

Evaluation of Life Sciences 2022-2024

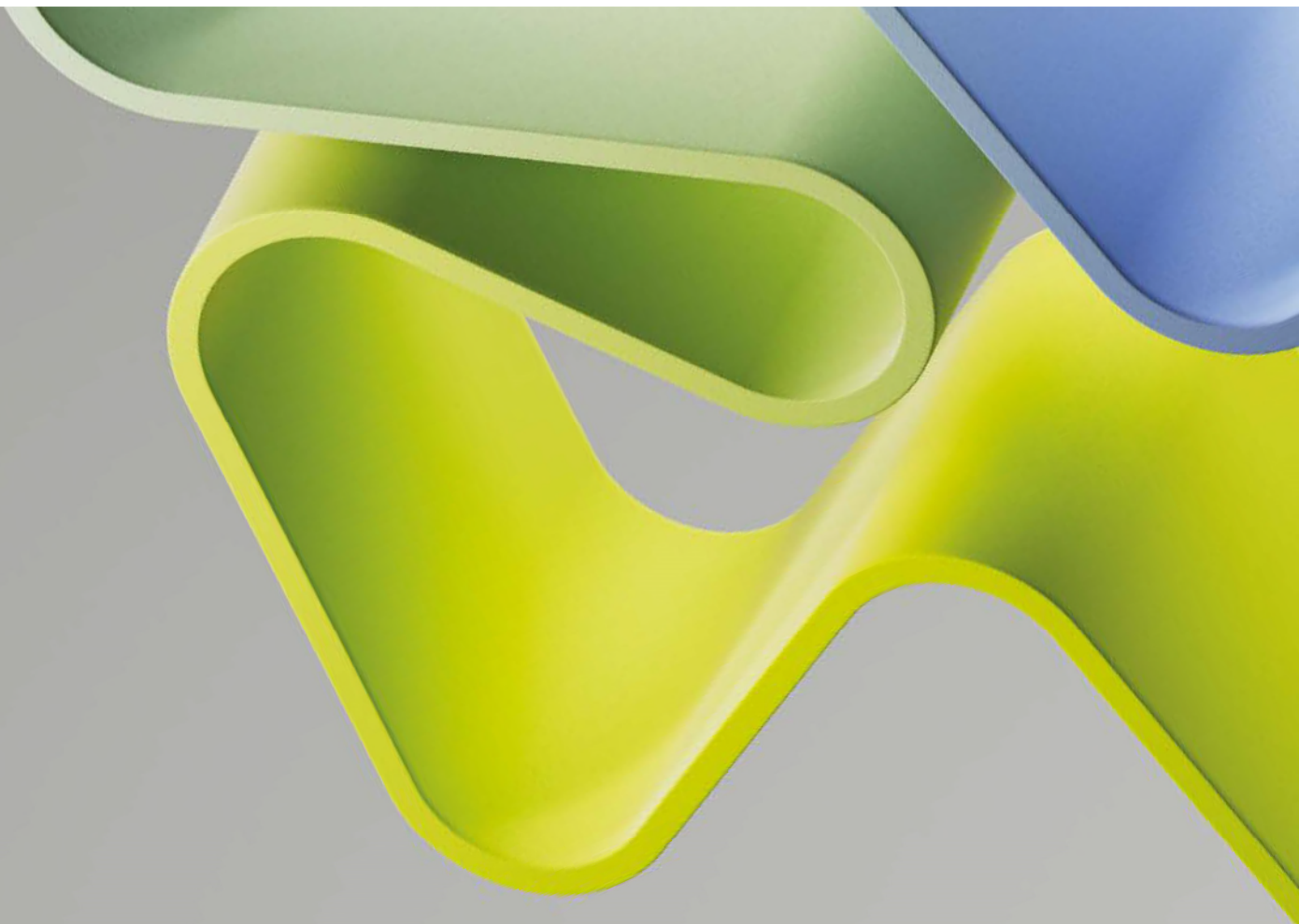
Evaluation of Biosciences 2022-2023

Evaluation report

**Faculty of Chemistry, Biotechnology and Food
Science (KBM)**

Norwegian University of Life Sciences (NMBU)

December 2023



Contents

Statement from Evaluation Committee 2	2
Profile of the administrative unit	3
Overall assessment	4
Recommendations	5
1.Strategy, resources and organisation of research	6
1.1 Research Strategy	6
1.2 Organisation of research	6
1.3 Research funding	7
1.4 Use of infrastructures	7
1.5 National and international collaboration	8
1.6 Research staff	8
2. Research production, quality and integrity	9
2.1 Research quality and integrity	9
2.2. Open Science	11
3. Diversity and equality	11
4. Relevance to institutional and sectorial purposes	12
Appendices	15

Statement from Evaluation Committee 2

This report is from Evaluation Committee 2 which evaluated the following administrative units representing the higher education sector in the Evaluation of Biosciences 2022-2023:

- Faculty of Bioscience (BIOVIT), Norwegian University of Life Sciences (NMBU)
- Faculty of Chemistry, Biotechnology and Food Science (KBM), NMBU
- Faculty of Biosciences and Aquaculture (FBA), Nord University (Nord)
- Department of Biotechnology and Food Science (IBT), Norwegian University of Science and Technology (NTNU)
- Computational Biology Administrative unit (CBU), University of Bergen (UiB)
- Department of biological sciences (BIO), UiB
- Department of Biosciences (IBV), University of Oslo (UiO)
- Department of Chemistry, Bioscience and Environmental Engineering, University of Stavanger (UiS)
- Faculty of Biosciences, Fisheries and Economics (BFE), University of Tromsø – The Arctic University of Norway (UiT)

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 Studiebarometeret and the National Teacher Survey (Norwegian Agency for Quality Assurance in Education [NOKUT]). The digital interviews took place in Autumn 2023.

This report is the consensus view from committee 2. All members of the committee have agreed with the assessments, conclusions and recommendations presented here.

Evaluation committee 2 consisted of the following members:

Professor/Dean
Ivo Sbalzarini (chair),
TUD Dresden University of Technology
& Max Planck Institute of Molecular
Cell Biology and Genetics

Professor
Caroline Austin,
Newcastle University

Professor/Pro-Dean
Ade Whitehouse,
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Professor/Deputy Dean
Lena Mäler,
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EM. Professor/Director
Nico P.E. Vermeulen,
Vrije Universiteit Amsterdam

EM. Professor/Director
Lene Lange,
Technical University Denmark

Adjunct Professor, dr.
Pikka Jokelainen,
Statens Serum Institut

Dr Anoushka Davé, Principal Consultant, Technopolis Group, was the committee secretary.

Oslo, December 2023

Profile of the administrative unit

In 2021, the Faculty of Chemistry, Biotechnology and Food Science (KBM) had a total of 137 employees, out of which 26 were professors, 15 associate professors, four research professors, 43 PhD students, 20 postdocs and 29 engineers and technical staff. Among the professors, women are the minority (16%) while among PhD students, they are a majority (71.3%).

KBM is comprised of six research groups: Bioinformatics and Applied Statistics (BIAS), Biotechnology, Microbiology, Natural Product Chemistry and Organic Analysis, Nitrogen, and Food Quality and Sustainability (SciFood). The Natural Product Chemistry and Organic Analysis research group was evaluated in the parallel EVALNAT evaluation of natural sciences.

KBM identified the following objectives for research and innovation in the strategic plan 2019-2023: (1) that researchers publish in internationally reputable scientific journals and are well-cited; (2) that KBM produces at least three articles per year in top-level broad-scope journals; (3) that KBM has international recognition, for example through collaboration with outstanding groups abroad, high numbers of citations and invited lectures at prestigious international conferences; (4) that its knowledge, quality, and competitive research is widely used in society, contributes to solving complex interdisciplinary challenges (technology transfer), and leads to value creation, increasing the international recognition of some of the research (sub-)groups; (5) that researchers with a PhD from KBM are attractive to multiple sectors, and lead and participate in more externally funded projects that promote high research quality, increase their innovation power, and involve attractive research consortia; and (6) that KBM is a desired academic partner locally, nationally, and internationally. Moreover, KBM states that enabling fundamental free research and enabling its researchers to obtain external funding for such research is core to everything the administrative unit does. For example, KBM considers the administrative unit's high-level innovation activities to be a direct result of the administrative unit's systematic focus on high-quality fundamental research.

As a higher education institution (HEI), KBM strives to follow the four overall goals for HEIs that receive public funding: high quality in research and education; research and education for welfare, value creation and innovation; access to education; and efficiency, diversity, and solidity of the higher education sector and research system. In relation to this, KBM in its self-assessment mentions that the specific development agreement (*Utviklingsavtale*) between the Ministry and NMBU defines interdisciplinarity, collaboration with the University of Oslo, and development of Campus Ås as a leading competence hub for developing the bioeconomy in Norway as objectives. In its self-assessment, KBM states that the administrative unit does high quality research that addresses all these goals, which is evidenced through its success in acquiring external funding, publications in high-quality journals, invitations to give keynote and plenary lectures at international conferences, and its central role in a considerable number of larger national and international collaborative research projects.

Based on its self-assessment, in the future KBM might take advantage of its strong basic research environment, culture for high quality research and good research infrastructure as well as the fact that KBM works in areas of great societal importance and interest.

Overall assessment

The Faculty of Chemistry, Biotechnology and Food Science at the Norwegian University of Life Sciences (NMBU-KBM) conducts high-quality, interdisciplinary research and research-based education. In this evaluation, five research groups were included: Biotechnology, Bioinformatics and Applied Statistics, Microbiology, Nitrogen and Food Quality and Sustainability. Chemistry was excluded. The overall assessment considering the Terms of Reference provided by the Unit is that KBM is impressively strong in basic research and innovative applied research in biotechnology, environment and food, and in collaboration with industry. In the interview, a new cross-faculty application (with NMBU-BIOVIT) for a Centre of Excellence on climate change/gas emissions related to food systems and microbiomes was mentioned, further illustrating KBM's interdisciplinary ambitions. This interdisciplinarity in research could, however, have been illustrated more strongly in KBM's self-assessment.

KBM's research quality is exemplified by the expert panels' evaluations (high quality scores for most research groups), the many national and international collaborations (participating but also leading), invited lectures, collaborative research projects and publications in high-quality journals as evidenced in the Nordic Institute for Studies of innovation, research and education (NIFU) analysis.

KBM's external funding has strongly increased, up to approximately 70% of the administrative unit's total budget, notably from the Research Council of Norway (RCN), EU and industry. With more than 100 active projects in 2021, including a recent European Research Council (ERC) Synergy grant, KBM's strategy to incentivise and increase external funding (e.g. by training, supporting and professionalising writing of grant proposals) is exceptional. However, external funding is unevenly distributed amongst the groups, providing an opportunity to improve the amount of external funding captured by some individual researchers in KBM.

