Forskningsrådet

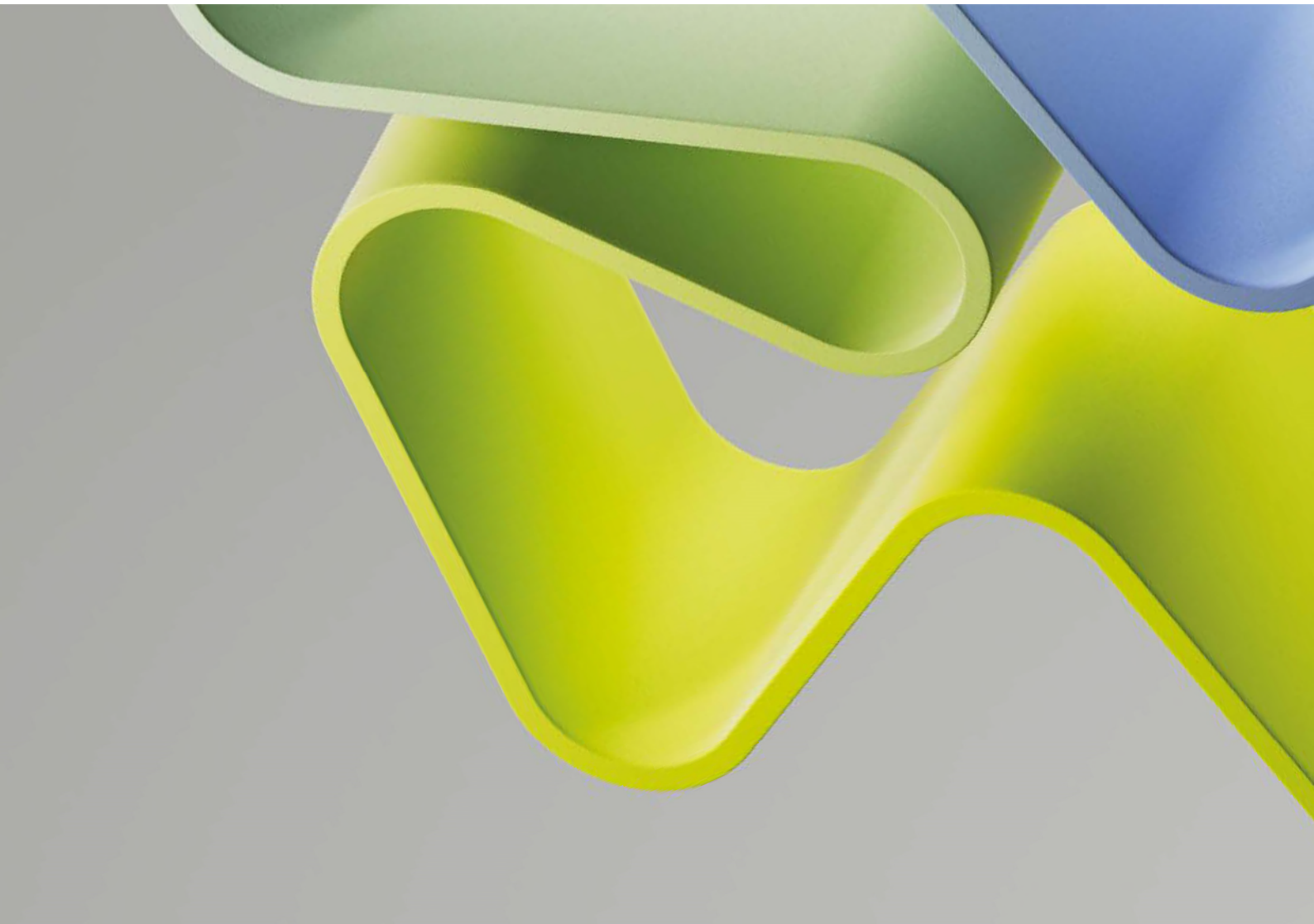
Evaluation of Natural Sciences 2022-2024

Evaluation report

Department of Chemistry

Norwegian University of Science and Technology - Faculty of Science

January 2024



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Statement from Evaluation Committee II

The members of this Evaluation Committee have evaluated the following administrative units at the higher education institutions within natural sciences in 2022-2023 and submitted a report for each administrative unit:

