Innovation: A Novel Dimension in Academic Evaluation

Report by the Working Group for Merit-based Recognition and Competence Development

UHR-Innovation

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Contents:

Abbreviations

CoARA: Coalition for Advancing Research Assessment

EIT: European Institute of Innovation & Technology

EUA: European University Association

HVL: Western Norway University of Applied Sciences

LTP: Long-term Plan for Research and Higher Education 2023-2032

NOR-CAM: Norwegian Career Assessment Matrix

https://www.uhr.no/en/news-from-uhr/nor-cam-a-toolbox-for-recognition-and-rewards-in-academic-careers.5780.aspx

NSO: National Union of Students in Norway

NTNU: Norwegian University of Science and Technology

R&D: Research and development

TRL: Technology Readiness Level

TTO: Technology Transfer Office

UHR: Universities Norway

UoA: University of Agder

UoB: University of Bergen

University sector: Includes universities and university colleges

Preface: Competence to increase innovation capacity

The University and University College sector's (university sector) social mission is becoming increasingly important, and the expectations of our partners in both the business and public sectors are growing. We ensure high standards in education and research. We generate new and relevant knowledge, and we are also increasingly expected to actively facilitate the application of knowledge to address challenges and create value in society. This requires a great deal of work.

The university sector's role in innovation spans a wide range. Our contribution entails 'developing the existing' and 'creating the new' every single day. We are constantly striving to improve. A 2022 study by the European University Association (EUA) revealed that although most universities in Europe have incorporated innovation ambitions into their strategies, they have limited ***capacity*** and/or ***expertise*** to realise these ambitions. This also applies to many Norwegian universities and university colleges. There are strong indications that more emphasis should be placed on competence development among academic staff and merit-based recognition in order to support and enhance the university sector's future innovation efforts and contributions. More cooperation with the business and public sectors, which can apply the generated knowledge to the development of their own products, services, value chains and processes, is essential.

I would like to thank the working group appointed by UHR-Innovation, which has provided detailed recommendations for the innovation competence that is needed in universities to realise the sector's social mission. The group has also proposed suggestions for how this can be achieved and how the competence can be documented and used in recruitment and promotion processes, as outlined in the NOR-CAM guide.[1]

The report and recommendations will be valuable tools for increasing the university sector's innovation capacity going forward.

We hope you will be inspired.

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1. https://www.uhr.no/temasider/karrierepolitikk-og-merittering/nor-cam-veileder-for-vurdering-i-akademiske-karrierelop/

Introduction

According to the Norwegian University and University Colleges Act, universities and university colleges have a broad purpose or social mission, encompassing research, education, innovation and dissemination. The broad social mission is also clearly articulated in the Norwegian Government's Long-term Plan for Research and Higher Education 2023-2032 (LTP). The working group believes it is crucial that research lays the foundation of the social mission of universities and university colleges, and that academic studies, dissemination and innovation are research based. This is also the basis for the group's recommendations.

Universities and university colleges address the breadth of the social mission to differing degrees and with an emphasis on different areas. This is reflected in the criteria applied in the recruitment and promotion of academics, which place little emphasis on competence beyond research and teaching.

The responsibility for the collective social mission of universities and university colleges does not rest solely on individual academic staff members; it must be understood as an institutional responsibility. In other words, not everyone has to be able to do everything, but the institution as a whole must have the capability to deliver. In the report, the working group assumes that fulfilling the social mission is an institutional responsibility. This means that the institution must have a sufficient number of employees with the knowledge, expertise and motivation to fulfil its overall mission.

The working group unanimous that research competence and the quality of research are the factors that should be weighted most heavily when recruiting and promoting academics, and that the current requirements for research competence should not be reduced. In some contexts, there is already a requirement for other special expertise, such as clinical skills.

There appears to be a growing need for administrative staff with expertise in research-based innovation. Universities and university colleges will need innovation competence not only among academics but also among administrative and technical staff. However, this report views these employees' role as a support function that enables the institutions to take strategic steps in their innovation efforts. It is assumed that technical administrative staff working in innovation understand research-based innovation processes and how these differ from those in the private business sector.

When positions are advertised, academic communities are free to set qualification requirements specific to each position beyond what generally applies to the relevant job category. The working group believes that formal qualification requirements beyond those for research and educational competence are not appropriate, partly because innovation expertise is highly diverse and difficult to measure. Job advertisements tailored to each position, reflecting the need for complementary competence, are therefore more important than formal, general requirements for innovation competence. Predictability and transparency are crucial in terms of what qualifications are required. However, institutions must have sufficient freedom to hire those with the expertise needed to fulfil their social mission. The growing intersectoral mobility brings with it a deeper understanding of the importance of diverse skillsets among the workforce.

The question is whether innovation should be an independent criterion in academic staff recruitment and promotion, and how such criteria should be weighted. By considering the candidate's overall competence profile, a comprehensive assessment can be made based on need, without being restricted by inflexible weighting parameters. When recruiting new academics, it may also be relevant to emphasise experience and competence beyond the quality standards in research and teaching. The working group believes that the relevance of the additional competence must be considered based on the discipline, the position and the existing competence within the unit.