Particular strengths of KBM lie within its infrastructure and its role in Norway, e.g. hosting the Centre for Environment-friendly Energy Research (FME)-funded Norwegian Centre for Sustainable Bio-based Fuels and Energy (Bio4Fuels), founding partner of SFIs Foods, participant in the national Advanced Proteomics Infrastructure, Food Pilot Plant Norway and the BioRefinery Lab. KBM scientists also use many international infrastructures. Maintaining funding of its high-quality infrastructure in the future is seen as a challenge, notably also for its high-tech applied research in biotechnology.

Overall, KBM is scientifically strong, productive and particularly relevant to society and industry. This is supported by three impact cases, illustrating excellent innovations in the biotechnology, agriculture and food sectors, by multiple patents and licences as well as spin-off companies. A particular strength is also the impressive, research-based higher education of many MSc students and PhD candidates, who are well trained, well supervised and crucial for KBM's research.

Recommendations

The evaluation committee wishes to extend the following recommendations to the administrative unit, which are constructive suggestions from an outside view on the basis of the information available to the committee and considering the aspects on which recommendations were requested in the terms of reference.

- There is room for improvement of the share of women among the research staff, notably at the higher categories.
- In addition to the existing training and support in grant writing and incentives for external grants, peer-to-peer mentoring could be used to increase funding success rates for all groups.
- External funding is unevenly distributed amongst research groups. Strategies to increase the ambitions and performances of other groups and stimulation of the sense of urgency of individual scientists are advised.
- KBM lists several threats, e.g. that funding policies are becoming unpredictable and that applied research also requires large investments in equipment and facilities. These issues should be put on the agenda of national and international strategic and/or decisive bodies. Top scientists from KBM (and NMBU) could play a more important role here.
- KBM lists cooperation policy plans that are running till 2023. Given its ambitions to increase (inter-) national recognition and external funding, notably for some research (sub-)groups, a critical evaluation of the current plans as well as an internally agreed future plan are urgently needed.
- KBM's recruitment plan seems primarily based on teaching needs. A plan also including high-quality research potential, collaboration potential and international recognition is advised. The establishment of an international advisory/stakeholders' board could be of help to optimise KBM's research and educational strategy, notably also in view of the NMBU strategy for 2023-2030.
- KBM strives for more publications in high-quality journals, and more focus on quality than on quantity. There is room for improvement. Mentoring junior researchers by experienced scientists might help. New incentives, e.g. budgetary, might help here as well.
- KBM's emphasis on sustainability and interdisciplinarity and applications in food, biotechnology and environmental issues constitute intrinsic opportunities. KBM is advised to seriously and actively prepare its future educational and research strategies based on e.g. RCN's strategy 2020-2024 and beyond, NMBU's Strategy for 2023-2030, and Norway's Long-term plan for research and higher education (2019-2028). As evidenced by the 3 impact cases, KBM has already been scientifically strong, productive and particularly relevant to society and industry.

1. Strategy, resources and organisation of research

In the interview, KBM representatives expressed their feeling that the faculty is privileged in terms of high-quality research, state-of-the-art infrastructure, and a unique combination of advanced basic and innovative applied research. The evaluation committee agrees with this statement.

KBM has a flat organisation, including Heads of Research (HoR) and Education (HoE). It emphasises sustainability and interdisciplinarity, which could have been illustrated better in the self-assessment. To endorse its strategies, several tools, including central investments in infrastructure, freedom-to-operate group budgets and other incentives (e.g. external funding) are applied in practice. In the research group assessments, the organisational dimension was scored well: three groups scoring 4 and two scoring 5 out of 5.

The external funding of KBM is remarkably high, albeit not evenly distributed amongst the research groups and the individual scientists, which indicates room for improvement. Education and training of MSc and PhD students is strongly research-based, and in general well monitored and well supervised. KBM uses tenure-track positions as opportunities for (excellent) early career researchers to develop their research careers and encourages associate professors to apply for full professorships through a national committee. However, it is not clear how successful these initiatives are in practice. For cross-sectorial and interdisciplinary collaborations, KBM has a policy that includes budgetary incentives and fosters a culture with focus on open scientific discussions and solving societal challenges.

1.1 Research Strategy

KBM's strategic plan (2019-2023) presents research and innovation objectives, which are logical, operational and mostly straightforward. No bridging interdisciplinary research themes or activities are visibly presented, which would be expected in view of the synergy and critical mass as well as the examples of successful research projects presented by the administrative unit. In the interview, however, a trans-faculty group with NMBU-BIOVIT, namely Microbial Ecology and Multi-omics, was mentioned. Moreover, last year an application for a Centre of Excellence on 'climate change/gas-emissions related to food systems and microbiomes' was submitted. A recent employee survey apparently scored high on internal collaboration and synergies. To endorse its strategy, several tools are mentioned: funding for infrastructure, freedom-to-operate group budgets based on activities (e.g. number of MSc/PhD candidates), incentives for strategic goals (e.g. external funding) and a recruitment plan for permanent staff (e.g. teaching need and research potential).

The "Strategy for NMBU 2023-2030" offers new opportunities for focus and interdisciplinary collaboration between KBM and other faculties, e.g. BIOVIT.

1.2 Organisation of research

KBM comprises a faculty with research and education broadly ranging from Chemistry to Food Science and emphasis on sustainability and interdisciplinarity. It contained 11 research groups, but after a recent reorganisation this was reduced to seven, of which six were submitted for evaluation (two Biotechnology groups were evaluated as one).

KBM has a flat organisation, including Heads of Research (HoR) and Education (HoE), a small faculty administration and advisory committees with a broad representation. The committees also advise the Dean in administrative, quality control and strategic matters. In the research group assessments, the organisational dimension was scored well: three groups scoring 4 and two scoring 5 out of 5.

KBM members are well represented in national organisations for research funding and related policy forming bodies. For international collaborations, basic funding is provided to research groups to establish networks. Some groups have well-recognised and influential scientists who could maybe play an even more prominent role in this context.

The Biotechnology group, operating in a highly relevant domain of KBM, houses 40-50% of KBM's PhD candidates and postdocs thanks also to a strong external funding portfolio. KBM would benefit from a strategy to increase the ambitions and performance of other groups in this regard.

PhD candidates perform a substantial part of KBM's research, and their progress and well-being are monitored in a structured way, including a talent programme, a mobility grant system and counselling from a PhD advisor. For junior scientists, however, this is the responsibility of group leaders. There is no mentoring for group leaders, albeit the university offers courses (on leadership, communication, grant writing, etc), so this is something the administrative unit could consider for the future.

1.3 Research funding

Research funds from NMBU: 112 million NOK basic funding, of which 18 million NOK for PhD/postdoc fellowships, 9 million NOK for research groups, 12 million NOK for infrastructure. It is not clear how much of the budget is for education.

External funding increased remarkably, i.e. from 42 million NOK in 2011 to 85 million NOK in 2021, primarily due to competitive funding from RCN (64 million NOK), EU (5.7 million NOK) and the Novo Nordisk Foundation (NNF). In 2021, KBM had 98 active RCN projects, 4 NNF projects and 6 EU projects. More recently, EU funding increased drastically to 11 projects, including an ERC Synergy grant.

The level of external funding is very good as per international comparison (60–70%), however, it is quite unevenly distributed amongst groups and the sense of urgency to acquire external funding amongst individual researchers seems to vary. From the self-assessment, it is not clear whether there are strategies to support the weaker groups. Apparently, there is good administrative support at NMBU for EU grants and applications. RCN also organises events on EU funding. Less experienced researchers also get support from the EU office.

Funding for basic research is seen as an increasing challenge in the Norwegian research system. This is also the case for applied research in certain areas, such as biotechnology, which often requires large and costly equipment/facilities. Alternatively, a good balance between basic and applied research is also providing new opportunities to solve societal problems and to develop new innovations. An apparent shift in incentives from funding research to education may affect research performance.

1.4 Use of infrastructures

KBM has good research infrastructure and clearly plays its role in the Norwegian research ecosystem, e.g. by hosting the FME BioFuels infrastructure, by being a founding partner of SFIs Foods of Norway and Industrial Biotechnology, and by participation in the National network of Advanced Proteomics Infrastructure (NAPI), the Food Pilot Norway and the Norwegian Biorefinery Lab.

Apart from its leading roles in Norwegian infrastructures, KBM's scientists make extensive use of other national infrastructures such as Sigma 2, Service for Sensitive Data (TSD), Nettskjema, Norwegian Open Research Data Infrastructure (NORDi) etc. and international infrastructures such as European Organization for Nuclear Research (CERN), European Molecular Biology Laboratory/European Molecular Biology Conference (EMBL/EMBC), European Synchrotron Radiation Facility (ESRF, synchrotron/crystallography), Swiss-Norwegian Beamlines (SNBL) and European Strategy Forum on Research Infrastructures (ESFRI, including ELIXIR, ESRF, European Nucleotide Archive (ENA)). This is truly impressive and speaks to the outstanding network of the administrative unit.

It is considered a weakness that part of KBM's facilities and infrastructures are old and not ideal for modern research, e.g. in biotechnology. Moreover, unpredictable funding policies make it difficult to maintain continuity in research topics, basic research (funding cuts by RCN according to the self-assessment of the administrative unit) and research infrastructures. As a result, more project and

overhead money needs to be dedicated to maintenance and service contracts of infrastructure, which may affect the quality and earn potential of basic and applied research.

Although the tools for bioinformatics, computational chemistry and systems biology are at a high level, in part via ELIXIR, there is room for improvement when it comes to incorporating artificial intelligence (AI) and machine learning techniques into daily research and teaching. Advanced computational approaches are key drivers for future research.

1.5 National and international collaboration

Collaboration is part of KBM's policy and there are collaborations with many different types of institutions, e.g. academic national (5 institutions) and international (6), public national (6) and international (6) as well as private (4) institutions.

At the national level, strategic collaborations exist through joint positions with three regional hospitals, two HEIs and two institutes, as well as multiple collaborations with regional companies. At the international level, KBM researchers are urged to have extensive collaborations, which is stimulated through related strategic funding from KBM and NMBU. This seems to be working very well.

For cross-sectorial and interdisciplinary collaborations, KBM has a policy including budgetary incentives and fostering a culture with focus on open scientific discussions and solving societal challenges. It is not really clear, however, whether the international and interdisciplinary collaborations are to some extent evenly distributed amongst the research groups.

In the NIFU analysis, the share of international co-authors is approximately 60% (most frequently from Karolinska University and Karolinska hospital) and approximately 40% for national co-authors (most frequently from UiO and UiO hospital). Most externally funded research projects involve international collaborations. This is very good.

Existing mobility grants for PhD candidates and postdocs as well as grants for sabbaticals for academic staff help support KBM's network and encourage taking initiative for external collaborations.

1.6 Research staff

In total there are 137 scientific employees, of which 28% are permanent staff. Professors and associate professors have 40% research time, and research leaves are scheduled every 7 years (for female associate professors, every 5 years). Associate Professors are supported by a mentoring system and are encouraged to apply for full professorships through a national committee. However, it is not clear how successful this is.

PhD candidates and postdocs prepare a work plan, which includes a reflection on their future career. KBM uses tenure-track positions as career advancement opportunities for (excellent) early-career researchers. This is very good.

