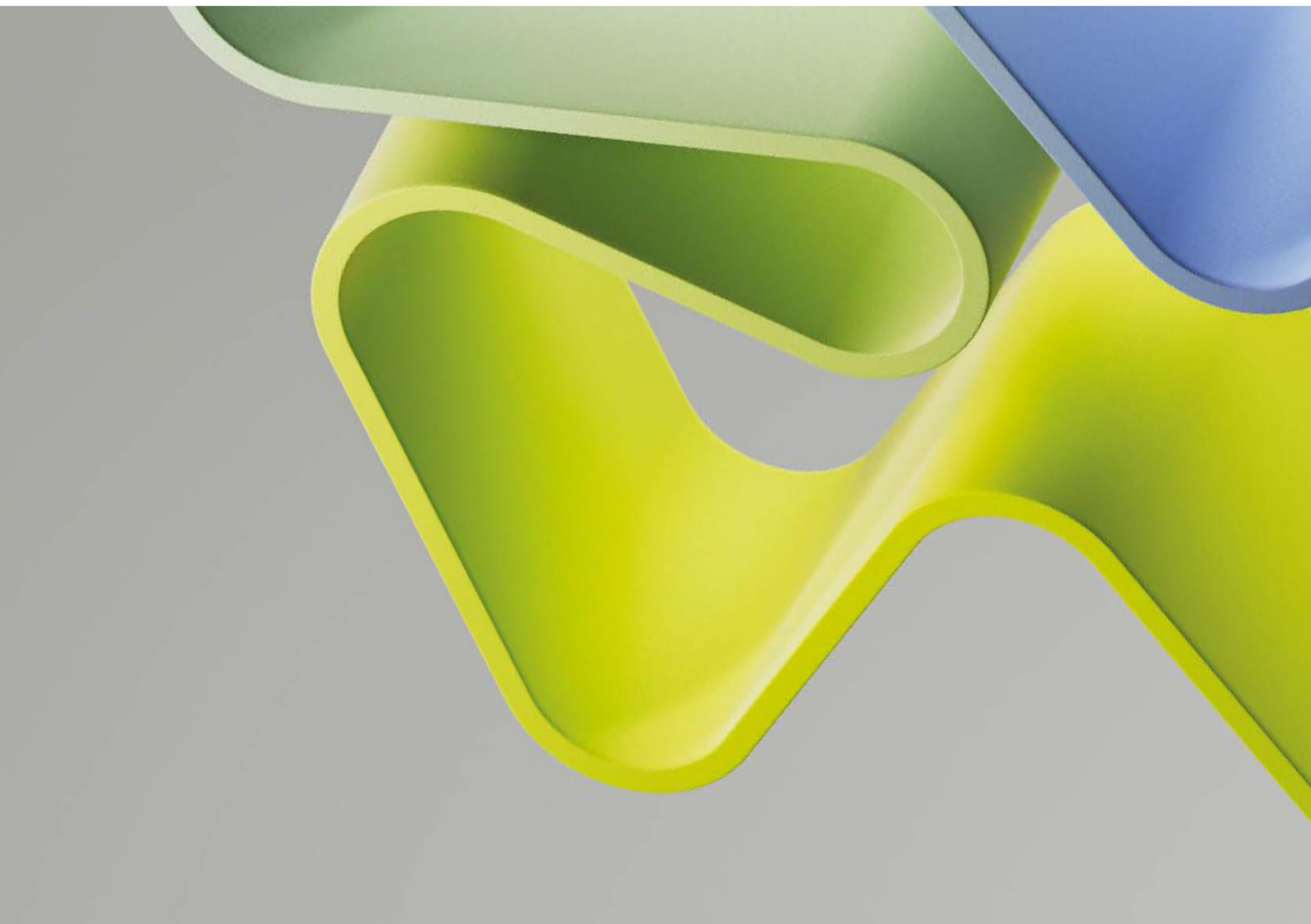
Evaluation Report for Administrative Unit