The diversity in innovation efforts and expertise makes it impractical to set formal requirements for innovation competence when recruiting and promoting academics. Qualitative evaluations will provide a more complete picture of the applicant's skillset. The working group therefore recommends that candidates provide a self-reflective description of their own competence, when these competences are wanted by the institution. This will give the institution the flexibility and autonomy to create job descriptions that are tailored to its specific requirements. However, it will be more challenging in the case of academics seeking promotion because the applicant will not be competing with anyone else.

The majority of graduates find work outside academia. It is important that they understand the relevance and applicability of their studies in the professional realm. Cultivating student innovation requires academic staff to possess competence in this area and for it to be incorporated into study programmes. This can be done through recruitment and promotion, including for academic positions. Innovation competence can be integrated into all study programmes, in one or more courses, based on the characteristics of the discipline and the institution's profile.

A regulatory framework may be needed to support the diversity of institutions and their individual characteristics.

Our advice is intended to provide insight into how innovation competence can be assessed and documented. In the report, we will discuss and offer advice on how to assess innovation competence when recruiting and promoting academics.

Summary

The Working Committee's recommendations are intended to serve as advice on what competence beyond research and teaching qualifications should be considered in recruitment and promotion processes, and how this can be documented. The social mission is based on research, which in turn drives academic studies, dissemination and innovation. Research expertise is crucial for candidates applying for academic positions and those seeking promotion. The current requirement for research should not be reduced.

Rather than standardising competence and setting formal requirements for innovation competence, criteria and expectations for innovation skills can be tailored to individual positions and the institution's profile. When assessing and ranking candidates for certain positions, it may be relevant to place an emphasis on innovation experience and competence in addition to the established requirement for research and teaching. A candidate's breadth of experience with patents, innovation and documented research work can be weighted and assessed, in addition to published works. Each discipline and institution should independently consider what weighting to give to other competencies, and each discipline should set criteria for how this can be assessed.

The working group recommends:

Merit-based recognition

1. The working group uses a broad definition of innovation and works on the basis that innovation in the university sector is rooted in research. Research competence is central to the assessment of qualifications when recruiting and promoting academic staff, and the current requirement for research should not be reduced.
2. The following criteria should be emphasised when assessing innovation competence (refer to the NOR-CAM matrix): formal competence, contributions to new or significantly improved products, services or technologies, contributions to innovation in businesses or organisations, contributions to the innovation system or ecosystem for entrepreneurship, social innovation, policymaking/regulation, and contributions to student innovation (Table 1).
3. When assessing innovation competence, qualitative evaluations will provide a more complete picture of the applicant's skillset. Self-reflective descriptions of the candidate's own competence, and an indication of contributions in line with the job description and discipline are therefore recommended (Appendix 1).
4. Innovation competence, including experience and deliverables (pilot projects, patents, business start-ups etc.) should be assessed against the competence needs of the academic communities and departments.
5. When assessing applicants, emphasis should be placed on whether they have contributed to innovation competence in study programmes, supervised students in practical innovation efforts or business start-up, and/or helped develop an environment for student innovation/entrepreneurship at the institution.

Framework or structure for innovation (Table 2)

6. An automated CV function should be developed in the research information system to facilitate the retrieval of competence documentation and career achievements.
7. Facilitating student innovation in institutions requires teaching and administrative staff in the institution to possess competence in this area and for it to be incorporated into study programmes.

8. Innovation competence will be a crucial component of many study programmes, and UHR-Innovation has established a dedicated working group with a parallel focus on student innovation.
9. A Norwegian assessment model should be developed for academic positions, in line with the NOR-CAM recommendations, in close dialogue with international actors, as changes to the assessment criteria cannot be made by one country alone.
10. Institutions need technical and administrative staff with expertise in research-based innovation and relevant measures for stimulating innovation processes and projects. In addition to having knowledge and experience in innovation, technical administrative staff should also be familiar with the university sector and understand research-based innovation processes.

Remit of the working group

UHR-Innovation's Working Committee hereby appoints the Working Group for Merit-based Recognition and Competence Development. The working group functions on behalf of the Working Committee in accordance with UHR's directives for its strategic units. Its task is to propose recommendations for how innovation can be measured and recognised in staff recruitment and promotion, as well as suggest ways to enhance innovation competence among university employees. A natural part of this work will be to consider discipline-specific variations and adopt a broad understanding of innovation. The working group's remit is as follows:

1. The working group shall give recommendations for the innovation competence that university employees should possess and suggest measures that can enhance innovation competence in the university sector. In addition to discipline-specific variations, it will be natural to consider differences at various levels, such as distinguishing between academics who actively contribute to innovation efforts at a practical level and other academic staff, as well as distinguishing between academic and administrative staff.
2. The working group shall give recommendations for how competence in innovation can be documented in recruitment and promotion processes. This work must be viewed in conjunction with the NOR-CAM guide and represents an extension of these efforts.

The working group, which is chaired by Gottfried Greve, is free to choose its own working method. The working group shall be operational until May 2023 and will keep the Working Committee abreast of its work. The final proposal from the working group shall be submitted to the Working Committee for further processing.