NMBU has a mobility grant system, on the one hand, for international sabbaticals and, on the other hand, for PhD candidates and postdocs. Mobility is said not to be limited by economic restrictions. International recruitment of PhD candidates and staff is the standard.

Mentoring early career staff in writing proposals and how to become a group leader etc. is the responsibility of group leaders. Group leaders are active researchers. Four KBM scientists participated in an NMBU talent programme for development to future leaders, including e.g. leadership, grant writing and mentoring skills courses. New permanent staff have an additional mentor from another group, although this is not a formal arrangement.

2. Research production, quality and integrity

KBM recently reorganised to seven research groups, six of which were selected for this evaluation. The two Biotechnology groups were evaluated as one (so five research groups evaluated in total), and the Nitrogen group spans two faculties. A schematic representation of KBM's research groups/focus areas could have clarified its structure and interdisciplinarity.

The assessment reports for the five groups are clear and very informative. The scores for the quality dimension of the groups were: 5 (Biotechnology), 4 (Nitrogen, Microbiology and BIAS) and 3 (SciFood). The assessments and performance scores of the expert panels for each research group are reproduced in the following sections after a spelling and language check.

In the NIFU analysis (2017-2020), KBM's mean normalised citation score (MNCS) varied from 141 to 123 (Norwegian average 120). The share of the top 10% most cited papers varied from 22.5% to 12.2% and the total number of publications from 141 to 162. Five multi-author Nature Group publications received the highest citation numbers (105 to 600). The share of international co-authors is approximately 60% and of national co-authors approximately 40%. Overall good, but not excellent from an international perspective.

KBM transfers large fractions of its budget to its research groups, which have significant budgetary independence and freedom to operate e.g. investment in extensions for PhD candidates from 3 to 4 years for taking on teaching, which is excellent. There are also incentives based on publications, master's theses, projects, etc. KBM is currently discussing whether the incentives need to be changed, e.g. to include external funding, project applications and related scores. This is an important discussion that should be completed.

When asked about international benchmarks, KBM representatives responded in the interview that their combination of research areas is unique and therefore hard to benchmark. It is not clear if this is actually a good way of self-assessing research quality.

2.1 Research quality and integrity

Bioinformatics and Applied Statistics (BIAS) research group – overall assessment by Panel 4b

The principal investigators (PIs) in the group are generally highly competent and internationally renowned. The research output is of high quality. The theses' topics are highly relevant and have societal impact. The teaching is extremely successful and valuable. These are four important boxes to tick in a research evaluation. The main problem is that the current diverse model likely will not be sustainable going forward due to the changing nature of computational life science research. For example, while the group is using infrastructures of various kinds, both international/European and national, it does not seem to be a strong driver for the competitiveness of the group. It is not like they say, we have this asset and therefore we can engage in these collaborations or coordinate them. The good news is that the area is full of opportunities, but the self-assessment report does not communicate a strong model for how to exploit them going forward.

Biotechnology research group – overall assessment by Panel 4b

This is a high-quality group, and the panel fully endorses the wording in the conclusion: "Our group is a flagship of NMBU, with some of the best and most cited papers, the most prestigious projects (two of NMBU's in total three ERC projects so far are in our group), leading roles in several national research centres, competitive grants for fundamental research, and a strong national and international reputation." The achievements are generally impressive. The self-assessment report was less clear on the more specific competitive aspects and challenges that are relevant in the now crowded biotechnology domain, and especially how the group intends to deal with them. There are

also classical aspects like gender balance in the leadership and succession plans that could have been developed more.

The grading shows the performance of the group is well balanced and high-level across the dimensions. The organisational environment is outstanding for supporting the production of outstanding research and extensive contributions to societal impact.

Food quality and sustainability (SciFood) research group – overall assessment by Panel 4b

The group is strong in its research field and recognises key strengths and weaknesses as well as the need and opportunities to grow. The group is strategic and realistic; however, there is room for being more ambitious.

The organisation dimension (environment) is very strong and supports the production of high-quality research. The research is impactful, however mainly within the research field. Societal impact is achieved directly by contributing to societally important topics and indirectly through training the new generations of experts. Strategic approaches are well described and have focus on collaborations.

The scores are well balanced across the dimensions. The quality dimension is good for the research field, and group contributions could have gotten a higher score if more details were provided.

Overall, a strong group with a strong organisational foundation, strategic approach and potential for growth and more impact.

Microbiology research group – overall assessment by Panel 4b

This is a small, newly formed excellent research group which is just starting to develop its ambitious new research structure. The group is generating high quality research which is successfully translated into excellent societal outputs. There is an excellent balance between basic and applied research.

The group is generating fundamentally important advances in microbiological research which is internationally recognised. The administrative unit is providing a leading microbiological research environment in Norway.

The research group aspires to be competitive with other leading international microbiology research institutions. The group has strong foundations from which to achieve these goals which could be further enhanced by strategic academic recruitment.

Natural Product Chemistry and Organic Analysis research group – overall assessment by Panel 7

The group consists of four professors as well as associate professors. The research in the group covers organic analytical chemistry, natural products, and bioactive molecules (including chemical synthesis), and enzymology with a strong focus on metalloproteins. The panel notes that the group is excellently organised and uses this to improve its research quality.

The infrastructure is very good and used by different groups. Service of the university to the group is state-of-the-art.

The panel fully agrees on the excellence of this team. They perform very good as a research group and are working on important and relevant topics. Their organisation is excellent and strongly supports their research goals. They work to combine their efforts and are about to build a common

strategy. The panel notes that the group is at a high international level with only very few required improvements.

However, resources and manpower are an issue, and strategies to recruit people seem to work only partly. The panel suggests that the group considers opening up its portfolio to get a broader view and higher visibility. The panel recommends that the group consider recruiting people that fit in, but also to open up new fields to become more attractive. Besides this, the panel anticipates that the group will continue its excellent work.

Nitrogen research group – overall assessment by Panel 1

The strengths of the Nitrogen research group include high success in acquiring external funding, successful mentorship of many junior researchers, and production of high-quality research. They provide good evidence of leadership in networking outside Norway, such as the European Training Network, which boosts international collaborations and enables mobility. The panel suggested that the group could demonstrate more engagement with end users across all stages of the research process, not only via dissemination of results.

The overall performance across the evaluation criteria is considered very good. The research group has a high output and contributes disproportionately to its institutes.

2.2. Open Science

KBM follows national open science policies and FAIR principles (Findable, Accessible, Interoperable, and Reusable), international guidelines and Plan S. Researchers are encouraged to publish open access. The fees are paid from group/project funding, but KBM supplements the remaining costs, which is very good and should be continued.

The NIFU report shows that the number of 'not-open access (OA) publications' decreased from 43 to 25% from 2017-2021, while 'Gold OA' increased from 36 to 53% and 'Green OA' from 21 to 21.5%. Overall, however, this is still a comparatively low fraction of OA publications. Publications, MSc and PhD theses are self-archived as well. NORDi is used actively and extensively.

A statistics and data analysis course is taught by the BIAS research group. This group has also published several open-source computational tools and databases.

KBM's dialogue with the public is extensive, e.g. including social media, appearances in TV/radio/podcasts, outreach to schools, receiving school classes and training. Up-to-date research news is published on KBM's website and active links to Facebook, Instagram and YouTube are also given. This is outstanding.

KBM considers FAIR data principles crucial and promotes them, e.g. in teaching statistics, data analysis, bioinformatics and coding to many students at NMBU, and it also runs the NMBU biostatistics service for MSc students, PhD candidates and other researchers.

3. Diversity and equality

KBM follows NMBU policies and practices in employment procedures and anti-discrimination. Awareness training is provided. One professor acts as local diversity and equality contact. Discrimination and harassment are reported. However, no data nor possible actions are provided for individuals (potentially) suffering from diversity or equality issues, nor on related successes/failures in practice.

The share of women varies from 16% for professors, 25% for research professors and 48% for associate professors to 71% for PhD candidates and 75% for technical staff. The successively lower gender balance at higher levels could be a sign of losing people along the career path, which should be carefully considered.

For female associate professors, a sabbatical leave is granted every 5 years, for others every 7 years. There is an active hiring programme for female associate professors, and they can apply for promotion to full professor through a national committee. As a reference, the average percentages of females for all administrative units evaluated in EVALBIOVIT are 27% for professors, 52 for associate professors, 47% for researchers/postdocs and 65% for PhD candidates. Thus, gender issues still exist at KBM, especially at the higher levels, and should be addressed.

35-40% of the professors are international as are 50% of permanent and temporary staff and PhD candidates. This is very good. On its website, KBM mentions there are 600 students in seven educational programmes but provides no details on the numbers of international students.

NMBU as well as KBM have mobility grant and talent programmes for early career researchers as well as annual job performance interviews. Five out of 21 talents supported in 2021 were from KBM. KBM has tenure-track positions for supporting talent. It is not clear, though, how serious and/or ambitious this tenure-track system is or how effective it is. Maybe this is something the administrative unit may want to measure and evaluate in the future.

4. Relevance to institutional and sectorial purposes

KBM mentions high-quality research, external funding, publications in quality journals, invited lectures at international conferences and collaborative research projects in this context. Three impact cases (N₂O emission/Nitrogen group, Redox enzymes in biomass processing/ Biotechnology, and Microbiota in milk/Microbiology) very nicely illustrate how high-quality research may address societal and industrial challenges. Three out of five research groups are contributing most to the sector-specific criterion.

KBM has a technology transfer office (called Art innovation) and has the highest number of innovation projects at NMBU. Moreover, it has several spin-off companies (e.g. BioCHOS, Agrobiofix) and multiple patents and licences. KBM's biomass enzymology research has significantly affected related companies. This shows that KBM has a successful, well-functioning innovation and commercialisation system (See form 10 of the self-assessment). It also has a long tradition of collaboration with industry, and houses some of them within its research facilities.

Collaboration across disciplines is a key part of KBM's research policy, with many institutions, including academic national (5) and international (6) public, national (6) international (4) and private (4). An ERC synergy project also reflects interdisciplinary collaboration. Collaboration is further illustrated by relatively large shares of international and national co-authorships. It is not clear, however, whether the collaborations are evenly distributed amongst research groups and individual scientists or not.

An agreement has been made between NMBU and the Ministry, defining an interdisciplinary collaboration with the University of Oslo and the development of Campus Ås as a leading hub for the bioeconomy of Norway. Successful collaborations, guest professorships and shared infrastructures with the University of Oslo are good indications in this context.

Five MSc and one PhD programmes are strongly research-based and adding to research group budgets. The three BSc programmes are less so, primarily for budgetary reasons. KBM has multiple industry-funded PhD candidates, illustrating its impact beyond academia. The related external funding contributes significantly to KBM's educational and research successes.

PhD candidates are mentored in a structured way, and a dedicated PhD advisor is available to them. 91% of the PhD students finish their theses, although it is not clear what the time frame for completion is. No details were given about postdoc training and mentoring, except the need to write a data-management plan. There is no mention of mentoring of junior faculty. These two points may need attention going forward.