- Department of Chemistry, Norwegian University of Science and Technology
- Department of Physics, Norwegian University of Science and Technology
- Department of Chemical Engineering, Norwegian University of Science and Technology
- Department of Materials Science and Engineering, Norwegian University of Science and Technology
- Department of Geoscience, University of Tromsø
- Department of Chemistry, University of Tromsø
- Department of Physics and Technology, University of Tromsø
- Department of Energy Resources, University of Stavanger
- UNIS – The University Centre in Svalbard

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

The Evaluation Committee has consisted of the following members:

Professor **Amelie Hagelauer** (chair)

Technical University of Munich, Germany

Dr. **Eric Deville**

IFP Energies Nouvelles, France

Professor **Christian Ruegg**

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Professor **Guido Mul**

University of Twente, The Netherlands

Professor **Sigridur Suman**

University of Iceland, Iceland

Description of the administrative unit

Norwegian University of Science and Technology - NTNU
Department of Chemistry - IKJ

The administrative unit
In 2021 Department of Chemistry had 25 employees in combined research and teaching positions. The unit performs research in broad areas and include both applied and basic research. Core research areas are medicinal chemistry, organic electronic materials, sustainable chemistry/catalysis, effects of pollution in nature, Arctic research, marine chemistry and aquaculture sciences, circular economy and sustainability food production, analytical methods for solving challenges in environmental chemistry, thermodynamics, quantum chemistry, computational reaction dynamics, and molecular modelling, physical chemistry, and biomolecular modelling.

The belonging research groups
IKJ consists of three research groups - Organic Chemistry group, Environmental and Analytical Chemistry group and Theoretical Chemistry group.

The administrative unit works in relation to the unit's strategies
The IKJ strategy aims to achieve the following objectives:

- Host and participate in Research Council projects and centers, as well as EU projects with the aim of covering society's needs
- The department should be characterized by high quality within experimental, computational, and theoretical research
- Research laboratories should be equipped with stat-of-the art scientific equipment and be available to all users
- All research groups should be active in research and work in teams to develop joint research projects and be involved in interdisciplinary collaboration at national and international level
- Research should be published to the largest possible extent in open access journals and be in accordance with current ethical standards and research policy
- Outstanding research groups are prioritized, and the department places special emphasis on identifying and supporting new research talents

The unit works in relation to the belonging sector
The Department primarily focuses on basic research, but also actively seeks engagement with industry partners such as Jotun, Equinor, DNV, SINTEF, and others. The Department works with the NTNU Technology Transfer Office for connecting research with relevant industry. The Department works with Adjunct professors with strong industry contacts. The Department has a strategy to increase number of industry-PhD's.
Department's research is directly relevant to ocean/coast, energy and environment which are in alignment with several of the thematic areas defined in the Norwegian Long-term Plan for Research and Higher Education. IKJ carefully follows the requirements, guidelines and evaluations given by NOKUT for quality in education.

Where the unit will be in the future
Long term development and strategy is to prioritize research areas within chemistry that are related to the UN's sustainability goals and invest especially in the research areas of energy, health, and environment.

Overall assessment of the Evaluation Committee

Norwegian University of Science and Technology (NTNU) is a large university formed through several mergers of smaller educational institutes. NTNU Department of Chemistry (IKJ) originates from the University of Trondheim. NTNU is an impressive educational institute that has regularly reorganized its faculties and is preparing for one more reorganization, perhaps partly because of its history as many separate units. The NTNU-IKJ performs at a high level and is internationally leading in research in some areas, particularly in marine and Arctic studies, and is internationally renowned for its contribution to theoretical chemistry. Overall, the unit is high performing, with its research groups well connected and embedded in international science communities or highly active to keep up national collaborations, while networking effectively for more.

The Environmental Chemistry group and Theoretical Chemistry group appear to have a solid foundation for their activities, and they have carved out their own space in international research. They have a well-defined focus and a commitment to excellence in research. The Organic Chemistry group is actively working on strengthening its position in organic electronic materials research. The Organic Chemistry group publication records suggest collaborations may be preferred over local leadership based on the group not leading the highest impact published work and its numerous collaborations. Despite that, this group is active in applied research and patenting and may improve its impact by increasing its initiatives in research activities and leadership. Two of the three research groups are performing very well at a high level in terms of quality in research and teaching, and with defined focus and strategies. The Organic Chemistry group is in transition and with determination and focus they have a bright future.

