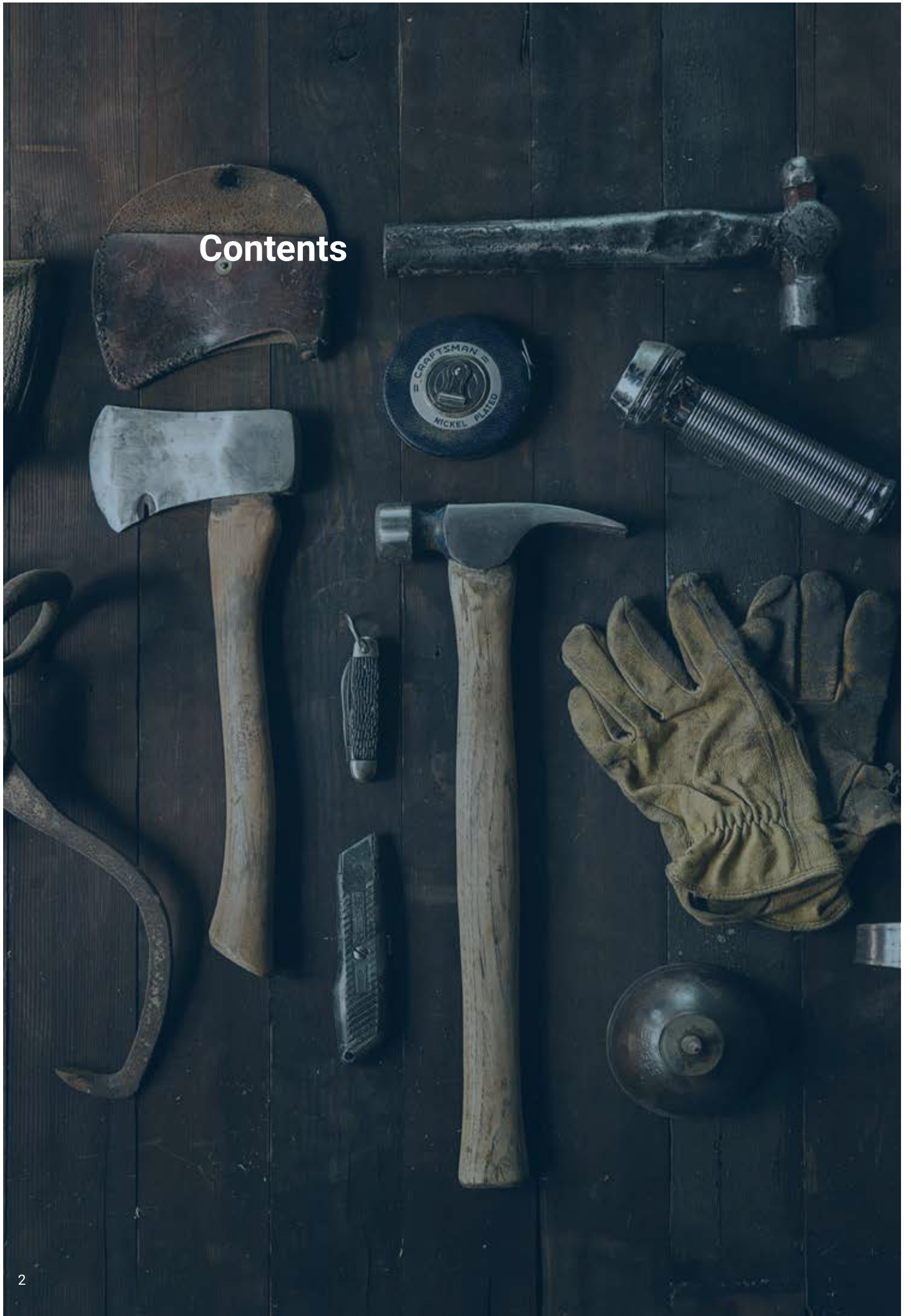




**NOR-CAM - A toolbox
for recognition and rewards
in academic careers**

U:R Universities
Norway

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Summary

In recent years, initiatives to further develop ways of assessing research quality and academic careers have increased in scope and strength. Some of the key change processes that contribute to these discussions are:

Open Science

There are strong indications that, in the time ahead, openness will be an integral part of all knowledge production and dissemination. Open research is about to become the new norm, and it will therefore be natural for all results, activities and competencies to be assessed in the light of the aims of open research. Open research will therefore affect how careers are assessed¹.

Assessing and recognising a greater breadth of competencies

in research and teaching and interaction with society. Many of the activities that academic staff perform in line with the institution's goals and work are not systematically assessed or valued. Individual research achievements in the form of published research results are more strongly incentivised than other work, and individual achievements are given greater weight than collaborative efforts. A better balance in the assessment of the various key activities has been called for.

The need to reduce and modify the reliance on quantitative publication metrics

in academic career assessment. The privileging of quantitative research results and the traditional, quantifiable indicators with which they are measured (e.g. number of publications, h-index and Journal Impact Factor) has become a challenge in many environments. These indicators do not always serve as valid proxies for research quality, they do not reflect the full extent of research activity, nor do they cover the other activities and competencies that are expected in an academic career.

A working group appointed by Universities Norway (UHR) was mandated to recommend guiding

principles for the assessment and evaluation of research(ers) in light of the transition to Open Science. This working group proposes a more flexible and holistic framework for recognition and rewards in academic research assessment. The ambition has been to develop a guide that adopts three core principles for assessment: more transparency, greater breadth, and comprehensive assessments as opposed to one-sided use of indicators. We propose NOR-CAM (The Norwegian Career Assessment Matrix) as a systematic framework in which these elements are assessed and can be combined for different purposes and needs. Such an expanded research assessment approach aims to incentivise and reward a broader range of academic activities, and ultimately to improve academic culture and the quality of research.

The knowledge sector is global. Changing the framework for recognition and rewards in one country at a time would be difficult. Researcher mobility and international funding makes it challenging to implement practices that are at odds with international norms. NOR-CAM is therefore developed in close contact with partners in several other countries, as well as in the European University Association (EUA) and the EU.

NOR-CAM and the associated framework for assessment can be used by:

• Academic institutions

- when recruiting academic and scientific staff
- in processes related to promotion from one scientific career stage to the next
- career guidance of employees by department and research leaders

as well as by:

¹ Both "open science" and "open research" are concepts used to cover open research practices in general. In this document we will use "open research" when we discuss open research activities and Open Science (with capitals) referring to the political concept.

- **Funders** when assessing project managers and participants in connection with research applications
- **National authorities** when evaluating of Norwegian research and education

An important goal of the guidance and framework is to make the assessment processes more transparent and predictable, both for the individual and for the institutions. What skills are needed for the position to be filled? How well does your own competence fit the position advertised? What are the requirements for promotion?