KBM's education and research (basic and applied) reportedly aligns well with the Norwegian Government's priorities. The priorities were not clarified, however. KBM does not have specific ethical guidelines for collaboration with industry but follows NMBU's guidelines in this area. For example, that all research should promote and preserve sustainability. The Dean has to approve all projects and can stop activities.

5. Relevance to society

KBM strongly contributes to the priorities of the Norwegian long-term plan for research and higher education, to the UN Sustainable Development Goals (SDGs) and to multiple societal challenges. More specifically, relevant topics include efficient and safe food production, reduction of greenhouse gasses in soil, understanding microbial diversity and bacterial pathogens in animals and humans, anti-microbial compounds, green production technologies (e.g. by enzymes) and the use of biomass as fuel. In terms of UN SDGs, KBM contributes to those related to agriculture & food safety, microbial diversity, health, education and capacity building, innovation, green transformation and clean energy.

In addition, KBM is very active in education and capacity building, e.g. by teaching and training around 600 students in seven different BSc and MSc programmes in basic (Chemistry, Biotechnology, Bioinformatics) and applied (Food Science) disciplines and more than 60 PhD candidates and postdocs, part of which are industry-funded. The training of the MSc students and PhD candidates is strongly research-based.

In terms of innovation and commercialisation, KBM is very active and successful. By combining basic and applied research, it succeeds in acquiring and running multiple application- and innovation-driven research projects, in founding several spin-off companies and in executing cross-disciplinary collaborations with industry, some of which are even housed in KBM's facilities.

The following three impact cases (i.e. nitrous oxide emission, Redox enzymes in biomass processing and Microbiota in milk) very nicely illustrate how high-quality basic research can address societal and industrial challenges.

Comments on impact case 1 – Game-changing biotechnology for combatting the N₂O emission from farmland

This impact case is enabling the agricultural sector to lower its climate footprint and creating business opportunities for the biogas and fertilizer industries; non-denitrifying nitrous oxide-respiring bacteria (NNRB) are used. By growing NNRB strains to high cell densities in organic wastes, organic fertilizers are produced which increase the abundance of NNRB in the soil, and thereby reduce the nitrous oxide emission by 50-95%. This NNRB technology attracted significant interest from agronomic and industrial stakeholders.

The NNRB technology, initially conceptualised in 2005 and further developed in 2016, was relatively simple; however, the practical application was not. Metagenomics and proteomics guided the optimisation of NNRB strains with broader catabolic profiles. Meanwhile, agronomic field experiments monitored by a field robot provided high-resolution data showing a reduction of 50-95% in nitrous oxide emission. A patent has been submitted and the technology will be commercialised by a spin-out. This is excellent.

The societal impact is illustrated by the fact that VEAS (a wastewater treatment plant) scaled the NNRB technology up to pilot level and developed it further to obtain new fertilizer products. With RCN support, the project continues as the NOX2N (a fertilizer reducing nitrous oxide emissions) project, with multiple stakeholders in the advisory board. Meanwhile, other fertilizer producers are applying the technology to develop dried organic fertilizers.

Comments on impact case 2 – New redox enzymes and processes for more efficient processing of polysaccharide-rich biomass

Lytic polysaccharide monoxygenases (LPMOs) cleave polysaccharides, such as chitin and cellulose, both in nature and industrial biorefineries. Upon discovery of these enzymes in 2010, the group combined fundamental with applied biotechnological research. In 2016, the group discovered how these “complicated” enzymes can be best used, with interesting prospects, e.g. converting biomass to single-cell protein for salmon feed. New applications of LPMOs in chemical catalysis and conversion of synthetic polymers are part of a Marie Curie Innovative Training Network and an ERC Synergy project (2020-6). Several highly visible publications (e.g. in *Science*, 2010) resulted in very high citation counts.

Applications of LPMOs in biomass processing are now widely used in collaboration with Novozymes (using an NMBU patent), DSM, Borregaard, St1 and Camby. LPMOs and LPMO competencies are still playing an important role in Foods of Norway, Bio4Fuels, Centre for Research-based Innovation (SFI) and Horizon ERA-NET projects.

So overall, a long-lasting and remarkably productive research line within KBM with excellent scientific output and equally excellent societal impact (“Salmon eat Norwegian spruce”) and industrial outreach.

Comments on impact case 3 Microbiota in raw milk, influence on udder health, and quality and shelf life of dairy products

For the Norwegian dairy industry, this research on dairy microbiota has led to new possibilities to optimise their production processes and shelf life of dairy products. This also led to changes in farming practices, raw milk treatment, and several innovation projects to better understand the fermentation process during cheese production. Cheese microbiota projects resulted in changes in the production of a starter at the dairy plants, changes during fermentation and revised cleaning procedures, and in more stable product quality and less waste.

The administrative unit has worked for a long time on various related projects, starting with RCN funded projects, such as ‘Cheese ripening’ (1998-2004), ‘NSLab in cheese’, ‘Healthy cheese’, ‘Bacterial flora and dynamics in milk’, ‘CloBio’, ‘Udder microbiota’, ‘Streptococcal infections’ and ‘HoliCow’ (2021-2024, ongoing). Meanwhile, an RCN innovation project is led by the industrial sector (2019-2023). Adria was involved in some projects and TINE (the largest agricultural company in Norway) in most projects.

Overall, these microbiota research competences led to forefront food microbiology research within KBM, with multiple scientific publications (several with high impact), close collaborations with important Scandinavian dairy companies and beneficial outcomes for farmers’ practices and higher quality products for consumers.

Appendices

List of research groups

Institution	Administrative unit	Research group
Norwegian University of Life Sciences (NMBU)	Faculty of Chemistry, Biotechnology and Food Science (KBM)	Bioinformatics & Applied Statistics (BIAS)
		Biotechnology
		Food quality and sustainability (SciFood)
		Microbiology
		Natural Product Chemistry and Organic Analysis
		Nitrogen

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 Evaluation of life sciences in Norway 2022-2023
- Administrative unit's Terms of Reference
- Administrative unit's self-assessment report
- Administrative unit's impact cases
- Administrative unit's research groups evaluation reports
- Panel reports from the Expert panels
- Bibliometric data (*NIFU Nordic Institute for Studies of innovation, research and education*)
- Personnel data (*Statistics Norway (SSB)*)
- Funding data – The Research Council's contribution to biosciences research (*RCN*)
- Extract from the Survey for academic staff and the Student Survey (*Norwegian Agency for Quality Assurance in Education (NOKUT)*)

After the document review, the Committee met and conducted 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 three weeks before the interview.

The Committee interviewed the Administrative unit in an hour-long virtual meeting to validate the Committee's understanding and refine perceptions as well as fill any gaps in understanding and evidence. The Administrative unit answered the Committee's questions including any follow-up questions.

After the online interview, the Committee held a meeting to review the initial assessment in light of the interview and draft a report based on their assessment of the Administrative unit against the assessment criteria.

A one-page profile of the Administrative unit was drafted based on information from the self-assessment. The Administrative unit had the opportunity to fact-check this profile. Thereafter, the profile was included in the final draft of the report.

The final draft was reviewed by committee members and any comments were addressed. After a final copy-edit, the final report was approved by the Committee.

Limitations

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

Evaluation of Biosciences 2022-2023

By evaluating Norwegian research and higher education we aim to enhance the quality, relevance, and efficiency. In accordance with the statutes of the Research Council of Norway (RCN), the RCN evaluates Norwegian professional environments to create a solid and up-to-date knowledge base about Norwegian research and higher education in an international perspective.

The evaluation of life sciences is conducted in 2022 - 2024. The evaluation of biosciences takes place in 2022 - 2023, and the evaluation of medicine and health is carried out in 2023-2024. The primary aim of the evaluation of life sciences is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), the institute sector and the health trusts. The evaluation shall result in recommendations to the institutions, the RCN and the ministries.

Evaluation of biosciences (EVALBIOVIT) 2022-2023

The evaluation of biosciences includes twenty-two administrative units (e.g., faculty, department, institution) which are assessed by evaluation committees according to sectorial affiliation and/or other relevant similarities between the units. The administrative units enrolled their research groups (97) to five expert panels organised by research subjects or themes and assessed across institutions and sectors.

Organisation of evaluation of biosciences research 2022 - 2023



The institutions have been allowed to adapt the evaluation mandate (Terms of Reference) to their own strategic goals. This is to ensure that the results of the evaluation will be useful for the institution's own strategic development. The administrative unit together with the research group(s) selects an appropriate benchmark for each of the research group(s).

The Research Council of Norway has commissioned an external evaluation secretariat at Technopolis Group for the implementation of the evaluation process.

Each institution/administrative unit is responsible for following up the recommendations that apply to their own institution/administrative unit. The Research Council will use the results from the evaluation in the development of funding instruments and as a basis for advice to the Government.

The web page for the evaluation of biosciences 2022-2023:

<https://www.forskningsradet.no/en/analysis-numbers/evaluations/subject-theme/biosciences/>

Til innmeldte administrative enheter til
fagevaluering av biovitenskap (EVALBIOVIT)

Vår saksbehandler/tlf.
Hilde D.G. Nielsen/4092 2260

Vår ref.
21/10653
Deres ref.

Oslo,
21.04.2022

Fagevaluering av biovitenskap (EVALBIOVIT) 2022 – 2023

Vi viser til invitasjonsbrev om å delta i fagevaluering av biovitenskap (EVALBIOVIT) datert 11.11.2021 og til informasjonsmøte med innmeldte administrative enheter 15.12.2021.

Porteføljestyret for livsvitenskap vedtok evalueringsprotokollen for fagevaluering av biovitenskap 05.04.2022 (vedlegg 1). Protokollen beskriver roller, prosesser og ansvarsfordeling i evalueringsarbeidet og er i tråd med forslaget til nytt nasjonalt rammeverk for evaluering av forskning og høyere utdanning utarbeidet i regi av Kunnskapsdepartementet.

Forskningsrådet har mottatt innmelding av 37 administrative enheter til EVALBIOVIT. Disse vil bli fordelt på sektorspesifikke evalueringskomitéer: 1-2 evalueringskomité/er for administrative enheter som tilhører instituttsektoren og 1-2 evalueringskomité/er for administrative enheter som tilhører UH-sektor. Universitetsmuseene vil bli evaluert samlet i én evalueringskomité for UH-sektor. Det skal i tillegg opprettes internasjonale fagekspertpaneler etter faglig eller tematisk likhet på tvers av sektorer. Ekspertpanelene skal evaluere forskergruppene som de administrative enhetene melder inn. Evalueringskomitéene og ekspertpanelene skal vurdere de innsamlede dataene og gi anbefalinger til den enkelte institusjon, til Forskningsrådet og til departementene.

Tilpasning av mandat (vedlegg 1)

Forskningsrådet ber med dette administrative enheter om å tilpasse mandatet (vedlegg 1) til de lokale forhold ved egen institusjon. Tilpasningen gjøres ved å fylle inn de åpne punktene i malen (Appendix A). Utfylt skjema sendes på epost til evalbiovit@forskningsradet.no innen 30. september 2022.