The unit has adequate resources and infrastructure to conduct research, and to train students at the MS and PhD levels with a focus on academic excellence. The research is well organized. However, the unit appears to operate in a vulnerable position because of the unit size and teaching load, where teaching activities are prioritized over research in case of staff absences.

Some of the research is highly relevant in contributing to the United Nations SDGs. Research projects are a mixture of basic and applied research – research excellence appears slightly lost in an emphasis on applied work. The groups appear to believe funding is favoured for applied research which explains their focus on applied research. Some synergies between groups exist, for example, Environmental Chemistry research group contributes to the work of other research groups. The unit is successful in securing external funding and has strong international links. However, the unclear focus and issues with research infrastructure for the Organic Chemistry group is a weakness of the unit which potentially will be overcome when the ongoing restructuring is complete.

The unit strengths include ability to support best performing research groups and new talents with in-kind funding and a selective ability to reduce teaching load. This focus is supported top down at the faculty level. Weaknesses are around uncertainty regarding funding that affects renewal and maintenance of equipment, increasing teaching load, and to maintain research at current level. The administrative unit strategic targets for research and society focus on energy, health, and the environment. In general, the impact cases show strong contribution to society and the future.

The Evaluation Committee considered the points raised by IKJ in their Terms-of-Reference document and have commented on many of the issues raised in that document. Where no comments are provided, this generally reflects a lack of relevant information in the self-assessment to allow the Evaluation Committee to reach a view.

Recommendations

Based on the overall assessment of the Department of Chemistry, NTNU, the Evaluation Committee recommends the following:

- The challenge in staffing for teaching activities could be addressed by hiring staff that is devoted to teaching (Lecturers). Similarly, part time staff could be assigned to teaching or research duties only to improve productivity
- NTNU is working on a reorganization of their school. This is an opportunity to bring together groups that have synergy but are not working together either by location or logistically. For example, the Department of Chemical Engineering hosts research groups in catalysis and environmental engineering, that likely have synergies with research groups in the IKJ department. Catalysis is a common theme in chemistry departments, and environmental/analytical sciences are currently an important topic in both units. Collaboration or exploitation of the synergies between IKP and IKJ could relieve identified challenges in teaching load.
- The Theoretical Chemistry and Environmental Chemistry groups both demonstrate important and significant societal contribution but could try to include more public outreach that could draw more attention to their research. This could possibly be achieved with open house event and layman presentations to the local public or to secondary educational institutions.
- The Organic Chemistry group is very good at public outreach but could improve its scientific prowess and leadership as leading authors on publications, and with increased number of funded grant applications as primary research group. It could be done with the current collaborators, but the Organic Chemistry group researchers could take the leadership roles in projects that involve consortia building and collaboration.
- Research projects are a mixture of basic and applied research - excellence appears slightly lost in overextension into applied work. The research groups believe they need to focus on applied research to obtain funding. The unit needs to ensure balanced effort between basic and applied research and could increase their effort in applying for basic research funding with longer-term future applications in mind.
- Focus on strengthening relations of MS and PhD work with industry as appropriate. The Theoretical Chemistry group focuses on basic research and academic excellence while the Organic Chemistry group is more connected to the industry. The Environmental Chemistry group has a balance in this regard which is reflected in their expertise as a group to have a natural synergy in applied and basic research.
- The units' research strategies could be focused better to the activities the research groups are leading and align them with the contribution to the Sustainable Development Goals (SDG) as defined by NTNU.

1. Strategy, resources, and organization of research

NTNU IKJ has a clearly planned research strategy and an adequate organization to carry out its research activities. NTNU has an overall strategy the administrative units adhere to in their research strategies and goals. The target goals for the administrative unit are in health, energy, and the environment. IKJ prioritizes excellence in research and supports the research groups that receive funding with in-kind support and reduction in teaching load. The cohesiveness of the unit may be improved based on expressed lack in supporting activities related to commercialization and relationship building with industry.