The guide is flexible but offers a systematic and structured framework for assessment. Because it is a matrix, the assessment can be adapted to emphasise different competencies for different tasks/positions/career stages depending on both the individual's career and the institutional needs. This will mean greater transparency about which assessment criteria are emphasised in the specific context, and will improve predictability, not least for applicants. It will also provide a better basis for career follow-up throughout the academic career path.

It is not enough just to agree on the need to modernise career assessment practices among academic leaders. Real change only happens when it becomes common practice within academic communities. Responsibility for implementing the new practice therefore must be rooted centrally in academic institutions and locally in departments and research centres. NOR-CAM and its principles will be a helpful tool for designing specific changes in routines for recruitment, evaluation committees and appointment committees.

For a new research assessment framework the working group has proposed:

Six principles:

1. Measure quality and excellence through a better balance between quantitative and qualitative goals

Bibliometric indicators should be used with caution and supplemented with other information

2. Recognise several competencies as merits but not in all areas at the same time or by each employee

The individual academic is not expected to excel in all areas. It is the universities that must achieve the expected objectives given by the government

regarding research, education and interaction with society, not the individual academic

3. Assess all results, activities and competencies in the light of Open Science principles

Openness should be seen as an integrated part of the academic activity

4. Practice transparency in the assessment and visibility of what should be recognised as merit

Individuals must know what criteria will be used to assess them and must be given insight into how the criteria are applied

5. Promote gender balance and diversity

Changes in the assessment criteria must be sensitive to impact on gender balance and diversity

6. Assist in the concrete practice of job vacancy announcements and assessment processes locally

The framework should be a helpful tool in the recruitment and appraisal processes in the institutions and within the academic communities

Four recommendations:

1. To establish a comprehensive framework for the assessment of academic careers that:

balances quantitative and qualitative goals and forms of documentation for academic standards and competencies

enables diverse career paths and promotes high standards in the three key areas: education, research and interaction with society

recognises the independent and individual competencies of academic staff as well as their achievements in groups and through collaboration

values Open Science principles (including open assessment systems)

values and encourages academic leadership and management

2. To engage internationally in developing a Norwegian assessment model because:

changes in the assessment criteria cannot be made by one country alone

a Norwegian model can contribute to related processes internationally

3. To use NOR-CAM as a practical and flexible tool for assessing academic results, competence and experience for academic personnel. NOR-CAM will highlight six areas of expertise through systematic documentation and reflection:

See the matrix below.

4. To develop an 'automagic CV system' that enables academics to retrieve data that can be used to document competencies and results in their own career, including applications for positions, promotions and external funding.

Who does what?

The institutions:

NOR-CAM and the principles behind it should be supported by the institution's management and be incorporated into the institution's career and HR policy..

The institutions should update their guidelines for the announcement of academic positions and for assessment in connection with employment and promotion

Scientific assessment committees should be followed up to ensure that the new system is implemented in practice.

Academic staff:

Use NOR-CAM to document achievements and competencies with components from the entire range of academic activities.

Funders:

Use NOR-CAM as a basis for assessing applicants and project participants' competencies when assessing research projects.

Authorities:

Ministry of Education and Research: incorporate the principles of NOR-CAM into the new national framework for the evaluation of Norwegian research and higher education.

Directorate for ICT and joint services in higher education and research: Develop a module that makes it easy to import, register and retrieve documentation of results and competence ('automagic CV system').

Mandate and delimitations

This working group was established in association with UHR's action plan for Open Science. The working group's starting point is the need for change in the ways researchers and research are assessed in light of Open Science. The working group started its work in the autumn of 2019 and has engaged closely with similar efforts in several other European countries, as well as in EUA and the EU.

The working group's mandate

'The working group shall draw up guiding principles for the assessment and evaluation of research in the context of assessing applications for research projects, as well as for appointments and promotion.

Research quality is multidimensional, subject-dependent and context-dependent, and assessments of research and researchers need to take this into account. It will be necessary to examine what results, processes and activities will be relevant to include in various settings. One key point will be to consider how to relate to the degree of openness when assessing research. Manuals on how to assess quality in different practical settings will contribute to transparency and predictability in the research system.

In the preparation of the manuals, the working group may use the following topics and issues as its starting point:

- How the use of bibliometric analyses and indicators can be included in assessments of researchers and research.
- How openness can be assessed at various stages of the research process.
- How published works other than traditional academic articles, chapters in anthologies and monographs, as well as datasets, source codes, software and other research output can be included in an assessment.
- What an appropriate implementation of DORA could mean in practice.

- Multilingual dissemination of research (the Helsinki initiative).
- In manuals for appointments and promotions it will be necessary to assess how the Open Science Career Evaluation Matrix (OS-CAM) can be applied in a Norwegian context.'

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Concepts and definitions

Researchers and academic staff

In colloquial speech, the terms 'researcher' and 'academic staff' are often used interchangeably. Many academic staff members are lecturers, and will not necessarily have a research background. Some are researchers with no teaching responsibilities. Others may perform managerial tasks, while many spend much of their time on innovation or various forms of external relations. The working group will therefore mainly use the term *academic staff* to refer to this group.

Assessment of persons vs. projects vs. careers

Assessment of persons vs. projects vs. careers
This report will mainly focus on the assessment of the competence of persons in the context of their careers, primarily with a view to factors that are highlighted and assessed in association with appointments to academic posts and promotion to higher positions. The approach chosen will obviously be relevant also for the assessment of projects that apply for funding, for example from the Research Council of Norway, but here it will mainly relate to assessing the competence of the principle investigator and the collaborators, not the project description. However, the requirements for research grants that are currently being introduced with regard to Open Access (Plan S), FAIR data² etc. are in keeping with the assessment criteria applied by the working group.

When referring to 'career-related assessment', we mean assessments at given points in a person's career, not assessments of their entire career.

Evaluation vs. assessment

In the following, the working group will use the term assessment to refer to the competence, experience, and results of individuals, while we believe that evaluation is best suited to describing a collection of assessments at an aggregated level, for example a subject area, a priority area, a programme or an institution. The assessments of individuals and competence areas will nevertheless be sub-components in an evaluation, and the recommendations of the working group will therefore be relevant, for example for future evaluations of Norwegian research and education.

What is open science?

The working group has chosen to use the definition in the Research Council Policy for Open Science from 2020: 'Open science means transparency and knowledge-sharing in research processes to make knowledge accessible across academic groups,

sectors and national boundaries. The concept of open science encompasses the entire research process – from the start-up via funding and implementation of the research through data management, analysis, scholarly publication, scientific synthesis and communication activities. Open science has a wide scope and is also used to refer to open cooperation, open peer review, open working methods, open educational resources, research integrity, accountability, and involvement of users and citizens.³ In the original Norwegian-language version of this report, the term *open research* ("åpen forskning") is used to underline that also the arts and humanities and artistic research are included. This English translation of the report uses the term Open Science to align with international conventions.