Innmelding av forskergrupper (vedlegg 2a og 2b)

Forskningsrådet ber administrative enheter om å melde inn forskergrupper i tråd med forskergruppedefinisjonen beskrevet i kapittel 1.2 i evalueringsprotokollen. Det bes også om at forskergruppene innplasseres i den tentative fagpanelinndelingen for EVALBIOVIT (vedlegg 2a). Utfylt regneark (vedlegg 2b) sendes til evalbiovit@forskningsradet.no innen 31. mai 2022.

Forskningsrådet vil ferdigstille panelstruktur og avgjøre den endelige fordelingen av forskergruppene på fagpaneler etter at alle forskergrupper er meldt inn.

Invitasjon til å foreslå eksperter (vedlegg 3a og 3b)

Forskningsrådet inviterer administrative enheter til å spille inn forslag til eksperter som kan inngå i evalueringskomitéene og i ekspertpanelene (vedlegg 3a). Hver evalueringskomité skal bestå av 7-9 komitémedlemmer. Hvert ekspertpanel skal bestå av 5-7 eksperter. Utfylt regneark (vedlegg 3b, fane 1 og fane 2) sendes til evalbiovit@forskningsradet.no innen 31. mai 2022.

Forskningsrådet v/porteføljestyret for livsvitenskap vil oppnevne leder og medlemmer til evalueringskomitéene og til ekspertpanelene.

Data og datainnsamling

Forskningsrådet har nå ute et oppdrag for analyse av data om personal og forskningsproduksjon. Analysen skal i hovedsak baseres på data i DBH, NIFUs forskerpersonaleregister og Cristin. Analysene vil inkludere indikatorer som skal brukes for evaluering av alle institusjoner.

Videre vil institusjonene få et ansvar for innsamling av data til en egevaluering som skal inngå i vurderingsgrunnlaget for evalueringskomiteene. For å sikre at evalueringen blir nyttig for forskningsinstitusjonenes utvikling, vil Forskningsrådet også invitere institusjonene til å delta i utvelgelse av relevante evalueringsdata og indikatorer som kan danne grunnlag for vurdering opp mot institusjonens egne strategiske mål og sektormål. På bakgrunn av dette har Forskningsrådet en forventning om at institusjonene som deltar i evalueringen stiller med nødvendige ressurser gjennom hele evalueringsprosessen.

Forskningsrådet har, etter en anbudskonkurranse om sekretariatstjenester, inngått en avtale med Technopolis Group som skal bistå Forskningsrådets administrasjon i arbeidet med EVALBIOVIT. Sekretariatet skal blant annet koordinere datainnsamlingen fra institusjonene og systematisere det innsamlede materialet for vurdering i ekspertpaneler og evalueringskomitéer.

Endring av administrativ enhet

For noen få tilfeller kan det være behov for å gjøre noen endringer i forhold til den administrative enheten¹ som allerede er innmeldt til EVALBIOVIT. For eksempel kan et fakultet som ble meldt inn samlet til EVALBIOVIT i desember 2021 finne det mer hensiktsmessig å heller melde inn fakultetets institutter som egne administrative enheter. Hvis man ønsker å endre på den administrative enheten må dette meldes Forskningsrådets administrasjon så fort som mulig, men ikke senere enn 31.05.2022. Melding om endring sendes på epost til: evalbiovit@forskningsradet.no.

Informasjonsmøte 9. mai 2022 og nettside for EVALBIOVIT

Forskningsrådet arrangerer 09.05.2022 kl. 12.00-12.45 et informasjonsmøte for alle som deltar i EVALBIOVIT. Møtet vil foregå digitalt (Zoom). Vi vil i møtet bl.a. gå gjennom evalueringsprotokollen samt at det vil være mulig å stille spørsmål. Påmelding til evalbiovit@forskningsradet.no innen 07.05.2022.

Forskningsrådet har opprette en egen nettside hvor informasjon om EVALBIOVIT vil bli publisert fortløpende. Lenke til nettsiden finner dere her: <https://www.forskningsradet.no/statistikk-evalueringer/biovitenskap-2022-2023/>.

¹ Med administrativ enhet menes en organisatorisk enhet på nivå 2 eller 3 i organisasjonsstrukturen til DBH for UH sektor eller NIFUs organisasjonsregister for institutt- og helsesektoren.

Spørsmål som gjelder fagevalueringen kan sendes på epost til evalbiovit@forskningsradet.no eller ved å kontakte Hilde Dorthea Grindvik Nielsen på epost hgn@forskningsradet.no /mobil 40 92 22 60.

Med vennlig hilsen
Norges forskningsråd

Ole Johan Borge
avdelingsdirektør
Avdeling for helseforskning og helseinnovasjon

Hilde G. Nielsen
spesialrådgiver
Avdeling for helseforskning og helseinnovasjon

Vedlegg

1. Evalueringsprotokoll for fagevaluering av biovitenskap 2022-2023
- 2a. Tentativ fagpanelinndeling for evaluering av forskergrupper
- 2b. Skjema for innmelding av forskergrupper
- 3a. Invitasjon til å foreslå eksperter og informasjon om evalueringskomitéer og ekspertpaneler
- 3b. Skjema for å foreslå eksperter til evalueringskomitéer og ekspertpaneler

Evaluation of life sciences in Norway 2022-2023

LIVSEVAL protocol version 1.0

By decision of the Portfolio board for life sciences April 5., 2022

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1 Introduction

Research assessments based on this protocol serve different aims and have different target groups. The primary aim of the evaluation of life sciences is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), and by the institute sector and regional health authorities and health trusts. These institutions will hereafter be collectively referred to as Research Performing Organisations (RPOs). The assessments should serve a formative purpose by contributing to the development of research quality and relevance at these institutions and at the national level.

1.1 Evaluation units

The assessment will comprise a number of *administrative units* submitted for evaluation by the host institution. By assessing these administrative units in light of the goals and strategies set for them by their host institution, it will be possible to learn more about how public funding is used at the institution(s) to facilitate high-quality research and how this research contributes to society. The administrative units will be assessed by evaluation committees according to sectoral affiliation and/or other relevant similarities between the units.

The administrative units will be invited to submit data on their *research groups* to be assessed by expert panels organised by research subject or theme. See Chapter 3 for details on organisation.

<i>Administrative unit</i>	An administrative unit is any part of an RPO that is recognised as a formal (administrative) unit of that RPO, with a designated budget, strategic goals and dedicated management. It may, for instance, be a university faculty or department, a department of an independent research institute or a hospital.
<i>Research group</i>	Designates groups of researchers within the administrative units that fulfil the minimum requirements set out in section 1.2. Research groups are identified and submitted for evaluation by the administrative unit, which may decide to consider itself a single research group.

1.2 Minimum requirements for research groups

- 1) The research group must be sufficiently large in size, i.e. at least five persons in full-time positions with research obligations. This merely indicates the minimum number, and larger units are preferable. In exceptional cases, the minimum number may include PhD students, postdoctoral fellows and/or non-tenured researchers. *In all cases, a research group must include at least three full-time tenured staff.* Adjunct professors, technical staff and other relevant personnel may be listed as group members but may not be included in the minimum number.

- 2) The research group subject to assessment must have been established for at least three years. Groups of more recent date may be accepted if they have come into existence as a consequence of major organisational changes within their host institution.
- 3) The research group should be known as such both within and outside the institution (e.g. have a separate website). It should be able to document common activities and results in the form of co-publications, research databases and infrastructure, software, or shared responsibilities for delivering education, health services or research-based solutions to designated markets.
- 4) In its self-assessment, the administrative unit should propose a suitable benchmark for the research group. The benchmark will be considered by the expert panels as a reference in their assessment of the performance of the group. The benchmark can be grounded in both academic and extra-academic standards and targets, depending on the purpose of the group and its host institution.

1.3 The evaluation in a nutshell

The assessment concerns:

- research that the administrative unit and its research groups have conducted in the previous 10 years
- the research strategy that the administrative units under evaluation intend to pursue going forward
- the capacity and quality of research in life sciences at the national level

The Research Council of Norway (RCN) will:

- provide a template for the Terms of Reference¹ for the assessment of RPOs and a national-level assessment in life sciences
- appoint members to evaluation committees and expert panels
- provide secretarial services
- commission reports on research personnel and publications based on data in national registries
- take responsibility for following up assessments and recommendations at the national level.

RPOs conducting research in life sciences are expected to take part in the evaluation. The board of each RPO under evaluation is responsible for tailoring the assessment to its own strategies and specific needs and for following them up within their own institution. Each participating RPO will carry out the following steps:

- 1) Identify the administrative unit(s) to be included as the main unit(s) of assessment
- 2) Specify the Terms of Reference by including information on specific tasks and/or strategic goals of relevance to the administrative unit(s)

¹ The terms of reference (ToR) document defines all aspects of how the evaluation committees and expert panels will conduct the [research area] evaluation. It defines the objectives and the scope of the evaluation, outlines the responsibilities of the involved parties, and provides a description of the resources available to carry out the evaluation.

- 3) The administrative unit will, in turn, be invited to register a set of research groups that fulfil the minimum criteria specified above (see section 1.2). The administrative unit may decide to consider itself a single research group.
- 4) For each research group, the administrative unit should select an appropriate benchmark in consultation with the group in question. This benchmark can be a reference to an academic level of performance or to the group's contributions to other institutional or sectoral purposes (see section 2.4). The benchmark will be used as a reference in the assessment of the unit by the expert panel.
- 5) The administrative units subject to assessment must provide information about each of their research groups, and about the administrative unit as a whole, by preparing self-assessments and by providing additional documentation in support of the self-assessment.

1.4 Target groups

- Administrative units represented by institutional management and boards
- Research groups represented by researchers and research group leaders
- Research funders
- Government

The evaluation will result in recommendations to the institutions, the RCN and the ministries. The results of the evaluation will also be disseminated for the benefit of potential students, users of research and society at large.

This protocol is intended for all participants in the evaluation. It provides the information required to organise and carry out the research assessments. Questions about the interpretation or implementation of the protocol should be addressed to the RCN.

2 Assessment criteria

The administrative units are to be assessed on the basis of five assessment criteria. The five criteria are applied in accordance with international standards. Finally, the evaluation committee passes judgement on the administrative units as a whole in qualitative terms. In this overall assessment, the committee should relate the assessment of the specific tasks to the strategic goals that the administrative unit has set for itself in the Terms of Reference.

When assessing administrative units, the committees will build on a separate assessment by expert panels of the research groups within the administrative units. See Chapter 3 'Evaluation process and organisation' for a description of the division of tasks.

2.1 Strategy, resources and organisation

The evaluation committee assesses the framework conditions for research in terms of funding, personnel, recruitment and research infrastructure in relation to the strategic aims set for the administrative unit. The administrative unit should address at least the following five specific aspects in its self-assessment: 1) funding sources, 2) national and international cooperation, 3) cross-sector and interdisciplinary cooperation, 4) research careers and mobility, and 5) Open Science. These five aspects relate to how the unit organises and actually performs its research, its composition in terms of leadership and personnel, and how the unit is run on a day-to-day basis.