Composition of the working group

The working group is made up of the following members:

- Gottfried Greve (University of Bergen, UoB) (Chair)
- Gry Agnete Alsos (Nord University)
- Ann Camilla Schulze-Krogh (University of Agder UoA)
- Ina Maria Finnerud (National Union of Students in Norway, NSO)
- Catherine Taylor Nordgård (Norwegian University of Science and Technology, NTNU)
- Gro Anita Fonnes Flaten (Western Norway University of Applied Sciences, HVL) (Appointed by UHR-Research) (Moved to a new job and did not therefore participate in the finalisation of the report.)

Group secretary: Hilde Kyrkjebø (NTNU)

In addition to the group members, other experts may be consulted and involved as needed.

Working method

The group has held one physical meeting (23 November 2022) and seven Teams meetings.

The chair of the group has held one Teams meeting with the Working Committee (27 January 2023).

In addition to the Working Group for Merit-based Recognition and Competence Development, another working group has been working on student innovation. These groups were established by UHR-Innovation at the same time, and it has therefore been crucial for the

groups to communicate and interact. Ina Maria Finnerud chaired the Working Group for Student Innovation and has ensured close interaction between the two groups. Overall, the two working groups have addressed common challenges related to innovation, R&D and entrepreneurship, as well as the fulfilment of institutions' social mission, the University and University Colleges Act and the LTP.

Background

Higher education institutions' remit in terms of innovation is outlined in section 1-3 (e) of the University and University Colleges Act: 'contributing to innovation and value creation based on results from research and academic and artistic development work'. Their innovation remit is thus linked to the academic activity and should be based on knowledge generated by this work.

In the LTP, the government identifies enhancing competitiveness and innovation capacity as one of the three overall priorities. The plan states that 'research, development, innovation and higher education are crucial to society's value creation'. The government therefore aims to better support the business and public sectors in exploring and applying knowledge and technology, which in turn will enhance value creation and aid the transition to green energy and digitalisation.

Traditionally, the university sector's understanding of research-based innovation has been linked to a classic technology push model, where basic research contributes to applied research, which in turn fosters (technology) development and the identification of knowledge that can be commercialised.

In order to facilitate commercialisation, technology transfer offices (TTOs) have been established, along with support functions for the protection of intellectual property rights (IPR), licensing, identification of relevant markets, etc. In this model, the role of academic staff in innovation is primarily that of providers of commercially viable knowledge, holders of IPR and potential contributors to the commercialisation phase.

Today, this technology push model is just one component of higher education institutions' innovation activity. Innovation is increasingly taking place in a dialogue between various stakeholders via open innovation forums and collaboratively driven innovation. Academic staff at higher education institutions contribute to innovation in various ways:

- As suppliers of research for innovation projects initiated by entities outside the higher education institutions.
- Through study programmes in entrepreneurship and interdisciplinary initiatives involving students, researchers and external actors.
- As contributors to collaborative innovation efforts with businesses or entities in the public sector.
- As contributors in clusters or projects involving multiple actors.
- As facilitators who provide knowledge about innovation processes.
- As contributors to the design of policies that impact on innovation.

Academics in higher education institutions contribute to innovation that is implemented in the business sector, the public sector and the third sector, as well as across sectors. Academics' innovation efforts encompass innovation processes that are owned by them, and their institutions and innovation processes owned by others. Innovation activity in the university sector involves commercially viable innovation as well as service and social innovation aimed at improving the well-being of individuals or groups. When formulating criteria for recognising innovation-based merit, it is natural to adopt a perspective that encompasses diverse forms of

innovation and acknowledges the diverse roles that academics can play in the innovation process.

Innovation is used and defined in various ways. The European University Association (EUA) Innovation Agenda 2026 refers to innovation as 'a process of knowledge co-creation and transfer that generates social, economic, and environmental benefits by means of novel ideas, approaches, technologies, or ways of organising'. Innovation is based on open and systematic interactions between academia, the authorities, the private sector and the general public. It encompasses the entire R&D chain, from curiosity-driven basic research to applied R&D. The opportunities and resources required to implement innovation are determined by political, cultural and economic factors. Innovation efforts involve close, strategic collaboration between key stakeholders from these three spheres and are usually anchored in local or regional hubs, typically referred to as innovation ecosystems EUA Innovation Agenda 2026.pdf.

Definitions

The working group has applied UHR's broad definition of innovation https://www.uhr.no/temasider/innovasjon/

- Innovation refers to the development of new or significantly improved products, services or processes that are adopted and increase value creation and/or social utility.
- In the university sector, R&D, academic studies and dissemination are the foundation for innovation and the vehicles for fostering this.
- Innovation is research-based when expertise, knowledge and ideas arising from research activity are used to improve products, services or processes.
- Innovation encompasses efforts to ensure economic and sustainable growth, competitiveness, and increased social utility in the form of improved public services or a more smoothly functioning societal system.

The working group also bases its work on the following:

- Innovation does not occur in a vacuum; it relies on interaction and the exchange of knowledge between the university sector, the public sector, commercial actors and society at large.
- Innovation can be considered a natural extension of research; progressing from curiosity-driven basic research and applied research to advancements that are adopted in society.
- Innovation in the university sector is based on research and, in the case of students, it emanates from their academic studies. Our work is also more based on the institution's needs/remit as opposed to the individual researcher's development potential. In other words, the institution has a greater responsibility than individual employees to fulfil the collective social mission.