Assessment of academic careers in light of open science

As this work has moved forward (and in line with the mandate), the working group's proposals have converged towards a recommendation for a general manual for the assessment of academic qualifications, i.e., not only in connection with open science. We believe that this also meets a need in many institutions that endorse the principles of open science and have signed the DORA declaration (see below), but may find that it is difficult to adhere to these principles in practice.

² FAIR Data principles: Findable, Accessible, Interoperable and Reusable (Wilkinson et al., 2016) See also: <https://www.go-fair.org/fair-principles/>

³ See also the EU's definition of Open Science and Foster's Open Science Taxonomy.

Need for further development

Challenges

In light of the broad social remit of universities and university colleges, the academic staff are expected to perform a large number of tasks, pursuant to the Universities and University Colleges Act⁴ with the appurtenant Regulations concerning appointment and promotion to teaching and research posts.⁵ Today, many of these tasks are not systematically assessed.

In appointments and promotions, much of the emphasis is placed on research results, often understood as published works in academic journals or books. After the amendment of the regulations in 2019, pedagogical competence should also be emphasised in appointments and promotions. Competencies related to dissemination, innovation, collaboration and leadership should also earn merit, but practices vary, and there is no systematic framework for how to assess and document these aspects. In parallel, there is a significant tendency towards more openness in research, in Norway as well as internationally. This applies not only to open publishing, but also to open availability of data (FAIR data), research processes, source codes etc. In other words, there is currently an imbalance in how these key areas are valued. In addition, many would also argue that the current assessment system fails to underpin the requirement for both collaboration and individual competition.

There is consequently a need for a common national (and eventually international) framework that makes it possible to identify activities that earn merit so that these can be documented by academic staff members and assessed by employers. The same applies to the assessment of research projects, for example by the Research Council of Norway or other funding agencies. This is particularly important for young academics who are planning to build an academic career, and in relation to achieving a better gender balance and more diversity in academia. It would also make it possible to include more competencies in the key areas of research, teaching, dissemination, external relations and leadership when recruiting research groups and facilitate the development of different career paths in academia.

The working group believes that no comprehensive reform is needed. Unlike many other countries, it is already common practice in Norway to include a wide range of activities in assessments of academic staff. As a rule, a qualitative assessment of the applicant's or the staff member's competence will be undertaken. The current practice for appointments (and promotions) in Norwegian universities and university colleges is therefore relatively well aligned with the principles for a broadened basis for assessment. For example, it is common to include more than just published works and bibliometrics as indicators of research quality.⁶ In a standard recruitment process for an academic post in a Norwegian university, a recommendation from an expert committee will contain a qualitative assessment of the (most important) academic works submitted, summarised in an overall appraisal of their academic strengths and weaknesses. The assessment is often made on the basis of a fairly open vacancy announcement, with few specific assessment criteria. In contrast to similar processes in other countries, there is also a high degree of transparency around the assessments made in recruitment processes. For example, the applicant invariably receives the committee's recommendation for comment.

After the new regulations entered into force on 1 September 2019, the applicant's pedagogical competence must be assessed. Basic pedagogical competence has been added as a requirement for appointment as an associate professor, and successful applicants need to develop this competence in order to qualify for a full professorship. In the recruitment process, the candidates with the highest ranking will be invited to an interview, and frequently also to hold a trial lecture. Here, the academic quality and profile, as well as other competence areas will be assessed,

⁴ <https://lovdata.no/dokument/NLE/lov/2005-04-01-15>

⁵ <https://lovdata.no/dokument/SFE/forskrift/2006-02-09-129>

⁶ There are some differences between the disciplines, however. Some disciplines place major emphasis on bibliometric parameters and ranking of publication channels.

including the ability to collaborate and contribute to an academic/institutional community. Furthermore, many Norwegian universities and university colleges, as well as the Research Council of Norway, have signed the DORA declaration, which recommends that indicators at the journal level, for example the Journal Impact Factor (JIF), should not be used to assess the academic quality of individual articles.⁷ For the Research Council of Norway, this has meant that experts are now asked to disregard such indicators when assessing publications that researchers have referred to in their project applications.

The challenge, however, is that assessments for appointments, promotion and research funding are not made within a uniform framework or according to a shared set of criteria. The regulations refer to 'an academic level consistent with established international or national standards'.⁸ This is further specified to some extent in the institutions' internal regulations,⁹ and some disciplines have agreed on national guidelines.¹⁰ The challenge, however, is that the goal of increasing the emphasis on broader competence assessments is often trumped by the emphasis on 'traditional' research results.¹¹ Quantitative indicators continue to play a key role in the assessment of project applications and candidates for academic posts.

This is problematic, also in light of the virtual absence of templates or standards that define the assessment criteria in the other competence areas. Unclear and/or differing definitions of key concepts are often used in the different CV templates, for example 'service' and 'leadership', forcing the researchers to adjust their CV for every application they write. Metrics and bibliometric information continue to be requested, such as the number of citations for individual articles, h-index and citation index. However, these data are retrieved from varying sources (Web of Science, Google Scholar etc.). For academic activities and results related to data, source code, peer reviewing, etc., few or no authoritative sources exist. Such items are nevertheless requested in assessments, and the researchers try to provide this information to the best of their abilities.

As well as presenting problems for those who apply for posts or promotions, it is also difficult for the members of the committees that assess the applications. They all have their own understanding of the concepts and metrics that are used, often coloured by their home institutions, the countries where they work and their discipline. Even in areas where more specific guidelines are available, the prevailing practice will often be based on unwritten rules that can be difficult to relate to. This is particularly difficult for young academics, who often apply for posts and projects in many different institutions and countries

in parallel. The widespread practice of placing the main emphasis on publications and the ranking of publication channels has a conserving effect that is not conducive to the necessary transition to Open Science. In addition, the increasing dominance of quantitative data gives rise to strategic adaptation among the actors to increase their number of citations and thereby boost the indices. This can come at the expense of research quality. These problems concern both individuals and institutions. Often, the desire for a broader form of assessment will be endorsed at the leadership level, while the practical application may still be inconsistent when it comes to each

Further development of good practices

The working group believes that in the Norwegian context, the current assessment regime needs to be developed and systematised, rather than radically altered. Quantitative data could continue to be used, but with greater caution than previously. They also need to be supplemented with documentation of competence in a broader range of activities in line with what the education and research institutions need to fulfil their social remit.