Administrative Unit: **USN School of Business**

Institution: **University of South-Eastern Norway (USN)**

Evaluation Committee Higher Education Institutions 3

December 2024

Contents

Statement from Evaluation Committee Higher Education Institutions 3

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

- Department of Industrial Technology, UiT The Arctic University of Norway

- Department of Electric Energy (IEL), Norwegian University of Science and Technology (NTNU)

- Department of Marine Technology (IMT), Norwegian University of Science and Technology (NTNU)

- Department of Mechanical and Industrial Engineering (MTP), Norwegian University of Science and Technology (NTNU)

- Faculty of Engineering and Natural Sciences (FIN) / Faculty of Technology, Environmental and Social Sciences (FTMS), from 1.1.2026, Western Norway University of Applied Sciences (HVL)

- Department of Mechanical, Electronic and Chemical Engineering, Oslo Metropolitan University (OsloMet)

- Faculty of Computer Science, Engineering and Economics (IIØ), Østfold University College (ØUC)

- Department of Electrical Engineering (IET), UiT The Arctic University of Norway

- Department of Technology and Safety (ITS), UiT The Arctic University of Norway

- Department of Electrical Engineering (IT) and Cybernetics (EIK), University of South-Eastern Norway (USN)

- USN School of Business, University of South-Eastern Norway (USN)

- Department of Microsystems (IMS), University of South-Eastern Norway (USN)

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 has consisted of the following members:

Professor Lina Sarro (Chair), TU Delft (Chair)

Professor Stefania Bruschi, University of Padova

Professor Khaled Ahmed, University of Strathclyde

Professor Andreas Müller, Johannes Kepler University Linz

Professor Maria Teresa Correia de Barros, University of Lisbon

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Professor Kostas J. Spyrou, Nat. Techn. Univ. of Athens

Description of the Administrative Unit

USN School of Business, SoB

University of South-Eastern Norway, USN

The administrative unit

USN has been created in 2016 by merging regionally focused colleges across eight campuses in SE Norway and is still in the process of building and strengthening research capacity. The School of Business is spread across five of the eight campuses and is one of four faculties at USN. In 2021, it reorganised its eight research groups into 15. Only one of these – the MIS research group – has been submitted to EVALMIT.

The research groups of the administrative unit

The Management Information Systems (MIS) group has been submitted to EVALMIT for evaluation. The SoB currently has a large number of other research groups, which have not been submitted: Collaborative Innovation, Societal transformation and Operations Management; Digital transformation; Digitalisation Management; Market and Strategy; New Perspectives on Work-Life and Organisations; ; Political Culture; Research in Arts and Design (RAAD); Research group in Law; Societal Analysis; Corporate governance, board of directors and top management; Sustainability Management; Work Motivation and Optimal Functioning; and Business Management and Economics.

The unit's work and strategies

USN's overall strategy focuses on the societal challenges but is otherwise rather generic in terms of developing the capacity and quality of the university across all three missions. The SoB aims to be regionally anchored and internationally well-known while contributing to sustainable development. It delegates the nuts and bolts of strategy to the research group level.

The unit's work in its sector

The SoB addresses all three university missions, with increasing attention to postgraduate education, intellectual property, and commercialisation.

The future of the unit

The self-evaluation does not cover this in any detail but says that the MIS group will take on new changes in technology such as AI, increase the amount of interdisciplinary research it does and address societal challenges.

Overall Assessment

The University of South-Eastern Norway (USN) School of Business consists of four departments located at different campuses. The only group being part of this evaluation is the Management Information Systems (MIS) research group. The MIS group is not embedded in a specific department, but each member is also a member of one of the other departments. The MIS group is thus physically spread across four campuses. This is perceived as a potential threat as it complicates interaction and communication. On the other hand, this is also an opportunity as presence on different campuses facilitates the direct interaction with the local community, favouring collaborations and increasing the potential societal impact the group and the AU can have in the region.

The MIS group does not appear to have common themes or synergy among its projects. The multidisciplinary character of the group can constitute an asset to address relevant societal aspects if well exploited by the AU. However, an effort to foster collaboration among group's members and streamline funding processes could enhance the group's performance and make a more significant contribution to the scientific development of the field of expertise.