Responsibility

As part of their social mission, higher education institutions are responsible for ensuring that knowledge derived from research is applied, as well as fostering research-based innovation and commercialising research output (see section 1-3 of the University and University Colleges Act). They are also responsible for ensuring that study programmes include innovation activities (student entrepreneurship). Institutional responsibility is wide-ranging, which is in line with the broad definition and understanding we are applying.

Following the restructuring of the local project funding scheme in the FORNY programme, institutions has gotten a more explicit responsibility for the early stages of commercialisation. The social mission must therefore be understood as an integrated whole, where research, education and innovation are closely intertwined. Innovation in the university sector cannot solely be gauged using narrowly defined indicators, such as the number of patents or spin-offs. Innovation is an integral part of institutions' area of responsibility and must be reflected in their plans and strategies in the same way as research and education.

Research is not separate from the world around us

Researchers with robust knowledge and affiliations outside academia will see needs and correlations beyond the academic realm. This helps them realise the potential of research output with a view to addressing societal challenges. This capability can be developed through collaborative projects and co-creation with the business sector, the public sector and other external stakeholders. Exchanging information, knowledge and ideas between research and innovation is a two-way process that not only involves research-driven innovation but also innovation-driven research that helps solve societal challenges. The university sector could therefore participate in a regional innovation system (see Isaksen A and Trippl M, 2016 Path Development in Different Regional Innovation Systems | 5 | A Conceptual Analysis (taylorfrancis.com).

New application for core generic competence

Interdisciplinary collaboration, communication and dissemination skills are not exclusive to innovation projects and are often core elements of classic research projects and curiosity-driven research. Several disciplines and courses are incorporating innovation and entrepreneurship into their agenda because the curiosity driving innovation processes and projects can help increase relevance, understanding and insight across various disciplines. Demand for this type of competence is expected to grow in order to meet the changing needs in the business sector and society in general.

Research and innovation as an integrated whole

A common understanding of research and innovation as part of an integrated whole could lead to time-savings for employees and serve as a framework for increased flexibility in the sector. Incorporating this understanding into governing documents and work plans would help to clarify expectations, thus reducing frustration about having 'yet something else to deliver'. Research and innovation as an integrated whole align well with the societal challenges outlined in the LTP, and clearer communication from the university sector could foster greater cooperation between academia, the public, private and third sectors.

The LTP describes innovation as a fundamental driver of value creation. Because the social mission of higher education institutions is multifaceted, it is important to document research-based innovation activity both qualitatively and quantitatively. There are various approaches to understanding innovation, what lays the groundwork for innovation, and the role the university sector plays in the regional and national innovation system. Each institution's goals,

resources and experience will shape its approach to innovation. An institution's expectation of innovation competence among its academic staff requires innovation activity to be recognised on a par with research, education and dissemination, and thus be included in the academic staff's R&D time. The University of Agder has, for instance, adopted the following principles for what is included in academic staff's R&D time:

> *R&D encompasses research, academic and artistic development work, innovation, and dissemination related to these activities. These categories form the framework for which tasks can be included in the R&D time and the R&D component of individual work plans. This includes, for example: development (applications for external and internal funding of R&D and innovation, participation and leadership in research projects, research and innovation projects and artistic and academic development projects.*
>
> (Principles for distribution of R&D time, adopted by UoA 1 February 2022)

For institutions to realise their potential and meet expectations outlined in LTPs and development agreements based on their unique profiles, innovation must be an integral part of the work of the individual academic staff rather than an additional task. Provisions should be in place for innovation to be included in the R&D time. Institutions' governing documents and reports must reflect the fact that innovation is prioritised and considered a crucial part of the university sector's remit. The quality of research is typically evaluated both qualitatively and quantitatively. Innovation can be understood as both the end product/service and the process leading up to this. In terms of developing innovation expertise, the process itself should be considered particularly important because the timeline in innovation projects can be lengthy, and it should therefore be possible to assess the expertise developed before any end product is finalised. A great deal of expertise can also be acquired in processes where the end product is not successful. The process serves as an important driver for exploiting the institution's innovation potential.

Culture

Building an innovation culture will be crucial for the university sector to fulfil its broad social mission. A culture and awareness of the potential for research-based innovation can be established and strengthened by drawing on the unique characteristics, history and framework conditions of academic disciplines. Qualitatively, a culture of innovation can be documented through descriptions of expectations related to goal achievement in governing documents and reports. Defined development goals in the agreement with the Ministry of Education and Research can also help to raise awareness and establish a culture. Developing administrative support services for research-based innovation could also help create an organisational structure that fosters a culture of innovation. Quantitatively, culture-fostering indicators can include assigning job titles to academic and technical administrative staff who work with innovation, such as innovation managers, innovation advisers, innovation mentors, etc. The collective competence of an institution will be the sum of structures that underpin and foster research-based innovation. Higher education institutions should have strategies for how research can contribute to innovation and the development of society.

Relevance

The applicability and thus the innovation potential of both curiosity-driven research and more applied research is sometimes easy to identify, while at other times it is less evident. The time aspect plays a key role in this context: today there is a tendency to focus on short-term expectations for research outcomes. Assessments of relevance should consider whether the research and possible innovation have the potential to address a complex challenge within or

outside the discipline. The relevance of an innovation can be linked to benefits described by others, whether the business sector or public sector can leverage the knowledge generated, or whether it can be used in cultural contexts. It is also essential to evaluate the scalability of the innovation and determine the potential for financial gain (revenue or cost savings) or for improving the provision for users of, for example, public sector services.