As a basis for such a system, the working group has sought to operationalise and refine the Open Science Career Assessment Matrix (OS-CAM) (see below), a matrix developed by an EU working group¹² that has inspired the work of EUA's Expert Group on Open Science/Science 2.0¹³.

Furthermore, the working group has considered the assessment criteria from OS-CAM in light of institutional rules for appointing candidates to professorships and associate professorships,¹⁴ as well as the Regulations concerning appointment and promotion to teaching and research posts.¹⁵ In turn, this has provided a basis for development of a competence assessment matrix as a tool for use in assessments of academic staff members and academic careers in Norway: Norwegian Career Assessment Matrix (NOR-CAM).

In NOR-CAM, the working group has developed a framework for assessing competence areas that are relevant for appointments and promotions in the higher education sector. It includes various forms of research output (data, source code, videos, etc., in addition to published works), the research process, pedagogical competence (scope, development of new study programmes etc.), external relations (dissemination, social media etc.), as well as leadership and organisational experience.

⁷ <https://sfidora.org/>

⁸ <https://lovdata.no/dokument/SFE/forskrift/2006-02-09-129>

⁹ See for example UiO: <https://www.uio.no/english/about/regulations/personnel/academic/rules-appointment-professor.html>

¹⁰ E.g. a coordination of processes for promotion to professorships in STEM disciplines in Norway.

¹¹ See for example The role of metrics in peer assessments: <https://nifu.brage.unit.no/nifu-xmlui/handle/11250/2722202>

¹² https://ec.europa.eu/research/openscience/index.cfm?pg=rewards_wg

¹³ <https://eua.eu/issues/21:open-science.html>

Principles for an assessment framework

Norway has a relatively favourable starting point for expanding the assessment basis for appointment, promotion and project evaluation processes and making them more predictable and flexible. The proposals from the working group do not therefore entail any radical change in current Norwegian academic assessment practice. Instead, they represent a further development of prevailing practices, with a focus on ensuring a broader and more flexible basis for assessments. In addition, a more uniform framework will simplify the production of technological solutions for automatic generation and extraction of information from CVs. This will save a lot of manual effort for job and project applicants. Moreover, it will make the process more predictable for all parties involved.

The working group believes that such a framework should be based on the following six principles:

1. What is quality? Balancing quantitative and qualitative measures

The implicit and near-exclusive emphasis on traditional, quantifiable indicators of research results (e.g. number of published works, the h-index and the Journal Impact Factor) has become a challenge in many academic communities. Too much emphasis is placed on result indicators that fail to show the entire picture. Bibliometric indicators tell a story, but not the whole story. Figures and quantifiable measures must therefore be used with caution and supported with other information when making assessments related to appoint-

¹⁴ Mapping study, primarily based on regulations at the University of Oslo and Oslo University Hospital.

¹⁵ <https://lovdata.no/dokument/SFE/forskrift/2006-02-09-129>

ments, promotions or the allocation of resources. One-dimensional use of bibliometric indicators can also disrupt the balance between disciplines. The indicators are not identical in the different academic disciplines, and when used across them, the indicators challenge the diversity that exists within and between the disciplines. Relying too heavily on bibliometric indicators can therefore undermine academic diversity, thwart interdisciplinarity and weaken the social impact of research. Not least, they can hinder Open Science practices. It is thus important to calibrate and expand the assessment system.

The National Board of Scholarly Publishing, which is responsible for the academic administration of the publication indicator for institutional funding in Norway, gives the following advice regarding bibliometric indicators when used at the individual level¹⁶:

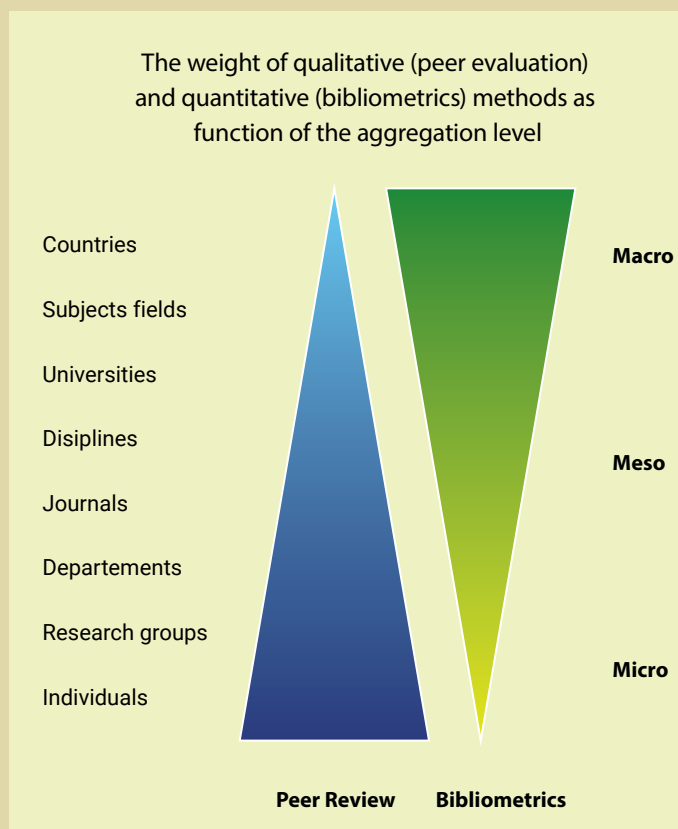
1. **Bibliometrics must not be used in isolation**
Appointments, promotions, career follow-up and allocations of tasks and resources must be based on an overall assessment. In most cases, it is not only the research that needs to be assessed. However, even in assessments of research, bibliometric indicators are of limited value, because they are retrospective, take no account of the context and cannot replace decision-making responsibility.
2. **Bibliometrics do not look ahead**
Bibliometrics point retrospectively to previous research activity. Assessments in the context of appointments, promotions or the allocation of resources must also look forward and appraise the possibilities for meeting the requirements and expectations stipulated..
3. **Bibliometrics do not understand varying contexts**
Research and academic activities take place in more or less active stages, depending on which other activities applicants are involved in, the resources that are available at any given time, and the type of projects and collaborations that the academic is engaged in. When allocating resources or deciding on appointments and promotions, committees and leaders have a responsibility to understand these variations..

Bibliometrics cannot make decisions

When a large number of applications makes it necessary to carry out a screening process before a closer assessment of relevant qualifications is made, bibliometrics can be one of several appropriate instruments. However,

the value of using bibliometrics will decrease as the assessment process approaches the decision stage. Qualitative methods and a responsible decision will be needed.

Bibliometric indicators will be useful at the macro level, but are less suitable as a basis for decisions at the individual level, see the graphic chart..