The unit has sufficient funding to conduct its research and all facilities they need to carry out analytical work. More funding should be targeted towards increasing efforts in research and to improve collaboration with industry through training of master's students and industry PhD candidates. The quality of the academic staff is excellent, many of whom are internationally renowned for their work in physical chemistry and environmental sciences. The unit makes use of national and international infrastructures to some extent when necessary.

1.1 Research Strategy

Research strategy of IKJ is aligned with public national and international strategic documents. Outstanding research groups are prioritized, and the department places special emphasis on identifying and supporting new research talents. Support includes in-kind funding like PhD positions in strategic research applications and/or projects, internal prioritizing of investment in equipment, temporary reduced teaching load, and administrative support with budgeting. Age distribution of academic staff is fairly even, and the individual group reports confirm a healthy renewal of researchers in the unit.

The research groups within the administrative unit have different strategies in research and innovation activities. They also vary in how they structure their activities and overall research organisation. They share looking to NTNU's overall strategy and SDG goals at the faculty level, and all engage both in basic and applied research topics. The Environmental Chemistry group has a clear strategic plan to support researchers into successful directions of their work. The Theoretical Chemistry group has a fluid strategy in coordinating research activities that are also highly successful in conducting high quality research. The Organic Chemistry group benefits from multiple collaborations and has success in teamwork and collaborations.

The apparent lack of leadership is an inherent weakness that may become a threat to future success of the administrative unit. The Organic Chemistry group could define better how their research contributes to specific SDGs through their specific strengths and abilities in research excellence. This group is concerned with maintenance of infrastructure that is perceived as a threat to research activities. The administrative and research units are aware of threats and opportunities for future research. Interview with the administrative unit suggested that the Organic Chemistry group is undergoing restructuring and staff renewal that has influenced the output quality, although new focus on specific research areas and forward-looking vision are promising.

1.2 Organisation of research

The department management team is led by Head of Department, two deputies of Research and Education with defined roles. Deputy of Research coordinates the graduate programme for students and represents three research group leaders. The management team has representatives of the administrative, and technical staff and students participating. The administrative unit is aware of its relevance and role within the institution. The administrative strategy is high level and aligned with UN Sustainable Development Goals (SDGs).

The presented organization is overall suitable to conduct the proposed research and innovation activities and the unit understands well its role and position in the Norwegian research ecosystem with respect to the strengths and weaknesses the different units identified. Some improvements will be beneficial for future research targets and to secure additional funding, in particular for ground-breaking research.

The research activity is organised in three research groups which draw together complementary expertise and infrastructure. The groups vary significantly in size, where the Theoretical Chemistry is very strong with leadership across levels of experience and expertise. They focus on high quality education but also share common commitment to method and software development in theoretical chemistry. Environmental Chemistry has strong applied research projects, and basic research projects that train PhD candidates in the thematic framework of the chemistry department. The Organic Chemistry is the most diverse group and it operates most informally. They have a mixture of applied and basic research projects and collaborations with both industry and other academic outfits.

1.3 Research funding

The unit receives most of its funding from the Ministry of Higher Education. About 24% of the total funding is obtained from competitive funding sources. About 5.3% is obtained from EU sources, and industry funded projects account for 1.8% of the total. Overall, the administrative unit has adequate funding for its research activities. Considering the experience of similar organisations internationally, there is room for increase in competitive funding and industry funding. The administrative unit targets industry for master's level projects and collaboration with adjunct professors from industry and could expand this collaboration to more frequent collaborative research projects.

1.4 Use of infrastructures

The Administrative unit has all facilities necessary to conduct their daily work. Administrative unit has analytical equipment (NMR) for research within organic chemistry, arctic research (SIOS, Ny-Ålesund)), marine research (Ocean Lab, RV Kronprins Haakon) and nanotechnology (Norfab) within Environmental / Analytical Chemistry and access to High-Performance Computing for modelling within the area of theoretical chemistry.

Access to infrastructures is through a booking system. Cost of usage is charged to funded projects except for Sigma2 and ESRF facility. Collaboration with SIOS and Zeppelin station gives access to databases.