Competence needed in institutions to ensure the necessary innovation competence in study programmes

The majority of graduates find work outside the world of academia. In preparation for the ever-evolving labour market and the growing complexity of societal challenges, students must develop generic skills. Key generic skills include innovation and entrepreneurial competence, problem-solving ability and academic curiosity. To ensure effective application of these skills, it is also important for graduates to understand the relevance of their studies and the competence they have acquired.

Although most study programmes can cover innovation, it is not necessarily included in all courses within a programme. It is also important to distinguish between different types of innovation: general innovation competence, specialised innovation competence, participation in the institution's innovation efforts and innovation competence gained through voluntary activities.

Fundamentally, there is an overarching goal that students should finish their studies and not dropping from out of their studies to pursue innovation activities. Nevertheless, innovation should be an important component of their studies, and all students should have the opportunity to acquire such competence during their course of study.

Some academics should have the skills needed to engage with students at different levels in their innovation journey. UHR is working on a separate report on student innovation, which should be read in conjunction with this chapter, in which the working group has created a framework/matrix outlining the different levels.

How to make qualitative and quantitative evaluations of innovation, and how to document innovation

Efforts are currently underway to place a greater emphasis on qualitative criteria in assessments of the quality of research. Assessments of innovation competence and activity should be based on the premise that qualitative criteria are in focus and given the most weight.

Well-established and quality-assured systems are in place to assess innovation height and social utility in externally funded projects. The Research Council of Norway, regional research funds, research mobilisation and Innovation Norway are actors in the Norwegian policy instruments that define criteria for documenting and assessing innovation. In addition, innovation and social utility in European systems are often defined as related to either academic, social or economic relevance. The university sector already reports statistics for business ideas, patents and spin-offs to the Ministry of Education and Research and owners, and the working group's proposal does not therefore place an emphasis on such criteria. Finally, it is worth mentioning the focus of the recently established alliance and signed agreement through CoARA:

- *'Value inclusion of stakeholders in the research process, from defining priority research questions to knowledge translation...'*
- and as a tool to achieve this *'...Consider diversity in research teams at all levels, and in the content of research and innovation'*

(Agreement on Reforming Research Assessment, 20 July 2022, p. 21.)

CoARA has adopted a broad approach, with a desire for interdisciplinarity and diversity to raise standards and facilitate the ongoing development of institutions. The aim is to effectively address future challenges and actively contribute to the expected value creation. Institutionalising innovation activities as part of career development and merit-based recognition systems within higher education institutions may be crucial to achieving these aims.

Career development and merit-based recognition are core components of the university sector and are crucial for individual employees. The framework for academics in the sector has changed significantly in recent years, with both the sector and the researchers prioritising career development. Clear frameworks, conditions and systems that facilitate individual development are crucial. If the recommendations on how to document and assess innovation and innovation activities are to have significance, consideration should be given to the weighting of innovation activity in the merit-based recognition systems when recruiting and promoting academic staff in the university sector.

Quality

Quality has been proposed as the guiding principle and the most important criterion for assessing innovation. An assessment framework must be established to balance quantitative and qualitative goals (see NOR-CAM). Assessing the research underpinning the innovation, project, service or product can provide insight into the quality and robustness of the innovation. Emphasis can be placed on the environment from which the innovation originates, as well as the composition of research, research groups (interdisciplinarity) from which the innovation emanates, and how elements of innovation have been incorporated into the research process. It is also envisaged that the quality of innovation can be assessed through peer reviews, where research-based innovation outcomes are examined in terms of the robustness of the idea and the potential for real-life application. These peer reviews could use, for example, established criteria for assessing innovation height, i.e. how original and innovative the idea is compared to existing solutions, from an international perspective.

Quantity

Quantitatively, research-based innovation can be assessed based on illustrative measures such as knowledge application, number of pilot projects, certified testing, patents or business start-ups. Interdisciplinarity and collaborative partnerships with the business, public or cultural sector should also serve as independent criteria, as such collaborations form part of academics' innovation potential.

Assessment criteria in the recruitment and promotion of academic staff in higher education

The working group will propose recommendations on how competence in innovation can be documented in recruitment and promotion processes. This work (see Remit) should be viewed in conjunction with the NOR-CAM guide and serve as an extension of the principles outlined therein.

The NOR-CAM guide suggests using a matrix for assessing academic results, competence and experience for six areas of expertise. In addition to research and educational competence, impact and innovation, leadership and other experience are included.

Besides formal competence, the extension of the NOR-CAM principles can also draw on the experiences and contributions of job applicants and academics seeking promotion across different stages of innovation processes (pre-projects/idea generation, project development and completion/final result). An applicant's contribution to enhancing culture and competence in expert groups or the ecosystem can also be used. See Appendix 1 for recommendations on what to include in a self-reflective note on innovation contributions and competence in recruitment and promotion processes.

Innovation is often a collaborative effort in which employees can contribute at various stages of the value chain up to the end result. It is important that applicants describe their own contribution to the teamwork and the responsibilities they have had at the different stages of the value chain. Highlighting and evaluating different types of contributions to the process are important drivers for exploiting an institution's innovation potential.