Above, we have provided the abridged version of the recommendations from the Norwegian Board of Scholarly Publishing. The full version also includes the opportunities and limitations of the publication indicator, the Journal Impact Factor and the h-index, and regards these three indicators in light of the DORA declaration and the Leiden Manifesto.¹⁷ See also the study by Ingvild Reymert on bibliometrics in academic recruitment.¹⁸

Developing a more balanced and open assessment system does not mean reducing the requirement for quality. Rather, it is about reducing the use of numbers as a 'proxy' for quality. The new framework will make it easier to assess quality across the breadth of a candidate's activities. The goal is to reduce the focus on counting results (such as the number of publications) and place more emphasis on quality, content, academic integrity, creativity and contributions to research and/or society, and to recognise the academic's specific profile.

¹⁶ Metrics in individual-level assessments - Advice to research organizations and their leadership from The National Board of Scholarly Publishing: <https://npi.nsd.no/informasjon#lokaltNivaa>

¹⁷ <http://www.leidenmanifesto.org/>

¹⁸ Reymert, I. (2020) Bibliometrics in Academic Recruitment: A Screening Tool Rather than a Game Changer. Minerva. <https://doi.org/10.1007/s11024-020-09419-0>

2. Everybody should not do everything

Another key premise is that the responsibility for meeting the statutory objectives for research, education and external relations lies with the higher education institutions. Requiring that all academic staff members shall be assessed equally with regard to all three main objectives is therefore unrealistic and unnecessary. A key point for the working group is that an assessment system should underpin a wider set of career paths for the staff, not only in terms of different positions, but also in providing for more variation over time for each staff member individually.

The framework proposed by the working group will better enable individual staff members to profile themselves strongly in one of the main areas. Such profiling can be done in research, teaching, innovation, external relations or leadership. In appointments, career follow-up, promotions and other kinds of recognition, the assessment criteria should take such variations into account. This will pave the way for academic staff members to build a career that makes use of different competence areas and talents, and can better balance the strengths of individuals with the various needs associated with the academic activities in the institutions.

In addition to such flexible career opportunities for individuals, the assessment system must facilitate collaboration and interaction. Research activity is increasingly undertaken in groups. Such groups are often composed of people with different academic profiles, and this lends support to the argument for emphasising different competencies and qualities. The assessment system must also recognise the ability, competence and willingness to engage in collaboration, sharing and interaction, including across disciplines. In this way, the (specialist) competencies and profiles of the individuals will become part of a larger whole in the research group, institute or faculty.

Furthermore, changes in the assessment regimes in the institutions should concur with the assessments made in allocations of research funding by the Research Council of Norway and other funding agencies. For example, project experience and competence in developing research networks and building consortia are key criteria in applications for research grants.

Also, a joint commission coordinated by Universities Norway, proposed in April 2021 a career structure that permits more variation between groups of staff members, variation at various stages of individual career trajectories and diversity in career trajectories. Moreover, focus is placed on making better provisions

for individual staff members to profile themselves more strongly in a wider range of tasks. This is dependent on a career structure (and an assessment system) that underpins this kind of flexibility in appointments, promotions and general career follow-up. The goal is to ensure that academic staff members can build a career that makes use of various competence areas, as well as to better enable the balancing of individual strengths with the different needs of the institutions.

3. Open science as a fundamental principle

An important background for Universities Norway appointing the working group was linked to how increased requirements for openness have a bearing on the way in which careers are assessed. The working group is reasonably convinced that in the years to come, open research will not be considered as a supplement to the other academic activities that a researcher engages in, but will be an integral part of all production and dissemination of knowledge. Over time, openness will become the new normal. It will then be natural for all results, activities and competencies to be assessed in light of the goal of Open Science principles.

4. Transparency in assessment and identifying what earns merit

One of the main reasons for establishing an assessment framework is to make appointment processes more transparent and predictable. Today, it is often difficult for applicants (especially those from other countries and traditions) to identify the real assessment criteria. A consistent (but flexible) framework will make it easier for potential applicants to assess their competencies and chances in light of the requirements stipulated. Employers will also be able to better tailor their vacancy announcements to the specific competencies that are needed. Similarly, agencies that fund research can also be more specific in their calls for proposals and refine the assessments of competence in their application processes. This will make career planning simpler and provide a better basis for the institutions' career follow-up of individual academic staff members..

5. Promoting gender balance and diversity

Current assessment practices in relation to appointments, promotion and project funding can be a barrier to gender balance and diversity. The study on applications, recruitment and mobility in the higher education sector¹⁹ by the Nordic Institute for Studies in Innovation, Research and Education (NIFU) illustrates these challenges, which are also supported by other studies.²⁰ A number of formal guidelines have been established to improve the gender balance in the sector and ensure that the institutions strive for gender equality throughout the entire recruitment process.²¹ However, data from NIFU²² and others show that there are major disparities between the educational institutions and between departments within the same university in terms of how closely they follow the guidelines in order to ensure equality in the recruitment process. Replacing the current heavy weighting of academic publishing with a broader assessment framework will help to achieve equality and stimulate career opportunities for women and men and for people with a minority background.

6. Local design of announcements and assessment processes

National principles and recommended guidelines have little value if they are not followed in the academic communities. The current national regulations²³ on appointment and promotion are open to considerable interpretation. Real change in recruitment and promotion processes can only take place if individual units develop their own procedures and practices. Note that it is not sufficient to make changes once applications have been received; the process must start before the position is advertised. The text in the vacancy announcement must clearly specify which duties are to be performed, which competencies are required, and which goals are expected to be achieved. The working group's proposal is therefore formed as a practical guide on how this can be applied at the institutional level and in the individual units.

¹⁹ Attractive academic careers? Applications, recruitment and mobility in the higher education section | NIFU Chap.3 (In Norwegian): <https://www.nifu.no/publications/171098/>

²⁰ <https://journals.sagepub.com/doi/abs/10.1177/0950017011432918>
<https://onlinelibrary.wiley.com/doi/abs/10.1111/gwao.12368>

²¹ Act relating to universities and university colleges - <https://lovdata.no/dokument/NLE/lov/2005-04-01-15>, section 6-2 and Act relating to equality and a prohibition against discrimination - <https://lovdata.no/dokument/NLE/lov/2017-06-16-51>

International context

No going it alone

Research and academic activity are international by their very nature. People, funding and research output can all transverse national borders and continents. There is therefore little scope to change the framework for assessing academic staff and projects in isolation. In addition, the merit and assessment systems are fundamental to the entire knowledge sector, including outside higher education institutions. A real shift towards new assessment practices therefore requires multiple national and international actors to make changes.