The volume of research production in terms of publications is good, but the scientific quality of the projects and publications varies. This requires some effort to improve the overall quality. Research while keeping its applied character, should be of high international standard to enhance the credibility and impact of the group's output. A good balance between the impact and relevance of the research should be established while achieving high scientific standards.

The current number of PhD students in the AU and in the MIS group as well is low with respect to the number of staff members. Increasing the number of PhD students will certainly help in the scientific advancement of the group's activities as well as in the interaction with industry.

The main funding source is the national government. Additional funding from national and international sources has been increasing in the past years. This is a positive development for the sustainability of the group and for a potential increase in international collaborations.

The AU needs to maintain the strengths of the MIS group and address its weaknesses so it can improve its international presence and become a leader in applied research within the field of management information systems.

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

Recommendations

Based on the overall assessment of the School of Business, University of South-Eastern Norway, the Evaluation Committee recommends the following:

1. The MIS group members handle a quite diverse range of topics. There is the risk of lack of focus with potential dispersion of (human and financial) resources and of making it very difficult to be internationally recognised by their disciplinary peers and potential academic and industrial collaborators. Identify a few main fields of research and prioritising activities in these areas.
2. An action plan with the 5 pillars should be worked out to gather more measurable targets. This is necessary to monitor the progress annually and to allow reconsideration or modification of activities and tasks distribution in time to ensure the set goals in the medium and long term are achieved.

3. Closely monitor the management of the group, considering the 'diffused' structure and the matrix-like configuration (staff members are part of MIS but also part of one of the departments and are at different locations) to ensure optimal utilisation of the capability and potential of its members.
4. The AU is involved in the Centre for Security, Crisis Management and Emergency Preparedness. Evaluate which role the MIS group can have in the Centre's activities and act accordingly.
5. Encourage and support staff members to pursue more grant applications in national and international funding sources, to improve research quality and visibility and to underpin the sustainability of the group.
6. Measures should be implemented to encourage research activities that make original contributions to the field and address emerging challenges at an academic level.
7. The number of PhD students is quite low in relation to the number of professors. Actions to increase this number should be identified and executed.

1. Strategy, Resources, and Organisation of Research

The University of South-Eastern Norway (USN) School of Business is a large faculty (>250 staff members), consisting of four departments spread across five campuses. The only group being part of this evaluation is the Management Information Systems (MIS) research group. This group is something of a virtual group, as it is not part of a specific department, but its members are spread across all departments, depending on the specific competences and expertise each group member has and according to educational activities and the research question being addressed by the departments.

The group embraces the overarching strategy of the Administrative Unit, in line with the USN strategy, aiming at being regionally based and internationally recognised. Research and education are executed in close collaboration with the local community and regional labour market, offering IT education from all campuses. The multidisciplinary background present in the administrative unit provides a good opportunity to contribute to relevant societal challenges.

The fact that the unit is spread out across several locations certainly poses some difficulties in fully aligning research activities, but if well managed, can provide more impact locally and thus positively affect the entire region in which it operates.

The focus of the research and innovation is linked to the educational programmes. The multidisciplinary character of the group is reflected in both the educational programmes offered, covering business courses, IT and social sciences, as well as in the main research activities spacing across several fields, such as economic, IT, management, social sciences, politics and more. However, this large variety of topics covered poses some threats, as dispersion of resources and lack of focus can occur.

1.1 Research Strategy

The research strategy of the School of Business focuses on applied research that supports the green and digital transition, by promoting sustainable financial, social and cultural innovation.

The Management Information Systems group embraces the general strategy of the Administrative Unit, in line with the USN strategy. It supports the university's vision of being regionally based and internationally recognised and aims at aligning own goals and ambitions with the general goals of the university.

The overarching action plan created at faculty level and embraced by the AU and the MIS group, has several measures and expected outcomes outlined. It aims at producing visible contributions to societal challenges through practical research work and at the same time trying to achieve recognition as a competitive research group. A set of 5 action pillars have been defined, which all sound reasonable and appropriate. However, a more 'measurable' description of the short- and long-term targets might be preferred to better monitor the progress of these activities and to identify intermediate actions necessary to reach the envisioned goals. This is especially important given the 'virtual' character of the group and the physical distance of the group's members, which makes the cohesiveness of the strategy a real challenge.