To contribute to understanding what the administrative unit can or should change to improve its ability to perform, the evaluation committee is invited to focus on factors that may affect performance.

Further, the evaluation committee assesses the extent to which the administrative unit's goals for the future remain scientifically and societally relevant. It is also assessed whether its aims and strategy, as well as the foresight of its leadership and its overall management, are optimal in relation to attaining these goals. Finally, it is assessed whether the plans and resources are adequate to implement this strategy.

2.2 Research production, quality and integrity

The evaluation committee assesses the profile and quality of the administrative unit's research and the contribution the research makes to the body of scholarly knowledge and the knowledge base for other relevant sectors of society. The committee also assesses the scale of the unit's research results (scholarly publications, research infrastructure developed by the unit, and other contributions to the field) and its contribution to Open Science (early knowledge and sharing of data and other relevant digital objects, as well as science communication and collaboration with societal partners, where appropriate).

The evaluation committee considers the administrative unit's policy for research integrity and how violations of such integrity are prevented. It is interested in how the unit deals with research data, data management, confidentiality (GDPR) and integrity, and the extent to which independent and critical pursuit of research is made possible within the unit. Research integrity relates to both the scientific integrity of conducted research and the professional integrity of researchers.

2.3 Diversity and equality

The evaluation committee considers the diversity of the administrative unit, including gender equality. The presence of differences can be a powerful incentive for creativity and talent development in a diverse administrative unit. Diversity is not an end in itself in that regard, but a tool for bringing together different perspectives and opinions.

The evaluation committee considers the strategy and practices of the administrative unit to prevent discrimination on the grounds of gender, age, disability, ethnicity, religion, sexual orientation or other personal characteristics.

2.4 Relevance to institutional and sectoral purposes

The evaluation committee compares the relevance of the administrative unit's activities and results to the specific aspects detailed in the Terms of Reference for each institution and to the relevant sectoral goals (see below).

Higher Education Institutions

There are 36 Higher Education Institutions in Norway that receive public funding from the Ministry for Education and Research. Twenty-one of the 36 institutions are owned by the ministry, whereas the last 15 are privately owned. The HEIs are regulated under the Act relating to universities and university colleges of 1 August 2005.

The purposes of Norwegian HEIs are defined as follows in the Act relating to universities and university colleges²

- provide higher education at a high international level;
- conduct research and academic and artistic development work at a high international level;
- disseminate knowledge of the institution's activities and promote an understanding of the principle of academic freedom and application of scientific and artistic methods and results in the teaching of students, in the institution's own general activity as well as in public administration, in cultural life and in business and industry.

In line with these purposes, the Ministry for Research and Education has defined four overall goals for HEIs that receive public funding. These goals have been applied since 2015:

- 1) High quality in research and education
- 2) Research and education for welfare, value creation and innovation
- 3) Access to education (esp. capacity in health and teacher education)
- 4) Efficiency, diversity and solidity of the higher education sector and research system

The committee is invited to assess to what extent the research activities and results of each administrative unit have contributed to sectoral purposes as defined above. In particular, the committee is invited to take the share of resources spent on education at the administrative units into account and to assess the relevance and contributions of research to education, focusing on the master's and PhD levels. This assessment should be distinguished from an

² <https://lovdata.no/dokument/NLE/lov/2005-04-01-15?q=universities>

assessment of the quality of education in itself, and it is limited to the role of research in fostering high-quality education.

Research institutes (the institute sector)

Norway's large institute sector reflects a practical orientation of state R&D funding that has long historical roots. The Government's strategy for the institute sector³ applies to the 33 independent research institutes that receive public basic funding through the RCN, in addition to 12 institutes outside the public basic funding system.

The institute sector plays an important and specific role in attaining the overall goal of the national research system, i.e. to increase competitiveness and innovation power to address major societal challenges. The research institutes' contributions to achieving these objectives should therefore form the basis for the evaluation. The main purpose of the sector is to conduct independent applied research for present and future use in the private and public sector. However, some institutes primarily focus on developing a research platform for public policy decisions, others on fulfilling their public responsibilities.

The institutes should:

- maintain a sound academic level, documented through scientific publications in recognised journals
- obtain competitive national and/or international research funding grants
- conduct contract research for private and/or public clients
- demonstrate robustness by having a reasonable number of researchers allocated to each research field

The committee is invited to assess the extent to which the research activities and results of each administrative unit contribute to sectoral purposes and overall goals as defined above. In particular, the committee is invited to assess the level of collaboration between the administrative unit(s) and partners in their own or other sectors.

The hospital sector

There are four regional health authorities (RHF) in Norway. They are responsible for the specialist health service in their respective regions. The RHF are regulated through the Health Enterprises Act of 15 June 2001 and are bound by requirements that apply to specialist and other health services, the Health Personnel Act and the Patient Rights Act. Under each of the regional health authorities, there are several health trusts (HF), which can consist of one or more hospitals. A health trust (HF) is wholly owned by an RHF.

Research is one of the four main tasks of hospital trusts.⁴ The three other main tasks are to ensure good treatment, education and training of patients and relatives. Research is important if the health service is to keep abreast of stay up-to-date with medical developments and carry out critical assessments of established and new diagnostic methods,

³ [Strategy for a holistic institute policy \(Kunnskapsdepartementet 2020\)](#)

⁴ Cf. the Specialist Health Services Act § 3-8 and the Health Enterprises Act §§ 1 and 2

treatment options and technology, and work on quality development and patient safety while caring for and guiding patients.

The committee is invited to assess the extent to which the research activities and results of each administrative unit have contributed to sectoral purposes as described above. The assessment does not include an evaluation of the health services performed by the services.

2.5 Relevance to society

The committee assesses the quality, scale and relevance of contributions targeting specific economic, social or cultural target groups, of advisory reports on policy, of contributions to public debates, and so on. The documentation provided as the basis for the assessment of societal relevance should make it possible to assess relevance to various sectors of society (i.e. business, the public sector, non-governmental organisations and civil society).

When relevant, the administrative units will be asked to link their contributions to national and international goals set for research, including the Norwegian Long-term Plan for Research and Higher Education and the UN Sustainable Development Goals. Sector-specific objectives, e.g. those described in the Development Agreements for the HEIs and other national guidelines for the different sectors, will be assessed as part of criterion 2.4.

The committee is also invited to assess the societal impact of research based on case studies submitted by the administrative units and/or other relevant data presented to the committee. Academic impact will be assessed as part of criterion 2.2.

3 Evaluation process and organisation

The RCN will organise the assessment process as follows:

- Commission a professional secretariat to support the assessment process in the committees and panels, as well as the production of self-assessments within each RPO
- Commission reports on research personnel and publications within life sciences based on data in national registries
- Appoint one or more evaluation committees for the assessment of administrative units.
- Divide the administrative units between the appointed evaluation committees according to sectoral affiliation and/or other relevant similarities between the units.
- Appoint a number of expert panels for the assessment of research groups submitted by the administrative units.
- Divide research groups between expert panels according to similarity of research subjects or themes.
- Task the chairs of the evaluation committees with producing a national-level report building on the assessments of administrative units and a national-level assessments produced by the expert panels.

Committee members and members of the expert panels will be international, have sufficient competence and be able, as a body, to pass judgement based on all relevant assessment criteria. The RCN will facilitate the connection between the assessment levels of panels and committees by appointing committee members as panel chairs.

3.1 Division of tasks between the committee and panel levels

The expert panels will assess research groups across institutions and sectors, focusing on the first two criteria specified in Chapter 2: 'Strategy, resources and organisation' and 'Research production and quality' The assessments from the expert panels will also be used as part of the evidence base for a report on Norwegian research within life sciences (see section 3.3).

The evaluation committees will assess the administrative units based on all the criteria specified in Chapter 2. The assessment of research groups delivered by the expert panels will be a part of the evidence base for the committees' assessments of administrative units. See figure 1 below.

The evaluation committee has sole responsibility for the assessments and any recommendations in the report. The evaluation committee reaches a judgement on the research based on the administrative units and research groups' self-assessments provided by the RPOs, any additional documents provided by the RCN, and interviews with representatives of the administrative units. The additional documents will include a standardised analysis of research personnel and publications provided by the RCN.

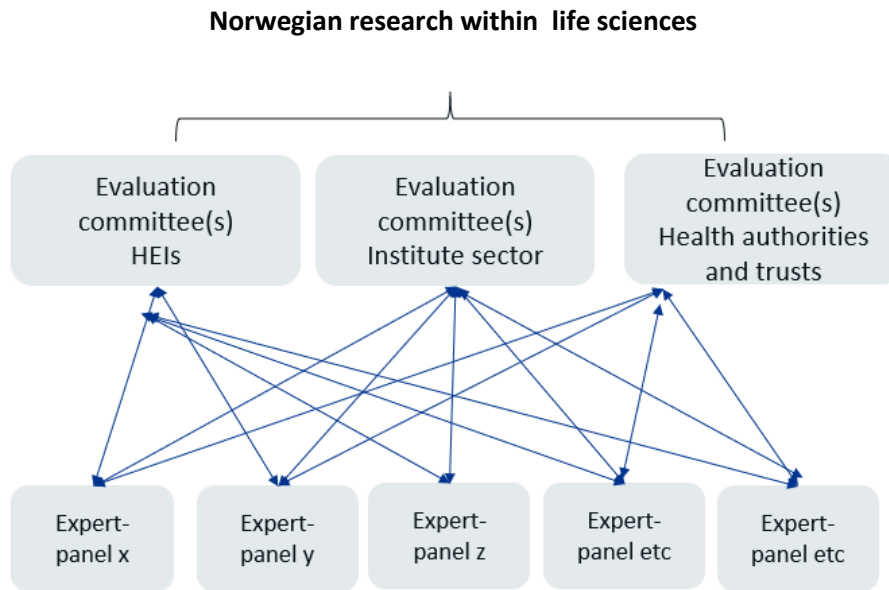


Figure 1. Evaluation committees and expert panels

The evaluation committee takes international trends and developments in science and society into account when forming its judgement. When judging the quality and relevance of the research, the committees shall bear in mind the specific tasks and/or strategic goals that the administrative unit has set for itself including sectoral purposes (see section 2.4 above).

3.2 Accuracy of factual information

The administrative unit under evaluation should be consulted to check the factual information before the final report is delivered to the RCN and the board of the institution hosting the administrative unit.

3.3 National level report

Finally, the RCN will ask the chairs of the evaluation committees to produce a national-level report that builds on the assessments of administrative units and the national-level assessments produced by the expert panels. The committee chairs will present their assessment of Norwegian research in life sciences at the national level in a separate report that pays specific attention to:

- Strengths and weaknesses of the research area in the international context
- The general resource situation regarding funding, personnel and infrastructure
- PhD training, recruitment, mobility and diversity
- Research cooperation nationally and internationally
- Societal impact and the role of research in society, including Open Science

This national-level assessment should be presented to the RCN.