Participation in national and international infrastructures is present (for some groups) but the internationalization side can be certainly improved by increased use. The administrative unit (and research groups) overall have been taking adequate actions to fulfil the FAIR-principles. The unit research staff composition (and research groups) is overall appropriate and the group career development practices are consistent with best practices.

1.5 National and international collaboration

The administrative unit uses collaborations extensively and effectively. Collaborations are with a wide range of industry, higher education institutions, and research institutes. Collaborations offer extensions of the local training to students and researchers to elevate their research experience from a national to international quality. IKJ has in place a programme for mobility for all staff and graduate students. Research staff members are entitled to a sabbatical leave every five years and Erasmus mobility grants are available to postdocs and PhD students. However, it is challenging to arrange the sabbaticals due to limited resources. The policy on sabbaticals should be maintained and followed up with adequate resourcing.

The research groups have access to the Network University in Svalbard (UNIS). Students can apply for a semester or courses at UNIS at the MS or PhD level. UNIS is highly collaborative international location with international recognition as a research facility.

1.6 Research staff

Some excellent scientists with global reputation and connections work at IKJ. The unit also has very strong network with global ties for collaborations, internationally in research institutes and academia and nationally in all relevant sectors. Good plan is in place for on-boarding early career researchers (ECR's) and academic staff. Overall, the staff composition/balance between professors, researchers and PhD students is good. Commitment to teaching quality in the on-boarding process is obvious.

The gender balance reflects increased hiring of females in later years. Female associate professors are at 36% compared to 14% at the Professor level.

2. Research production, quality, and integrity

The IKJ research groups show variance in publication quality between the groups, but overall performance is very good. Bibliometric data shows that the administrative unit ranks highest in productivity by women in Norway when measured as author shares per FTE. About 34% of published works are OA, and 25% are Gold OA. NTNU-IKJ impact compared to other papers published in Norway were below the normalized average of 100 on the list of citation impact score as "*share of 10% most cited pubs*" for the time period of 2018-2020. The bibliometric data also shows that more than half of all publications from IKJ were collaborations. About a third of the co-authored papers were in highly respected journals with high impact.

Two research groups (Theoretical Chemistry group and Environmental Chemistry group) are producing excellent research and are internationally established groups. The organic chemistry group has focused more on collaborations and networking and public outreach, and this shows as lower quality output in bibliometric data where the group does not appear to lead.

The administrative unit leadership has been successful in positioning staff into national centers for excellence in basic research, research-based innovation. Strategically most important participation is in the center of excellence SFF PoreLab and center for innovation SFI CtrlAqua. The administrative unit has competitive strategy to the international best practices of research integrity and importance of ethics.

2.1 Research quality and integrity

Research group Environmental Chemistry overall assessment

The Environmental Chemistry group established over ten years ago a strategic plan for analytical chemistry and environmental chemistry, with the focus on scientific collaboration with external institutions. Since then, the research output has gradually increased. The group has followed the marine strategy for 2019-2029 of the Faculty of Natural Sciences, NTNU, and cantered the studies increasingly to the Arctic research and activated an educational and research level collaboration with the University Centre in Svalbard (UNIS). The national and international collaboration has been active with the research on inorganic elements combined with organics and the organic analytical chemistry research, established in 2017, has further enhanced the national and international research cooperation. The Environmental Chemistry group has very good research record in all the fields they work, and the group has a great potential to contribute even more to the research questions related to the Arctic by focusing its future goals. In addition, the group has interesting and innovative future plans for mass spectrometry and big data handling if extra investments in relevant infrastructure comes true.

Research group Theoretical Chemistry Research Group overall assessment

The Theoretical Chemistry Research Group is a distinguished unit that performs original and most valuable work in the area of theoretical chemistry. The group places a high value on basic and advanced education in physical chemistry, and it has a supportive atmosphere for collaborative work, training and mentorship. Its structure is adapted to support their teaching and research goals. The group contributes to economic, societal and cultural development in Norway and internationally by bridging the gap between experimental discoveries in chemistry and theoretical modelling. The focus of research activities is on fundamental research with potential high impact on energy and health. The group is successful in attracting funding from several sources and uses resources according to the best practices to conduct high-quality research. The group's research activities are recognized by its contributions to high-quality peer-reviewed articles, conference participation, and software releases. The strong focus of the group on theory and method advancements is their major strength, as it is the development of unique software tools made available to the community for wide academic and industrial use. The group's recent developments on topics such as plasmonics, polaritons, and non-equilibrium surface properties demonstrate its prominent level of research quality. The group has strong collaborations with other universities in Norway and is comparable to international best practice examples in the field of theoretical chemistry. This is overall a strong group that should be further supported and highlighted.