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

- The AU's field of research is quite broad. As the MIS group members handle a quite diverse range of topics, there is the risk of lack of focus with potential dispersion of (human and financial) resources. Moreover, it makes it very difficult to be internationally recognised by their disciplinary peers and potential collaborators from both academia and industry. Main fields of research should be selected and activities in these areas should be prioritised.

- The action plan with the 5 pillars should be elaborated to define measurable targets, to help monitor the progress of the various activities and intervene in time on the plan to ensure reaching the set goals.

1.2 Organisation of Research

The research development and innovation activities within SoB are coordinated by the Vice Dean for research. The vice dean meets regularly with the research group leaders and with the programme manager for the PhD programme. For the PhD students, Attention is paid to integrating the PhD students into the group and securing appropriate supervision.

For all faculty members the four main tasks are clearly indicated. This has the objective to strengthen research-based education and innovation and contribute to sustainable development in society. The head of the department steers research direction, manages resources, fosters collaborations and is responsible to follow up on employees' careers. Research projects are owned and staffed at dept level. Administrative services supporting research groups are centralised.

However, as the MIS group is more of a virtual group, it is a bit unclear how decisions are taken on tasks and research activities, and how targets are set for individual group members. The self-assessment report mentions that the AU is involved in the Centre for Security, Crisis Management and Emergency Preparedness, but the role of the MIS group in relation to this Centre and its activities is not explicitly addressed.

The MIS group actively participates in several knowledge-sharing initiatives, like scientific conferences and workshops. This is an important way to contribute to relevant scientific and social questions and to increase visibility in the community.

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

- Closely monitor the management of the group, considering the 'diffused' structure and the matrix-like configuration (staff members are part of MIS but also part of one of the departments and are at different locations) to make sure to optimise capabilities and competences.

- Clarify and optimise participation for the MIS group in the Centre for Security, Crisis Management and Emergency Preparedness

1.3 Research Funding

The main funding source is the national government. The budget is assigned to the AU which then distributes it to the departments. As the MIS group is a 'virtual' group, it appears that the funding channelling to the group takes place through the departments. This seems to be the case also for the additional funding acquired by the MIS group members through grants from RCN and other national sources, as well as from internationally funded programmes. This additional funding from national and international sources has been increasing in the past years. This is a positive development for the sustainability of the group and potential increases in international collaborations, but this additional funding seems modest in relation to the number of staff members.

Central administrative support is offered for project applications and execution and should be certainly continued.

Recommendations to the administrative unit.

- Encourage staff members to pursue grant applications with national and international funding sources, to improve and guarantee the sustainability of the group and to strengthen its research activities and international visibility.
- Continue providing administrative support for both applying for and executing projects
- Increase, where possible, the amount of research time allocated to faculty members.

1.4 Research Infrastructures

The research group does not participate into Norwegian or European research infrastructures. Library and generic support tools are available. No specific need for infrastructure is mentioned, although this should be reconsidered, as new societal and industrial challenges might require different means for research execution. Moreover, involvement in larger research networks will be beneficial to broaden collaborations and improve quality of research.

Recommendation to the administrative unit.

- Reconsider participation in national and international research infrastructures.

1.5 National and international collaboration

Collaboration is important for the AU, as various fields of expertise and professions are involved in the areas in which the AU operates. In fact, the AU has a person dedicated to help its members to connect with companies in the region. The presence of the unit across multiple campuses, covering a broad geographical area, facilitates collaborations with regional partners.

A list of national and international collaborations is given on the self-evaluation. Several projects are reported that involve a large number of partners and institutions. These activities contribute to the advancement of ICT in the public sector and to develop methodologies for educational purposes in different sectors and various levels. However, in some cases the role of the MIS group is not explicitly mentioned.

Recommendation to the administrative unit.

- Several collaborations through national and international projects are in place. Efforts to generate more external funding and long-term collaborations should be pursued through this extensive national and international network.