Recent years have seen an increase in the scope of discussions and initiatives to further develop practices for assessing the quality of research and academic careers, especially in Europe. Most recently, the European Commission has indicated that the so-called 'mainstreaming' of Open Science in Horizon Europe will also entail the Commission 'reforming the research assessment system' and that there is a need to redefine 'the notion or "quality/excellence"'²⁴. There are also several initiatives in the USA, although the development there is more bottom up and not founded on a government initiative²⁵.

Opportunities to lead the way and make a difference

The working group understands that we are reaching a watershed, where the question is no longer whether we need a reform, but when and how. Several countries are in a similar situation to

Norway, and the EU and other international actors and networks are discussing how best to move forward. Effective national change processes along with positive international discussions can help ensure best practice and the sharing of good ideas. The knowledge sector in Norway is relatively well organised (authorities, funding providers, the higher education sector and the research institute sector) and is therefore well placed to help shape future assessment practices for academic activity both in Norway and internationally.²⁶ The working group has been able to build on several of the reports from other countries and institutions, and by the same token, other countries will be able to build on Norway's work in the field.

²² NIFU report 2019:10, pp. 45-46

²³ <https://lovdata.no/dokument/SFE/forskrift/2006-02-09-129>

²⁴ See e.g. A new ERA for Research and Innovation: <https://op.europa.eu/en/publication-detail/-/publication/f232e2ec-0345-11eb-a511-01aa75ed71a1> (p. 20, item 9)

²⁵ See for example Ideas for action (https://sfdora.org/wp-content/uploads/2020/05/DORA_IdeasForAction.pdf) and Research Culture: Changing how we evaluate research is difficult, but not impossible (<https://elifesciences.org/articles/58654>) from DORA or the following summary from a Convocation under the auspices of The National Academies (<https://www.nationalacademies.org/event/10-17-2019/re-envisioning-promotion-and-advancement-for-stem-faculty-aligning-incentives-with-values>)

²⁶ There has been substantial international interest in the working group's efforts throughout 2020. (Including EUA-workshop May 2021: <https://eua.eu/events/129-2020-eua-webinar-series-on-academic-career-assessment-in-the-transition-to-open-science.html> and The digital repository of case studies created by DORA, EUA, and SPARC: Reimagining academic assessment: stories of innovation and change: <https://sfdora.org/dora-case-studies/>)

International initiatives

Below is a description of some of the most important international initiatives and activities that the working group has drawn on. The list is not exhaustive and new activities are likely to be added.

The San Fransisco Declaration on Research Assessment (DORA)

DORA was launched in 2012 and is made up of 15 recommendations relating to the evaluation of research. The general recommendation is that journal-based metrics, such as the Journal Impact Factor, should not be used to assess the quality of individual research articles, or to assess an individual scientist's contributions, or in appointment, promotions or funding decisions.

In addition to this general principle, DORA includes recommendations aimed at funding agencies, academic institutions, journals, organisations that develop and supply metrics, and individual researchers.

As of December 2020, 2047 institutions and 16 449 individuals had signed up to DORA. In Norway, nine higher education institutions have signed up, including the Research Council of Norway and Oslo University Hospital.

The Leiden Manifesto for Research Metrics

The Leiden Manifesto was developed by international bibliometric experts under the leadership of Diana Hicks and Paul Wouters, and was launched in Nature in 2015. The Manifesto consists of 10 principles for the responsible evaluation of research to counteract the unwanted use of metrics to evaluate researchers and research. The authors of the Manifesto refer to the extensive use of university rankings, metrics such as the h-index and Journal Impact Factor. The core principles in the Leiden Manifesto include the following: metrics should be used to support qualitative assessments, results should be considered in the context of the institution's research mission, locally relevant research should be recognised, and data collection and analytical processes should be transparent.

Science Europe's Position Statement and Recommendations on Research Assessment Processes

Science Europe's Position Statement from July 2020 presents examples of best practice and a framework for universities and funding providers to develop their own criteria and practices for evaluating research.

Research Assessment in the Transition to Open Science (EUA)

This report presents the results of the 2019 EUA Open Science and Access Survey on Research Assessment. The EUA recognises that the transition to open research cannot take place without a change in the way researchers and research are assessed. The report describes the status of how research is assessed in European universities. When assessing researchers, most universities that participated in the survey currently put the emphasis on academic publishing and external funding. The EUA recommends developing research assessment practices and including a wider range of output and activities in the assessment process. The EUA also points out that changing assessment practices is an international issue that requires dialogue within organisations, between institutions and across national borders.

The Hong Kong Principles for assessing researchers: Fostering research integrity

These principles were developed during the 6th World Conference on Research Integrity and were launched in July 2020. The aim has been to ensure that researchers are recognised and rewarded for activities that strengthen research integrity through 'responsible research practices; transparent reporting; open science (open research); valuing a diversity of types of research; and recognising all contributions to research and scholarly activity.'

The European Research Area

The new communication from the European Commission regarding a common European Research Area addresses the increased focus on research careers. With regard to research assessment practices, the Commission aims to develop a Researchers Competence Framework (measure 8, p. 13) and 'incentivise open science practices by improving the research assessment system' (measure 9, p. 14).

International inspiration

In addition to the initiatives described above, there are a further two that the working group considers to be particularly important as a source of inspiration for the proposed Norwegian framework:

'Room for everyone's talent'

The first initiative is the framework outlined in the report by Universities Norway's sister organisation in the Netherlands, VSNU and others: *"Room for everyone's talent: towards a new balance in the recognition and rewards for academics"*.²⁷

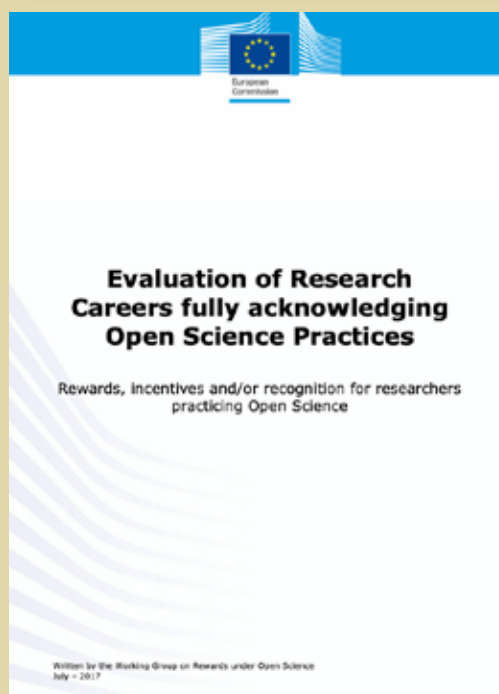
The document is based on the academic institutions' core activities: high standards in research and education and the application and impact of knowledge in society. This requires good academic leadership and open access to the results of research and education. It is also vital that academic activity spans a wide range, from long-term, basic curiosity-driven research to targeted problem-driven research. The link between research and education is also a core element of the Dutch initiative.