Innovation activities by academics in universities and university colleges include:

- Knowledge-based contributions to the development of new or significantly improved products, services, technologies, production processes, practices, forms of communication or organisation based on the higher education establishment's research or knowledge base.
- Knowledge-based contributions to businesses' or public/volunteer organisations' development of new or significantly improved products, services, technologies, production processes, practices, forms of communication or organisation in the business sector through collaboration with individual organisations or in clusters/networks.
- Knowledge-based contributions to societal/social innovation in collaboration with other social actors.
- Knowledge-based contributions to policy-making/new regulations.
- Knowledge-based contributions to the development of innovation systems or ecosystems for entrepreneurship.
- Contributions to support systems for knowledge-based innovation.
- Contributions to student innovation.

Research forms the basis for innovation within higher education establishments' social mission. Both scientific and administrative/technical staff can contribute to innovation in the private sector that is not linked to research (e.g. through business start-ups or voluntary work). This activity should not count towards higher education establishments' social mission, but it can contribute to an employee's overall skills enhancement in innovation.

Innovation competence can be documented through various activities and results and is relevant in recruitment and promotion processes. However, given the diversity of disciplines and research activities, as well as the breadth of different innovation activities, the criteria should be understood as illustrative and not as a requirement for every applicant.

Based on the unique characteristics of each institution, the competency criteria in Table 1 can constitute a framework for documenting activities and making qualitative and quantitative evaluations of innovation at institution, faculty, department or unit level.

Table 1 Merit-based recognition

Competency criterion	Possible documentation of competence
Formal competence[1]	• Study programmes or courses (master's level) in innovation or impact based on research • PhD courses in innovation or impact of own and others' research
New or significantly improved products, services or technologies	• Patent or other protection of IPR • Establishment of a company with a knowledge-based business idea
Leadership in or contribution to businesses' or organisations' innovation efforts[2]	• Active member in business clusters or business networks • Active contributor in regional development projects organised by external actors • Projects with companies or public organisations where innovation is the purpose or result • Long-term collaboration in knowledge exchange and innovation with private, public or voluntary organisations • Commissions for businesses or public entities as part of their innovation efforts
Contribution to innovation system or ecosystem for entrepreneurship[2]	• Contributions to the development of elements in the innovation system or ecosystem for entrepreneurship, such as: - creating forums for researchers, businesses, policy instruments and/or funding providers - helping to develop business incubators - contributing to training in innovation/entrepreneurship in an innovation system - leading/carrying out processes for public and private entities to develop the innovation/ecosystem for entrepreneurship - contributing to the development of TTO activities - leadership experience in academic networks and projects - leadership experience outside academia; in the business, cultural and public sectors
Social innovation[3]	• Active contributor in projects aimed at social innovation in collaboration with external actors • Collaboration with the public sector or voluntary organisations on the development of new services or other innovations • Collaboration with public and/or private actors on social innovation
Policy-making/regulation[2]	• Member of a public committee with a focus on policy-making/regulation • Project manager/participant in commissions involving the evaluation or investigation of policies or policy instruments • Leadership in panels and other committee work
Student innovation	• Teaching/supervision of students in practical innovation efforts or business start-ups • Contributions to the development of an environment for student innovation and entrepreneurship in a higher education establishment • Mentor for students working on their own innovations/ business start-ups

[1]*Suitable courses/study programmes must be developed and accessible to employees. The education should provide insight into practical innovation efforts, research-based innovation, and a theoretical foundation.*

[2] The contributions to innovation must be knowledge-based, i.e. build on the academic staff's competence in their discipline.
[3] Social innovation is a generic term for initiatives in which novel solutions are developed where the emphasis is on substantial improvement in society as opposed to commercial results per se. (SNL, https://snl.no/sosial_innovasjon)

Assessment of innovation juxtaposed with traditional assessment criteria such as research and education in recruitment processes

There is no expectation for everyone to be involved with everything, and it is not expected that all researchers should actively engage in innovation processes. Assessments of innovation competence that includes experience in or delivery of pilot projects, patents, start-ups etc. should therefore take place in the context of the competence needs of the academic community and department. Different competencies will need to be assessed in relation to specific needs, and not necessarily directly compared with one another. There is, however, a consensus in the working group that the quality standards in research and education cannot be deviated from. Nevertheless, the overall competence a candidate possesses beyond this could be assessed based on the identified needs.

The need for innovation competence should be included in job advertisements for posts where this is desirable. A distinction should also be made between positions where there is a general need for innovation competence and positions where the academic staff are expected to actively contribute to innovation efforts at a practical level or actively participate in entrepreneurship education.