1.6 Research staff

The unit aims to reach and maintain a good gender balance among the staff. This seems to be better at unit level than in the MIS group, but it has management attention. Plans for career development are said to be in place. New career development plans for PhDs and postdoctoral researchers are being implemented. However, detailed information on these plans is not given.

The limited amount of time Assistant professors are allocated for research raises some questions. More opportunities for promotion to Associate professors should be provided, to secure specific competences and increase the overall academic level of the MIS group. These faculty members often need more time for research. Also, for good career advancement, mobility (sabbatical or short stays) should be encouraged and facilitated.

The number of PhD students is quite low, considering the number of professors present in the group.

The yearly annual seminar dedicated to PhD supervisors is an important item and should be continued.

Recommendations to the administrative unit

- More PhD positions should be created through external funding to increase research capacity and the academic level of the group.

- Stimulate mobility of staff members, especially young researchers. This will be beneficial to their own development, career advancement but also to the overall group and AU academic growth.

1.7 Open Science

The School of Business actively promotes Open Science through seminars, dedicated publications and encourage staff members to publish openly, aligning with USN-wide initiatives on this matter. A full-text copy of all academic articles is made available through the university's institutional repository. The university also participates in national agreements with major publishers, offering researchers access to high-quality journals with open access options. Furthermore, USN has a publishing fund to cover article processing charges for journals not included in these agreements.

The guidelines for the management of research data (following the FAIR principles) and Open Access policy provided by the university have endorsed by the group. In addition, an institutional project aiming at covering more open science areas than current policies do, was recently initiated. The AU encourages its researchers to follow such developments.

2. Research production, quality and integrity

The MIS group produces relevant publications addressing important societal issues. International co-authors are present in the majority of the publications reported, indicating an extensive cooperative attitude. However, these publications contribute less to the advancement of the disciplines in which researchers are specialised. Publications consists

often of literature reviews or overviews. Therefore, the extent to which these contributions advance the state of the art in their own research field is limited. Measures should be taken to encourage research activities that make original contributions to the field, address emerging challenges at an academic level.

The scientific quality of the projects and publications varies. Some effort is needed to improve the overall quality. While maintaining its applied character, research should be more at the forefront of science and maintain high international standards to enhance the credibility and impact of the group's output. This will generate more visibility in the national and international community and potentially generate more projects and long-term collaborations. A good balance between impact and relevance of research and achieving high scientific standards, should be established.

2.1 Research quality and integrity

Research group Management Information Systems (MIS) overall assessment

The MIS group has several strengths, including its involvement in important and relevant research topics, its success in attracting external funding, and its multidisciplinary approach. However, the group faces challenges in creating a sense of community due to its dispersed nature across campuses and departments. The complicated funding structure and low ambition level in publishing research results are areas of weakness. Despite these challenges, the MIS research group has the potential to achieve its goals, particularly in contributing to societal impact through applied research. With a resolute effort to foster collaboration among members and streamline funding processes, the group can enhance its performance and make a more significant contribution to both national and international research environments. The group's multidisciplinary approach and focus on practical research topics position it well to engage with global partners and address pressing challenges on a broader scale. By leveraging its strengths and addressing its weaknesses, the MIS research group can foster its international presence and establish itself as a leader in applied research within the field of management information systems.

3. Diversity and equality

The unit does not have a specific policy with respect to diversity and equality, but follows the USN Action plan for Equality, Diversity and Inclusion. This is quite detailed, covering all different functions within the organisation. The AU states that personnel policy guidelines promote professional and efficient management; contribute to well-being in the workplace and to development of human resources. However, there is no mention of specific and/or detailed actions within the unit/research group to illustrate how the USN plan is implemented.

4. Relevance to institutional and sectoral purposes

The contribution to the sector-specific objectives, innovation and commercialisation activities is addressed at AU level. It is fair to assume that this issue is approached in a similar way by all research groups within the AU, including the one under this evaluation (MIS). The list of successful innovation and commercialisation results for the reporting period comprises a management tool, an e-learning system, prototypes with potential to develop into business opportunities, a data collection unit for optimising solar panel performance.