Research group Organic Chemistry Section overall assessment

Based on the evaluation criteria, the Organic Chemistry research group displays several strengths and weaknesses. One of the main strengths is their expertise in organic synthesis, which enables them to carry out innovative research projects. Additionally, their collaborations with other research groups and institutions demonstrate their ability to work effectively in a team and foster a culture of cooperation. The group is also well organized, with an informal structure that suits well its internal network, and which enables synergies to be exploited.

However, the panel identified areas for improvement. While the group's research outputs in all areas are of good quality, there could be a stronger focus on originality and breakthrough discoveries in some disciplines. The group's societal contribution also has room for improvement, particularly in terms of public outreach and stakeholder engagement. Finally, the panel would welcome even stronger intertwining of the research interests within the group.

Overall, the Organic Chemistry research group demonstrates a good performance across the evaluation criteria, particularly in organization, research quality and infrastructure/resources. The group has the potential to make significant contributions to the field of organic chemistry, particularly given their intersectional research approaches. Improvements in research originality and innovative content, public outreach, and stakeholder engagement are necessary to increase their overall impact and contribution to society.

2.2. Open Science

The presented commitment to open sciences is high level. The administrative unit follows publication policies and principles that require research funded by public grants to be published in compliant Open Access journals or platforms. Other funding schemes are included as appropriate. FAIR principles were communicated from the RCN and the Directorate of higher education. NTNU employs a database depository for open data from all fields and disciplines. Software developed by researchers at Department were made available. e.g., "eT software", PyRETIS, "Thermopack Software", and "PVT calculations". NTNU has strong commitment to open science demonstrated by efforts in open access software developed there. Open access of publications is based on funded grants, i.e. presumably the grants pay for the APC costs.

The administrative unit uses the CRISTiN archive for registration of disseminated material as well as information about projects. Data generated in projects funded by RCN, EU or other governmental funding instruments should as a rule be open. NTNU Chemistry Department generated a DATA Management plan which describes how data is managed until published. Data is shared with Research in Svalbard, and SIOS through this archive. Head of Department (HoD) holds the responsibility for signing confidentiality agreements under the Data Management plan.

3. Diversity and equality

The administrative unit's actions are appropriate to protect against discrimination. Their plans and intentions align with best international practices. The unit has international standards for protection against discrimination and follows a national policy for diversity and equality practices.

Training in ethics is provided to staff and students, and cases of unethical behaviour or censurable conditions are followed up on by the HoD. Diversity training is also provided. NTNU has policies for "Sexual Harassment", and "Gender Equality and Diversity", and Guidelines for "Ethics in Research" and "Public Service". These policies and guidelines are used in the training of students and staff.

4. Relevance to institutional and sectorial purposes

This administrative unit is very well organized to train and educate students at the higher educational level. The students have excellent opportunities to obtain training in academic research, experience international and national mobility and with a focus on applied research and strong networking at NTNU they also have opportunities to experience industrial interests in research. NTNU IKJ has variable focus within different research groups that overall encompass all three sectors with collaborations and joint focus on SDG goals. An important point that may be given is that the student to educator ratio is favourable for the student resulting in an opportunity to deepen their education through strong interactions with their mentors. The broad scope of IKJ allows the student a large choice for higher education studies.

Research activity has received lower priority than teaching at NTNU - a challenge that has been visited in the past two years and led to an updated Development Agreement. The administrative unit has a coherent plan with a recently appointed Dean for Innovation, but it is not clear if the infrastructure is in place. The administrative unit uses collaborations extensively and effectively in research. Collaborations offer extensions of the local training to national or international quality.