Assessments of applicants for promotion

As provided for in the Regulations concerning Appointment and Promotion to Teaching and Research Posts, the authority to assess applicants for promotion in teaching and research positions lies with the institutions. When assessing applicants for promotion in academic positions, their scientific qualifications must be thoroughly documented and be in accordance with established international and national standards within the relevant discipline. UHR's guidelines for its disciplinary strategic units cover the assessment of applications for promotion in the respective disciplines. The guidelines for the STEM subjects[2] stipulate the following:

> 'When assessed in relation to an international standard for professorships within the discipline in question, the applicant's academic qualifications must be considered 'good' as a bare minimum. Their academic output should demonstrate an in-depth understanding of their specialisation, broad-based insight into the discipline, and wide-ranging knowledge of related areas. Both widely recognised bibliometric indicators and the academic standard of selected works shall be assessed by the committee. This output should provide evidence of ongoing activity at professorial level. However, it should also be possible to demonstrate progression over time and previous works of a particularly high standard, indicating the potential for a more long-term career development towards qualifying as a professor. The most important element in the assessment of academic merit will be internationally published, peer-reviewed scientific works. However, weight must also be given to patents, innovation efforts and documented research used in business and public administration. The emphasis on classic academic competence vs. patents, innovation etc. will naturally vary between disciplines but should be based on subject-specific international standards for what

[2] wfdocument.ashx (acossky.no)

qualifies as competence within the discipline. It will be up to each discipline to determine the appropriate weighting. All disciplines are encouraged to develop criteria for how this should be assessed.'

Other related background experience may include developing registers, dissemination experience, and interdisciplinary and inter-institutional collaboration that can have significant societal impact.

The working group believes that a qualitative evaluation based on a self-reflective note by external candidates and those applying for promotion would best demonstrate the standard of their competence.

Measures to enhance innovation competence in the sector

Universities and university colleges have an independent responsibility to develop their own innovation competence. It is important to create a culture of innovation through training of the academic staff and the induction of new employees. This includes various training modules such as PhD courses and innovation courses for employees. Innovation forums should also be created internally in the institution and across higher education institutions, and UHR-Innovation is the starting point for this.

In Table 2, the working group outlines some components that institutions can use when assessing how innovation is embedded in their own organisation (culture/recognition/merit), and when incorporating innovation efforts and competence into their own activities.

Table 2

Assessment component	Qualitative	Quantitative
Quality	• What research underlies the activity, project, service or product (robustness)? • Is it the work from a particular environment, prioritised research centre etc.? • The composition of the team (interdisciplinary etc.)?	• Published, tested or patented? • Research group, individual researcher, student • Cooperation with the private or public sector
Relevance (impact)	• Is the research (innovation) central or does it have the potential to address a complex challenge internally/externally? • What benefit of the research have others described?	• Has the knowledge been applied: ✓ in the business sector ✓ with collaborative partners ✓ in the development of new services/products • Scalability? • Financial gain?
Culture	• How is innovation described in governing documents, strategy and action plans? • In evaluation reports, are environments, expert groups etc. required to report on innovation?	• Is innovation included in any scientific and technical administrative staff's work plans and/or titles? • Described in strategies and plans, employees' individual plans?
Competence	• What competence does the university/university college possess in innovation activities in a broad sense? • How is voluntary innovation activity facilitated?	• Study programmes covering innovation and entrepreneurship • Student innovation: organisations, projects etc.
Externally funded projects and initiatives	• Is the research (innovation) central, or does it have the potential to address important societal challenges?	• Grade and impact (statistics) • Overall financial support
Internal stimulation and incentive schemes	• What are the criteria for impact/implementation? • Success and follow-up?	• No. of schemes • No. of acceptances
Teaching	• Assessment of competence that students acquire. Social utility - demand from the business and public sectors for knowledge that students are expected to have (e.g. student surveys)	• ECTS credits given in various innovation and entrepreneurship courses
Merit-based recognition and promotion	• Awareness of the competence needed to fulfil the social mission when positions are advertised?	• System for assessing innovation competence? (tailored to the unique characteristics of each discipline and the distinctive characteristics of the institution)

The contributions of both the academic and technical/administrative staff are crucial for the university sector fulfilling its social mission. Institutions should consider facilitating career paths that include the development of innovation competence during working hours/R&D time, so that this competence can be recognised in promotion and recruitment processes of academics.

In order to facilitate innovation work, a cultural change is required in many places. Following the restructuring of local project funding from the Research Council of Norway, it is expected that these funds will be used for early-phase innovation work (up to Technology Readiness Level (TRL) 3-4) in the future. It must be emphasised in this context that financial resources are also needed for the entire innovation process, whether it involves service development or commercially viable products (early phase, patents and IPR, agreements with TTOs where institutions do not have a TTO in their own organisation, business start-ups, etc.). Higher education institutions should also encourage academics to actively apply for funding for innovation from, for example, Horizon Europe (Pillar I (Proof of Concept), Pillar 2 and Pillar 3) and the European Institute of Innovation and Technology (EIT).

Innovation also requires more innovation competence to be incorporated into existing and new study programmes, dedicated innovation programmes and structured formal training with courses in the form of UniPed (basic course in university pedagogy in Norway) and PhD courses on innovation and impact across disciplines. Suitable forums should also be established, such as conferences, with a focus on innovation and research's contribution to society.

If the aim is to utilise more of the knowledge generated in practice and strengthen the innovation efforts at the HE institution, this should be facilitated through good funding arrangements with the Research Council of Norway and Innovation Norway. Consideration should also be given to improving the core funding of Norway's TTOs. Funding schemes for service and social innovation are just as important as strengthening the commercially viable aspect of innovation efforts.

In order to streamline the documentation of innovation competence, an automated CV function should be developed in the existing research information system, enabling data to be retrieved that can be used to document competence and achievements over the course of a career. The working group recommends that job applicants and those applying for promotion be given the opportunity to write a self-reflective note about their own innovation competence. For job applicants, this could be linked to specific requirements and wishes in the job advertisement.