This initiative requires a cultural change and both national and international coordination between all relevant actors. This calls for a system of recognition and rewards of academics and research that:

1. Enables the diversification and vitalisation of career paths, thereby promoting excellence in each of the key areas;
2. Acknowledges the independence and individual qualities and ambitions of academics as well as recognising team performances;
3. Emphasises quality of work over quantitative results (such as number of publications);
4. Encourages all aspects of open science; and
5. Encourages high-quality academic leadership.

Open Science Career Assessment Matrix (OS-CAM)

The second initiative that the working group draws on is the Open Science Career Assessment Matrix (OS-CAM), which was launched in the EU report 'Evaluation of Research Careers fully acknowledging Open Science Practices; Rewards, incentives and/or recognition for researchers practicing Open Science' (2017).²⁸



The aim of OS-CAM has been to develop a multidimensional framework in which several aspects of a researcher's career, output and activities are included in the assessment. Open Science is a guiding principle of OS-CAM, and all output and activities are assessed on the basis of their degree of openness. This is described in more detail below.

It should also be noted that there are several international initiatives aimed at incorporating pedagogical competence into the assessment of careers, such as that in the European Higher Education Area (EHEA)²⁹ and in the EUA context.³⁰

²⁷ The Dutch position paper has a broad national base and is a collaboration between university associations, funding providers and academic associations (VSNU, NFU, KNAW, NWO and ZonMw): <https://www.vsnunl.nl/files/documenten/Domeinen/Onderzoek/Position%20paper%20Room%20for%20everyone%20E2%80%99s%20talent.pdf>

²⁸ The OS-CAM report: <https://op.europa.eu/en/publication-detail/-/publication/4733330-c9cb-11e7-8e69-01aa75ed71a1>

²⁹ http://www.ehea.info/Upload/document/ministerial_declarations/EHEAParis2018_Communique_final_952771.pdf

³⁰ <https://eua.eu/component/attachments/attachments.html?id=1886>

The toolbox: Norwegian Career Assessment Matrix (NOR-CAM)

From Set Menu to À la Carte – a toolbox for assessing academic results, competence and experience

The working group's recommendation is that the following be considered when appointing and promoting academic staff:

1. a wider range of activities than previously
2. the quality of the different activities
3. the scope of these
4. the degree of openness

These principles should also form the basis for the assessment of researchers in connection with project applications.

NOR-CAM is made up of six categories: research output, research process, service and leadership research impact, teaching and supervision and professional experience. In each category, relevant results, experience, competencies and activities can be described, documented and reflected on. The matrix contains examples of relevant competencies, activities and results for each of the categories in order to show what can be worthy of merit, but the list is not exhaustive. Components that are added under the different categories must be adapted to the context in which they are to be used.

It is important to understand that even if the 'menu' becomes longer, not all 'dishes' should be taken in at every 'meal'. Some competencies and qualities must be prioritised over others in vacancy announcements. The assessment criteria and the weighting of these will also vary according to the level of the position. The intended weighting of the various categories in the assessment process should be made clear in the announcement, and within the framework provided for in national regulations etc.

A common criterion in the matrix is the requirement for a high standard in all 'dishes'. Positions that entail both research and teaching require core competence in both these areas. The goal is to move away from a (seemingly) Set Menu where one 'dish' acts as a proxy for the whole meal. Instead, an à la Carte Menu approach should be used, where the various duties are defined more clearly and the competencies on which the assessment is based are stipulated. This will provide a better balance between the areas.

The quality of results should not only be assessed using various numerical metrics, see section 4.1 above. It is therefore recommended that job applicants select a relatively small number of results (for example 3-5 scientific published works), which are then subject to a qualitative assessment. The candidate can then be given the opportunity to reflect on how relevant the results are for the development of a subject area, and on whether and how they have been used in a broader context, including outside academia. The basis for assessment thus becomes a combination of documentable results and reflection.

Open access to research results and openness in the research process are key objectives that improve verifiability and quality, and increase the utilisation of knowledge. The degree of openness should therefore be indicated in descriptions and reflections in all of the categories, not least with regard to the first two, i.e. research output and the research process.

NOR-CAM – Norwegian Career Assessment Matrix

The Norwegian Career Assessment Matrix (NOR-CAM) is a further development of OS-CAM. The intention is for the matrix to serve as a framework for assessing general academic activity (results and competencies). One of the main aims of NOR-CAM is for multiple areas of expertise to be assessed more systematically than is currently the case.

1. Area of competence	2. Results and competencies (examples)	3. Documentation	4. Reflection
A. Research output	<ul style="list-style-type: none"> -Published works -Datasets -Software -Methodologies -Artistic results -Research reports 	CRIS systems (e.g. Cristin) and other databases	Reflection on the relevance and quality of the results. Emphasis is placed on open access to published works and other results, as well as whether the data adhere to the FAIR principles.
B. Research process	<ul style="list-style-type: none"> - Leadership and participation in research groups -Working across disciplines - Research integrity/RRR - Editorial activity - Peer reviews - Building consortia - External funding - Development of research infrastructure -Leadership and participation in clinical trials 	CRIS systems and other databases. Narrative CV system with links to source data.	Reflection on roles and relevance. How and why various actors within and outside academia have been involved in the research process. Emphasis is placed on transparency in the research process.
C. Pedagogical competence	<ul style="list-style-type: none"> - Planning, execution, evaluation and development of lectures and supervision of students - Participation in the development of educational standards in academic communities - Mentoring - Devising and sharing learning materials 	CV system with links to source data. Institutional registration of lecturing activity. Pedagogical portfolio.	Reflection on formal and informal competence and experience. Emphasis is placed on open education and the sharing of educational resources.