IKJ focuses on applied research in some of its research groups. A lack of strategy for relationship building with industry and innovation was identified as a weakness for the unit. The research groups likely need to build these relationships on a group level. The administrative unit is active in patenting and has shown in its impact case examples a strong focus in collaborations and consortium to drive commercialization activities, as far as the unit is able, with high potential impact on both research and industry. The administrative unit has in place well planned strategy for research with focus on sustainable development goals that is shared on the faculty level at NTNU but could be more specific how they approach their SDG goals.

The three research groups are aligned with the department strategy, strategies for the research groups and the research portfolio activities according to the Development Agreement between NTNU and the government.

5. Relevance to society

Strong focus on the UN sustainable development goals is presented as a planned strategy for NTNU IKJ, as well as support of projects with societal relevance. Priority research is directly relevant to ocean/coast, energy, environment which are in alignment with several of the thematic areas in the long-term plan. The administrative unit could be more specific regarding which SDG's they focus on and connect to them more specifically to their research goals. The overall approach is balanced but lacks public outreach. It should be noted that Theoretical Chemistry group, despite lacking public outreach, has significant societal contribution through their open access software that is also internationally known.

The relevance and contribution to society is present in some of the groups in line with UN SDGs. Two presented impact cases have strong societal impact and are of high quality. The societal impact relates to the environment, energy, and climate and align well with the long-term plan presented by NTNU at the faculty level.

Comments to impact case 1 - Sustainable food production in aquaculture (IKJ-NTNU)

This impact case addresses significant challenges in the salmon farming industry in Norway and internationally. A successful or partially successful project has a high impact on said industry and society in the future, where its impact could be a paradigm shift from ocean farming to closed container systems (CCS) farming of salmon. Stakeholders are a multidisciplinary international consortium from academia and industry that has participated for over eight years. NTNU-IKJ has been specifically involved in research on maintaining water quality in a CCS for salmon farming. The research project involves studying water salinity, microbial analysis, and the impact of nitrifying bioreactors on fish health and CCS water quality. The project expands to develop sensors to quantify or qualitatively determine the presence of metal ions like iron, zinc, and copper. An important role involves collecting and analysing data to avoid biofouling of the sensor systems, monitoring the water quality, and recirculation systems. At least 5 PhD students graduated, and multiple MS projects were conducted with industry partners. Clear references were given regarding the underpinning research, academic, and public outreach impact of the case, supporting societal impact. Important results regarding biofilm properties in CCS were obtained. The unspoken impact in the case is a general environmental concern over the impact of salmon farming in the ocean on aquatic wildlife, specifically on wild salmon survival. This case is high impact and vital work for the environment and society.

Comments to impact case 2 - Applications of porous layers for PEM fuel cells and CO_2 sequestration (IKJ-NTNU)

The case describes research from the Centre of Excellence PoreLab, which partners with the University of Oslo. Since 2017, five senior researchers from NTNU-IKJ have led the research, trained students, and published excellent papers in highly rated journals. Six PhD candidates from NTNU-IKJ were involved, with additional candidates co-supervised by the NTNU-IKJ researchers. The case presents a key discovery in the properties of MOF and zeolites and similarly porous structures, which are expected to lead to a new understanding of how porous materials function that may allow for future applications in hydrogen or CO2 storage and activation. If successful, this case presents a state-of-the-art theoretical work with a high societal impact. References to the underpinning research are excellent, as are the publications presented. The impact addresses future societal needs around climate, environment, and energy. Awards received by participants give evidence for international recognition of the case — academic interest and impact by interest in one of their key publications, as downloaded 13,000 times since 2018.

List of administrative unit´s research groups

Institution	Administrative Unit	Research Groups
The University Centre in Svalbard	The University Centre in Svalbard	Cryosphere Group
		Air-Cryosphere-Sea Interaction Group
		Space Physics
		Sedimentology, surface processes, paleoclimate, structural geology and geophysics
		Marine Biology
		Terrestrial Biology

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 (see appendix 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

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 group assessment, and the interview. The Administrative Unit had the opportunity to fact-check this summary. The Administrative Unit approved the summary with minor adjustments.

Limitations

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

Appendices (link to website)

1. Description of the evaluation of EVALNAT
2. Invitation to the evaluation including address list
3. Evaluation protocol
4. Self-assessment administrative units
5. Grading scale for research groups

Website: https://www.forskningsradet.no/tall-analyse/evalueringer/fag-tema/naturvitenskap/

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