Innovation competence among technical and administrative staff

In the working group's report, we do not take a position on the need for innovation in the organisation and operation of the university sector itself; we assess the efforts aimed at facilitating innovation, societal engagement and dissemination of research output where technical and administrative staff play a key role. These support roles are crucial for higher education institutions being able to strategically promote innovation within their own organisation. For most universities and university colleges, the responsibility for stimulating innovation will, as a minimum, cover early-phase innovation to TRL 3-4,[3] and social and non-

[3] https://www.innovasjonnorge.no/no/tjenester/innovasjon-og-utvikling/finansiering-for-innovasjon-og-utvikling/finansiering-av-innovasjonsprosjekt/technology-readiness-level-trl/

commercially viable innovation. However, many universities and university colleges have agreements with external actors (TTOs) for more traditional technology transfers.

It is important that higher education institutions build sufficient innovation competence among their technical and administrative staff. There will be a need for technical and administrative staff who work with academic staff to realise innovation potential in research and research projects. Administrative staff will also be needed to work with students to realise good business projects and facilitate the generation of practical knowledge and experience in establishing a business etc. Several universities have also had positive experiences with student mentors. It may also be relevant to consider the following competence in applicant assessments during promotion and recruitment processes of technical and administrative staff:

- Experience from the R&D sector
- Experience from innovation efforts, including knowledge of innovation theory
- Broad-based societal engagement
- Knowledge of the legislative/regulatory framework
- Knowledge of policy and financial instruments

Conclusion

Universities and university colleges have a broad social remit that encompasses research, education, innovation and dissemination. The responsibility for the sector's overall social mission does not rest solely on individual academic staff but must be understood as an institutional responsibility. A broad definition should be applied to innovation competence, and this competence in higher education institutions should be based on research, as is the case for educational competence. Research competence is crucial in the assessment of qualifications when recruiting and promoting academic staff.

Current requirements for research should not be reduced. When positions are advertised, academic communities/departments can formulate qualification requirements specific to each position beyond what generally applies to the relevant job category. It is therefore important that academic communities/departments have a conscious approach to the expertise needed to help universities and university colleges fulfil their social mission.

When assessing innovation competence, qualitative evaluations will provide a more complete picture of the applicant's skillset. The working group therefore recommends that candidates provide a self-reflective description of their own competence and contributions in relation to the job description and discipline. The assessment of innovation competence, including experience and/or deliverables (pilot projects, patents, start-ups etc.) should take place in the context of the competence needs of the academic community and department. When assessing applicants, emphasis should be placed on whether they have contributed to innovation competence in the study programmes, supervised students in practical innovation efforts or business start-up, and/or helped develop an environment for student innovation/entrepreneurship at the institution. In order to fulfil their social mission, universities and university colleges need to ensure that administrative and technical staff also have innovation competence.

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Appendix 1: Recommendations for content in self-reflective note in recruitment and promotion processes

The self-reflective note should be based on the individual's own experiences and contributions to the different parts of the innovation process (pre-project/idea generation, project development and completion/final result). An applicant's contributions to enhancing culture and competence in expert groups or the ecosystem can also be included, as well as various formal and informal competencies.

Innovation is often a collaborative effort in which employees can contribute at various stages of the value chain up to the end result. It is important that applicants describe their own contribution to the teamwork and the responsibilities they have had at the different stages of the value chain. Highlighting and evaluating different types of contributions to the process are important drivers for exploiting an institution's innovation potential.

Different types of experience, output and competence can be linked to the following three phases:

1. Pre-project/idea generation
    - Stakeholder contact/insight into societal needs
    - Active participation in various forums, clusters etc.
    - Stakeholder involvement in generating research questions
    - Dissemination to/communication with stakeholders, how to build bridges and identify common interests
2. Project development and evaluation
    - Incorporation of innovation ideas into projects (e.g. project description includes the 'next step' with regard to use in society, description of IMPACT potential)
    - Interdisciplinary/diverse teams, varied working methods (including innovation methodologies)
    - Open science and assessments of IPR (as open as possible, as closed as necessary)
    - Citizen science
    - Dissemination (especially to users and in the public domain)
    - Leadership
3. Completion/final results (including quantitative indicator)
    - Knowledge/technology transfer, how and to whom
    - Patents (also preferably in the execution phase)
    - Licensing
    - Start-up business
    - Change in practice (within our outside the university sector)
    - Basis for future research (innovation-driven research)

    Any IMPACT reference cases should be attached.

Enhancing ecosystem culture and competence

- Contributions to training others
- Sharing of knowledge
- Dissemination (also internally)
- Supervision/teaching

Competencies

- Formal competence in the form of study programmes and courses/conference participation

- Other relevant experience

Keywords for reflection could include
Assessment of own contributions and efforts with regard to:

- Interaction between research and knowledge application in practice – generation of ideas for possible applications
- Contribution to interdisciplinary collaboration
- Contribution to idea development and evaluation
- Contribution to knowledge transfer/exchange
- Contribution to the development of practices
- Contribution to society (impact)
- Own practices in light of knowledge of the field
- Contribution to teaching/supervision in relation to innovation