The MIS contribution to MSc and PhD programmes is mainly:

- Responsibility for 2 MSc programmes (eBusiness and cybersecurity; Digital Transformation) in collaboration with other Faculties

- Contribution to other MSc programmes

- Supervision of PhD students, including students from outside USN

- Development jointly with other universities of e-learning systems

5. Relevance to society

The flexible and accessible education provided by the unit is certainly of great value to the Norwegian long-term goals for research and higher education. The MIS group has co-developed and implemented the Protus system for teaching object-oriented programming at institutions like USN and NTNU, thus enhancing the overall quality of IT education.

Valuable contributions to society are also the involvement in connecting academic staff and students with regional companies and in organising conferences and events to foster knowledge exchange and innovation in the field of IT.

The research themes to which members of the research group are directly or indirectly contributing are all of great relevance to address societal challenges. If concrete actions for their involvement in Artificial Intelligence (AI) research are taken, the societal relevance and impact of the unit will increase.

Two impact cases are presented.

5.1 Impact cases

Comments on impact case 1: BETTEReHEALTH: Human, technical and political factors for better coordination and support of e-health in Africa

The first impact case presented is a large international project, funded by the EU H2020 programme. One group member, an Associate Professor in the department, was involved.

The main objective of this project was to provide decision-support tools and methods to implement, integrate and use e-health in Africa. It involves end-user communities and policymakers. Four regional hubs have been established in Africa. These consist of stakeholders with different backgrounds, namely policymakers, health services, technical implementers and academic researchers. Several regional workshops and two international conferences have been organised. Seven peer-reviewed scientific papers and five popular science articles have been published, in line with the aim of prioritising dissemination and communication of the research outcome. Best practice examples have been documented and knowledge regarding human, technical and public policy factors for successful implementation of e-health in Africa has been developed. An exploitation plan to sustain the regional hubs beyond the project period has been elaborated. This is a very relevant aspect to guarantee continuation and further expansion of the initiated programme.

The societal impact of this project is clear and the plans for turning it into a sustainable activity further underline the value of this activity.

Comments on impact case 2: Entrepreneurial Software Engineering: Bridging the Gap between Engineering and Business in Start-ups.

This impact case is a study on the application and adaptation of software development methodologies with entrepreneurial strategies in a startup context. One group member, a professor in the department, was involved.

The integration of these disciplines not only enhances innovation but also accelerates product development. The main impact of this project is to increase efficiency in the development of software products in startups. It is the result of a long-term collaboration among international research groups on the topic (Software startups Global Research Network). More than 55 members from different countries were involved. More than 130 peer-reviewed articles have been published in journals and conference proceedings in various areas: Software Engineering, Information Systems, Engineering Management and Entrepreneurship. This is a clear indication of the multidisciplinary character of the research theme addressed. The large dissemination is also beneficial to increase the outreach of the project outcomes.

The presented case has an educational and a practical impact. The research has contributed to shaping the curriculum and teaching methods in software engineering and entrepreneurship courses. Educational institutions have adopted these research results to prepare students for the unique challenges the startups environment presents. A practical impact can be seen in the benefit for startups in adopting the proposed methods and techniques to enable more efficient development processes.

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 HEI's)

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 at least 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 group's 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 that the Administrative Unit's self-assessment report was insufficient to assess all evaluation criteria fully, and some information gaps remained after the interview with the Administrative Unit.

List of administrative unit's research groups

Institution	Administrative Unit	Research Groups
University of South-Eastern Norway (USN)	USN School of Business	Management Information Systems (MIS)

Terms of Reference (ToR) for the administrative unit

The board of USN School of Business mandates the evaluation committee appointed by the Research Council of Norway (RCN) to assess USN School of Business based on the following Terms of Reference.

Assessment

You are asked to assess the organisation, quality and diversity of research conducted by USN School of Business 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.

In addition, we would like your report to provide a qualitative assessment of USN School of Business 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 USN School of Business 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 USN School of Business 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 the USN School of Business and RCT]. The USN School of Business 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 board of USN School of Business and the RCN no later than two weeks after all feedback on inaccuracies has been received from USN School of Business.

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)