Appendix A: Terms of References (ToR)

[Text in red to be filled in by the Research-performing organisations (RPOs)]

The board of [RPO] mandates the evaluation committee appointed by the Research Council of Norway (RCN) to assess [administrative unit] based on the following Terms of Reference.

Assessment

You are asked to assess the organisation, quality and diversity of research conducted by [administrative unit] 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 life sciences 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 [n] aspects in your assessment:

1. ...
2. ...
3. ...
4. ...
- ...

[To be completed by the board: specific aspects that the evaluation committee should focus on – they may be related to a) strategic issues, or b) an administrative unit's specific tasks.]

In addition, we would like your report to provide a qualitative assessment of [administrative unit] 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 **life sciences** secretariat at Technopolis Group.

The documents will include the following:

- a report on research personnel and publications within life sciences commissioned by RCN
- a self-assessment based on a template provided by the life sciences secretariat
- **[to be completed by the board]**

Interviews with representatives from the evaluated units

Interviews with the **[administrative unit]** 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 **[the administrative unit]** 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 life sciences secretariat. The committee may suggest adjustments to this format at its first meeting. A draft report should be sent to the **[administrative unit]** and RCN by [date]. The **[administrative unit]** should be allowed to check the report for factual inaccuracies; if such inaccuracies are found, they should be reported to the life sciences secretariat no later than two weeks after receipt of the draft report. After the committee has made the amendments judged necessary, a corrected version of the assessment report should be sent to the board of **[the RPO]** and the RCN no later than two weeks after all feedback on inaccuracies has been received from **[administrative unit]**.

Appendix B: Data sources

The lists below shows the most relevant data providers and types of data to be included in the evaluation. Data are categorised in two broad categories according to the data source: National registers and self-assessments prepared by the RFOs. The RCN will commission an analysis of data in national registers (R&D-expenditure, personnel, publications etc.) to be used as support for the committees' assessment of administrative units. The analysis will include a set of indicators related to research personnel and publications.

- **National directorates and data providers**
- Norwegian Directorate for Higher Education and Skills (HK-dir)
- Norwegian Agency for Quality Assurance in Education (NOKUT)
- Norwegian Agency for Shared Services in Education and Research (SIKT)
- Research Council of Norway (RCN)
- Statistics Norway (SSB)

National registers

- 1) R&D-expenditure
 - a. SSB: R&D statistics
 - b. SSB: Key figures for research institutes
 - c. HK-dir: Database for Statistics on Higher Education (DBH)
 - d. RCN: Project funding database (DVH)
 - e. EU-funding: eCorda
- 2) Research personnel
 - a. SSB: The Register of Research personnel
 - b. SSB: The Doctoral Degree Register
 - c. RCN: Key figures for research institutes
 - d. HK-dir: Database for Statistics on Higher Education (DBH)
- 3) Research publications
 - a. SIKT: Cristin - Current research information system in Norway
 - b. SIKT: Norwegian Infrastructure for Bibliometrics
(full bibliometric data incl. citations and co-authors)
- 4) Education
 - a. HK-dir/DBH: Students and study points
 - b. NOKUT: Study barometer
 - c. NOKUT: National Teacher Survey
- 5) Sector-oriented research
 - a. RCN: Key figures for research institutes
- 6) Patient treatments and health care services
 - a. Research & Innovation expenditure in the health trusts
 - b. Measurement of research and innovation activity in the health trusts
 - c. Collaboration between health trusts and HEIs
 - d. Funding of research and innovation in the health trusts
 - e. Classification of medical and health research using HRCS (HO21 monitor)

Self-assessments

- 1) Administrative units
 - a. *Self-assessment covering all assessment criteria*
 - b. Administrative data on funding sources
 - c. Administrative data on personnel
 - d. Administrative data on the division of staff resources between research and other activities (teaching, dissemination etc.)
 - e. Administrative data on research infrastructure and other support structures
 - f. SWOT analysis
 - g. Any supplementary data needed to assess performance related to the strategic goals and specific tasks of the unit

- 2) Research groups
 - a. *Self-assessment covering the first two assessment criteria (see Table 1)*
 - b. Administrative data on funding sources
 - c. Administrative data on personnel
 - d. Administrative data on contribution to sectoral purposes: teaching, commissioned work, clinical work [will be assessed at committee level]
 - e. Publication profiles
 - f. Example publications and other research results (databases, software etc.)
The examples should be accompanied by an explanation of the groups' specific contributions to the result
 - g. Any supplementary data needed to assess performance related to the benchmark defined by the administrative unit

The table below shows how different types of evaluation data may be relevant to different evaluation criteria. Please note that the self-assessment produced by the administrative units in the form of a written account of management, activities, results etc. should cover all criteria. A template for the self-assessment of research groups and administrative units will be commissioned by the RCN from the life sciences secretariat for the evaluation.

Table 1. Types of evaluation data per criterion

<div style="text-align: right;">Evaluation units</div> <div style="text-align: left;">Criteria</div>	Research groups	Administrative units
Strategy, resources and organisation	Self-assessment Administrative data	Self-assessment National registers Administrative data SWOT analysis
Research production and quality	Self-assessment Example publications (and other research results)	Self-assessment National registers
Diversity, equality and integrity		Self-assessment National registers Administrative data
Relevance to institutional and sectoral purposes		Self-assessment Administrative data
Relevance to society		Self-assessment National registers Impact cases
Overall assessment	<i>Data related to: Benchmark defined by administrative unit</i>	<i>Data related to: Strategic goals and specific tasks of the admin. unit</i>



**The Research Council
of Norway**

EVALBIOVIT

Self-assessment for administrative
units

Version 1.2

Overview

Institution (name and short name):

Administrative unit (name and short name):

Date:

Contact person:

Contact details (email):

1 Introduction

The primary aim of the evaluation is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), and by the institute sector. For the life sciences area, research undertaken by regional health authorities and health trusts is also included. These institutions will henceforth be collectively referred to as research performing organisations (RPOs). The evaluation report(s) will provide a set of recommendations to the RPOs, the Research Council of Norway (RCN) and the concerned ministries. The results of the evaluation will also be disseminated for the benefit of potential students, users of research, and society at large.

You have been invited to complete this self-assessment as an administrative unit. The self-assessment contains questions regarding the unit's research- and innovation related activities and developments over the past 10 years. All the submitted data will be evaluated by evaluation committees (for administrative units) and expert panels (for research groups). Please read through the whole document including all instructions before answering the questions to avoid overlaps.

As an administrative unit, you are also responsible for collecting the completed self-assessment for each of the research groups that belong to the unit. The research groups need to submit their completed self- assessment to the unit no later than the 1st of December 2022. The unit will submit the research groups' completed self-assessments and the unit's own completed self-assessment no later than the 5th of December 2022.

The whole self-assessment shall be written in English.

Please use the following format when naming your document: name of the institution, and name of the administrative unit, e.g. UiO_FacBiosci. Send it to evalbiovit@technopolis-group.com no later than 5th of December 2022.

For questions concerning the self-assessment or EVALBIOVIT in general, please contact RCN's evaluation secretariat at Technopolis Group: evalbiovit.questions@technopolis-group.com.

Many thanks in advance!

¹ Personal information will be deleted when evaluation reports are published and no later than 30 April 2024

For more information on how Technopolis Group handles data processing, see: <http://www.technopolis-group.com/privacy-policy/>

For more information on how the Research Council of Norway handles data processing, see: <https://www.forskingsradet.no/en/privacy-policy/>

2 Self-assessment for administrative units

Self-assessment guidelines:

- Data on personnel should refer to reporting to DBH on 1 October 2021 for HEIs and to the yearly reporting for 2021 for the institute sector
- Other data should refer to 31 December 2021 if not specified otherwise
- Please read the entire self-assessment document before answering
- Provide information – provide documents and other relevant data or figures about the administrative unit, for example strategy and other planning documents, as well as data on R&D expenditure, sources of income and results and outcomes of research
- Describe – explain and present using contextual information about the administrative unit (most often this includes filling out specific forms) and inform the reader about the administrative unit
- Reflect – comment in a reflective and evaluative manner how the administrative unit operates
- 4000 characters including spaces equals one page

2.1 Strategy, resources and organisation of research

2.1.1 Research strategy

- 2.1.1.1 Describe the main strategic goals for research and innovation of the administrative unit (1000–4000 characters). How are these goals related to institutional strategies?
- Describe the main fields and focus of research and innovation in the unit
 - Describe how you work to maximise synergies between the different purposes of the unit
 - Describe the planned research-field impact; planned policy impact and planned societal impact
 - Describe how the strategy is followed-up in the allocation of resources and other measures
 - Describe the most important occasions where priorities are made (i.e., announcement of new positions, applying for external funding, following up on evaluations)
 - If there is no long-term research strategy – explain why

Form 1 Administrative unit's strategic planning documents

Instructions: For each category (Research strategy, Research funding, Cooperation policy, Open science policy) present up to 5 documents that according to you are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then present these documents. Please use the following formatting: Name of document, Years active, Link to the document.

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.1.2 Organisation of research

- 2.1.2.1 Describe the organisation of research and innovation activities at the unit, including how responsibilities for research and other purposes (education, knowledge exchange, patient treatment, training etc) are distributed and delegated (500–1500 characters).

Form 2 SWOT analysis for administrative units

Instructions: Please complete a SWOT analysis for your administrative unit. Reflect on what are the major internal Strengths and Weaknesses as well as external Threats and Opportunities for your research and innovation activities and research environment. Assess what the present Strengths enable in the future and what kinds of Threats are related to the Weaknesses. Consider your scientific expertise and achievements, funding, facilities, organisation and management (500–2000 characters per cell).

2.1.3 Research funding

- 2.1.3.1 Describe the funding sources of the unit and indicate the share of the unit's budget (NOK) dedicated to research compared to other purposes. Shares may be calculated based on full time equivalents (FTE) allocated to research compared to total FTE in unit (500–1500 characters).
- 2.1.3.2 Describe how successful the administrative unit has been in obtaining competitive regional, national and/or international research funding grants (200–1000 characters).

Form 3 Funding levels for the administrative unit for 2021

Instructions: For administrative units in the institute sector receiving basic funding via RCN, funding levels should be provided for 2021 in the funding categories used in the yearly reporting:

- a) National grants (NOK) (post 1.1 og 1.2):
 - i) from the Research Council of Norway (NOK) – excluding basic funding
 - ii) from the ministries and underlying directorates (NOK)
 - iii) from industry (NOK)
 - iv) other national grants including third sector, private associations and foundations (NOK)
- b) National contract research (post 1.3)
- c) International grants (post 1.4)
- d) Funding related to public management (forvaltningsoppgaver post 1.5)

For Higher Education Institutions costs covered by external funding sources should be reported according to the same categories as far as possible. Costs may be classified as Other if they cannot be placed in one of the specified categories. Reporting should be based on incurred costs (regnskapstall) for 2021.

2.1.4 Participation in national infrastructures

- 2.1.4.1 Describe the most important participation in the national infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur) including as host institution(s) (200–1000 characters).

Form 4 Infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur)

Instructions: Please present up to 5 participations in the national infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur) for each area that were the most important to your administrative unit. For each category area, please use the following formatting:

Name of research infrastructure, Years when used, Description (100–500 characters) of the engagement with the research infrastructure (reasoning, objectives, expected/actual outcomes).

² Excluding basic funding.

³ For research institutes only research activities should be included from section 1.3 in the yearly reporting

- 2.1.4.2 Describe the most important participation in the international infrastructures funded by the ministries (Norsk deltakelse i internasjonale forskningsorganisasjoner finansiert av departementene) (200–1000 characters).

Form 5 Participation in international research organisations

Instructions: Please describe up to 5 participations in international and European infrastructures (ESFRI) for each area that have been most important to your research unit. When presenting your participation, please use the following formatting:

Name of research infrastructure, Years when used, Description (100–500 characters) of the participation in the research infrastructure (reasoning, objectives, expected/actual outcomes).

2.1.4.3 Describe the most important participation in European (ESFRI) infrastructures (Norske medlemskap i infrastrukturer i ESFRI roadmap) including as host institution(s) (200–1000 characters).

Form 6 Participation in infrastructures on the ESFRI Roadmap

Instructions: For each area, please give a description of up to 5 engagements that have been most important to your research unit. When presenting your participation, please use the following formatting: Name of research infrastructure, Years when used, Description (100–500 characters) of the engagement with the research infrastructure (reasoning, objectives, expected/actual outcomes)."

2.1.5 Accessibility to research infrastructures

2.1.5.1 Describe the accessibility to research infrastructures for your researchers. Considering both physical and electronic infrastructure (200–1000 characters).

2.1.5.2 Describe what is done at the unit to fulfil the FAIR-principles⁴ (200–1000 characters).

2.1.6 Research staff

2.1.6.1 Describe the profile of research personnel at the unit in terms of position and gender (200–1000 characters).

Form 7 Administrative data on the division of staff resources for 2021

2.1.6.2 Describe the structures and practices to foster researcher careers and help early-career researchers to make their way into the profession (200–1000 characters).

2.1.6.3 Describe how research time is distributed among staff including criteria for research leave (forskningsfri) (200–1000 characters).

2.1.6.4 Describe research mobility options (200–1000 characters).

2.2 Research production, quality, and integrity

2.2.1 Research quality and integrity

2.2.1.1 Describe the scientific focus areas of the research conducted at the administrative unit, including the unit's contribution to these areas (500–2000 characters).

2.2.1.2 Describe the unit's policy for research integrity, including preventative measures when integrity is at risk, or violated (200–1000 characters).⁵

2.2.2 Open Science policies at the administrative unit

2.2.2.1 Describe the institutional policies, approaches, and activities to the following Open Science areas (consider each area separately, 500–1000 characters in total):

- Open access to publications
- Open access to research data and implementation of FAIR data principles
- Open-source software/tools
- Open access to educational resources
- Open peer review
- Skills and training for Open Science
- Citizen science and/or involvement of stakeholders / user groups

2.2.2.2 Describe the most important contributions and impact of the unit's researchers towards the different Open Science areas (consider each area separately, 500–1000 characters in total):

- Open access to publications
- Open access to research data and implementation of FAIR data principles
- Open-source software/tools
- Open access to educational resources
- Open peer review
- Skills and training for Open Science
- Citizen science and/or involvement of stakeholders/user groups

2.2.2.3 Describe the institutional policy regarding ownership of research data, data management, and confidentiality (200–1000 characters). Is the use of data management plans implemented at the unit?

2.3 Diversity and equality

2.3.1 Diversity and equality practices

2.3.1.1 Describe the policy and practices to protect against any form of discrimination in the administrative unit (200–1000 characters).

Form 8 Administrative unit's policies against discrimination

Instructions: Give a description of up to 5 documents that are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then these documents should be referred to. For each document use the following formatting: Name of document, Years active, Link to the document

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.4 Relevance to institutional and sectorial purposes

2.4.1 Sector specific impact

2.4.1.1 Describe whether the administrative unit has activities aimed at achieving sector-specific objectives⁶ or focused on contributing to the knowledge base in general. Describe activities connected to sector-specific objectives, the rationale for participation and achieved and/or expected impacts (500–3000 characters).

- Alternatively, describe whether the activities of the unit are aimed at contribution to the knowledge base in general. Describe the rationale for this approach and the impacts of the unit's work to the knowledge base.

2.4.2 Research innovation and commercialisation

2.4.2.1 Describe the administrative unit's practices for innovation and commercialisation (500–1500 characters).

- Describe the interest among the research staff in doing innovation and commercialisation activities
- Describe how innovation and commercialisation is supported at the unit

Form 9 Administrative unit's policies for research innovation

Instructions: Describe up to 5 documents of the administrative unit's policies for research innovation, including IP policies, new patents, licenses, start-up/spin-off guidelines, etc., that are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then present these documents. For each document use the following formatting: Name of document, Years active, Link to the document

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.4.2.2 Provide examples of successful innovation and commercialisation results, such as new patents, licenses, etc (500–1500 characters).

Form 10 Administrative description of successful innovation and commercialisation results

Instructions: Please describe up to 10 successful innovation and commercialisation results at your administrative unit. For each result, please use the following formatting: Name of innovation and commercial results, Year, Links to relevant documents, articles, etc. that present the result, Description (100–500 characters) of successful innovation and commercialisation result.

2.4.3 Collaboration

2.4.3.1 Describe the unit's policy towards regional, national and international collaboration, as well as how cross-sectorial collaboration and interdisciplinary collaboration is approached at the administrative unit (500–1500 characters). Please fill out the forms that match your institution: the institute sector fills out Form 11a and Form 11b; HEIs fill out Form 12.

- Reflect on how successful the unit have been in meeting its aspirations for collaborations

Form 11a (institute sector) Administrative unit's partnerships ('faktisk samarbeid')

Instructions: For each of the administrative unit's tender and project-based cooperation (which are not tax deducted) please present up to 5 examples under each category (Collaboration with national public institutions; Collaboration with national private institutions; Collaboration with international public institutions; Collaboration with international private institutions). Please use 100– 500 characters to describe the impacts and relevance of collaboration.

Form 11b (institute sector) Administrative unit's collaboration

Instructions: For each of the administrative unit's tender and project-based cooperation please present up to 5 examples under each category (Collaboration with academic partners nationally; Collaboration with non-academic partners nationally; Collaboration with academic partners internationally; Collaboration with non-academic partners internationally). Please use 100–500 characters to describe the impacts and relevance of collaboration.

2.4.3.2 Reflect on the importance of different types of collaboration for the administrative unit (200–1000 characters).

- Regional, national and international collaborations
Collaborations with different sectors, including public, private and third sector

Form 12 (HEIs) Administrative unit's partnerships" ('faktisk samarbeid')

Instructions: For each of the administrative unit's tender and project-based cooperation (which are not tax deducted) please present up to 5 examples under each category (Collaboration with national public institutions; Collaboration with national private institutions; Collaboration with international public institutions; Collaboration with international private institutions). Please use 100– 500 characters to describe the impacts and relevance of collaboration.

2.4.3.3 Reflect on the importance of different types of collaboration for the administrative unit, the added value of these collaborations to the administrative unit and Norwegian research system (500–1500 characters).

2.4.4 ONLY for higher education institutions

- 2.4.4.1 Reflect on how research at the unit contributes towards master and PhD-level education provision, at your institutions and beyond (200–1000 characters).⁷
- 2.4.4.2 Describe the opportunities for master and bachelor students to become involved in research activities at the unit (200–1000 characters).

2.4.5 ONLY for research institutes

- 2.4.5.1 Describe how the research activities at the administrative unit contribute to the knowledge base for policy development, sustainable development, and societal and industrial transformations more generally (500–1500 characters).⁸
- 2.4.5.2 Describe the most important research activities including those with partners outside of research organisations (500–1500 characters).

2.5 Relevance to society

2.5.1 Administrative unit's societal impact

- 2.5.1.1 Reflect on the unit's contribution towards the Norwegian Long-term plan for research and higher education, societal challenges more widely, and the UN Sustainable Development Goals (500–1500 characters).
- 2.5.1.2 Describe how the administrative unit's research and innovation has contributed to economic, societal and cultural development by submitting one to five impact cases depending on the size of the unit. For up to 10 researchers: one case; for 10 to 30 researchers: two cases; for 30-50 researchers: three cases; for 50-100 researchers: four cases, and up to five cases for units exceeding 100 researchers. Please use the attached template for impact cases. Each impact case will be submitted as an attachment to the self-evaluation. Institutions that submit impact cases do not have to fill in the box below.

Case no. 1

Thank you for completing the self-assessment.

⁷ Please note: RCN will provide data from the national student survey (Studiebarometeret) on students' experience with research methods and exposure to research activities. The data will most probably be on an aggregate level but including the unit under assessment.

⁸ Strategi for helhetlig instituttpolitikk, Kunnskapsdepartementet, p.4): «Instituttsektoren skal utvikle kunnskapsgrunnlag for politikktutforming og bidra til bærekraftig utvikling og omstilling, gjennom forskning av høy kvalitet og relevans.» ([The government's strategy for an independent institute sector](#)).



Scales for research group assessment

Organisational dimension

Score	Organisational environment
5	An organisational environment that is outstanding for supporting the production of excellent research.
4	An organisational environment that is very strong for supporting the production of excellent research.
3	An organisational environment that is adequate for supporting the production of excellent research.
2	An organisational environment that is modest for supporting the production of excellent research.
1	An organisational environment that is not supportive for the production of excellent research.

Quality dimension

Score	Research and publication quality	Score	Research group's contribution Groups were invited to refer to the Contributor Roles Taxonomy in their description https://credit.niso.org/
5	Quality that is outstanding in terms of originality, significance and rigour.	5	The group has played an outstanding role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
4	Quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence.	4	The group has played a very considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
3	Quality that is recognised internationally in terms of originality, significance and rigour.	3	The group has a considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
2	Quality that meets the published definition of research for the purposes of this assessment.	2	The group has modest contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
1	Quality that falls below the published definition of research for the purposes of this assessment.	1	The group or a group member is credited in the publication, but there is little or no evidence of contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.

Societal impact dimension

Score	Research group's societal contribution, taking into consideration the resources available to the group	Score	User involvement
5	The group has contributed extensively to economic, societal and/or cultural development in Norway and/or internationally.	5	Societal partner involvement is outstanding – partners have had an important role in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
4	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is very considerable given what is expected from groups in the same research field.	4	Societal partners have very considerable involvement in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
3	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is on par with what is expected from groups in the same research field.	3	Societal partners have considerable involvement in the research process, from problem formulation to the publication and/or process or product innovation.
2	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is modest given what is expected from groups in the same research field.	2	Societal partners have a modest part in the research process, from problem formulation to the publication and/or process or product innovation.
1	There is little documentation of contributions from the group to economic, societal and/or cultural development in Norway and/or internationally.	1	There is little documentation of societal partners' participation in the research process, from problem formulation to the publication and/or process or product innovation.

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