³¹ Responsible research and innovation. See for example <https://www.rrr-practice.eu/about-rrr-practice/what-is-rrr/>

1. Area of competence	2. Results and competencies (examples)	3. Documentation	4. Reflection
<p>D. Impact and innovation</p>	<ul style="list-style-type: none"> -Innovation -Entrepreneurship and commercialisation -Social innovation -Innovation in the public sector -Citizen science -Textbooks -Publishing activity -Research reports and studies -Application of research in public administration and industry 	<p>CRIS systems and other databases. Altmetrics. Narratives and impact stories. Patents and licences.</p>	<p>Reflection on the relevance and effects of activities for society, as well as external contributions to research. Sharing of research and educational results with the general public and others.</p>
<p>E. Leadership</p>	<ul style="list-style-type: none"> -Institutional and departmental leadership -Leadership in academic networks and projects -Leadership outside academia -Leadership in panels and other committee work 	<p>CV system with links to source data, CRIS systems and other databases, narratives.</p>	<p>Formal and informal leadership, reflection on roles, processes and effects. Contribution to strategies and policy development in relation to open science.</p>
<p>F. Other experience</p>	<ul style="list-style-type: none"> -Experience and competence from sectors outside academia. -Courses and discipline-related development work. 	<p>CV system with links to source data.</p>	<p>Reflection on how these experiences contribute to the competence in general.</p>

More details on the content of NOR-CAM

1. *The six competence areas to be assessed*

NOR-CAM has four columns, and we have slightly adapted the categories in OS-CAM. The first column shows the proposed six areas of competence that represent the breadth of relevant academic activities at higher education institutions; A. Research output, B. Research process, C. Pedagogical competence, D. Impact and innovation, E. Leadership, and F. Other experience. In column 2, we have given examples of *Results and competencies* that could be included in the various competence areas. Note that these are only examples and the list is not exhaustive. These first two columns are fairly similar to OS-CAM. NOR-CAM has two more columns than OS-CAM: column 3 refers to the systematic *Documentation* of results and competence, and in column 4, the documentation is supported by relevant *Reflection*.

Note that the matrix is a toolbox. Not all tools are used at the same time; only those that are most relevant for the specific vacancy announcement/promotion/project should be used.

2. *Results and competencies*

NOR-CAM is a flexible toolbox that can be adapted for different purposes, activities and careers. What should be included in assessments and how much weighting they should have can vary depending on the position to be filled and the profile of the institution/unit. The second column relates to results, competence and experience. The column contains examples of what might be relevant, but the list is not exhaustive. It is the institutions themselves that are responsible for prioritising the components in a recruitment process and for assessing academic quality and breadth, within the framework provided for in national regulations. For example, an institution with a strong focus on innovation can give more weighting to innovation, knowledge transfer and commercialisation in its version of NOR-CAM. Similarly, a Centre of Excellence may want to prioritise academic publishing, building international consortia, and theory and methodology development. It will also be possible to move results and competencies from one cell to another, or have some in more than one cell. For example, citizen science can be in both B. Research process and in D. External relations. Innovation and dissemination can also be relevant in various contexts.

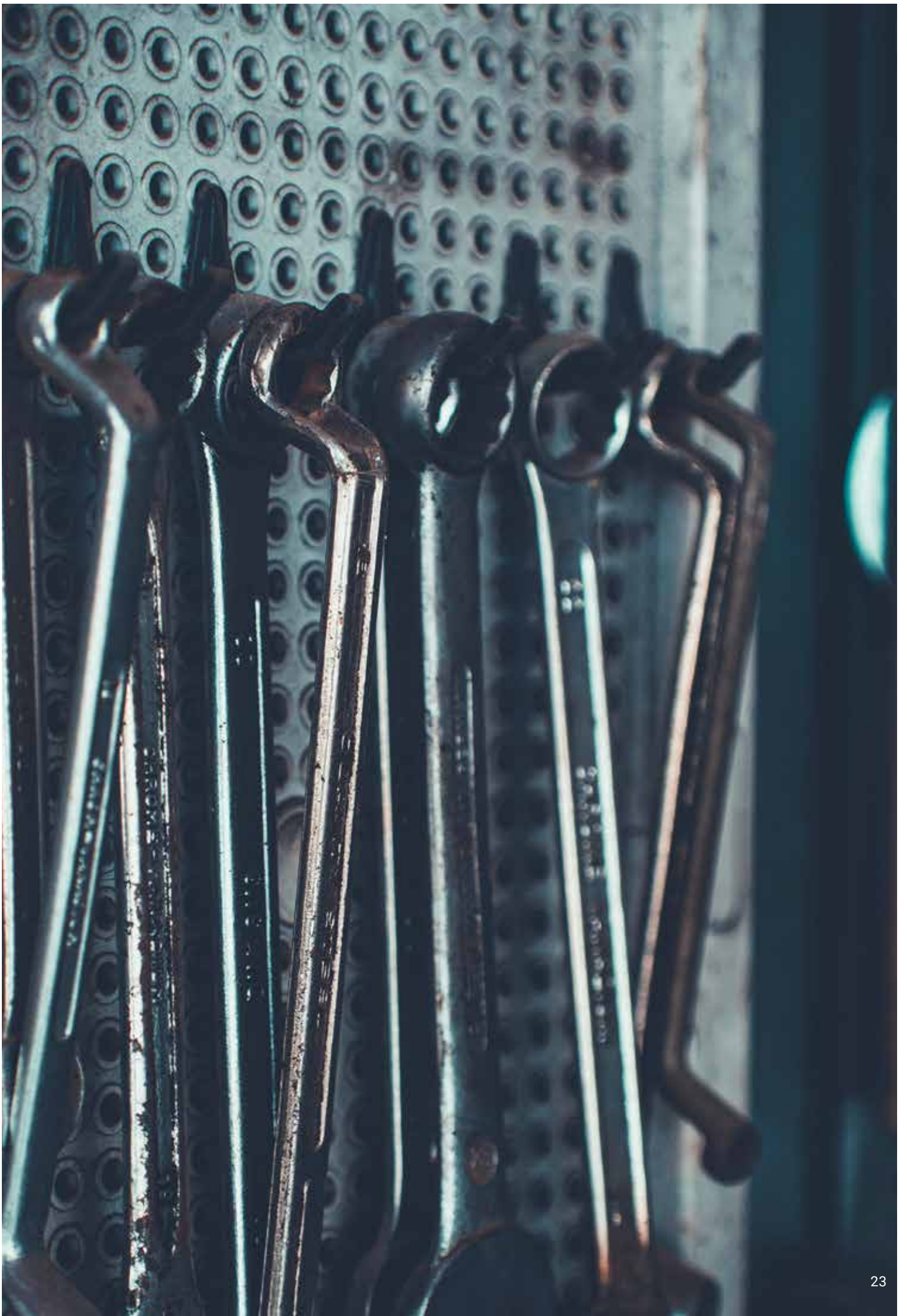
3. *Achilles' heel: How to document?*

Establishing a system and a structure for documenting a wider range and broader competency areas is a key challenge. It is easy to understand why the quality of research is measured by the standard and scope of publishing activity. Published

works are easy to count, and publishing has become an integral part of the academic culture and academic discipline-based ranking systems. In order to assess (real) quality in additional areas of competence, the research process, external relations, teaching activity/competence and leadership experience should also be documented systematically in a verifiable format that enables it to be used as a basis for comparison. Many of these activities are currently documented, but the information that exists is scattered between different databases and registers, and quality assurance and ownership vary. Efforts are needed to identify relevant sources and to enable data from them to be accessed in a way that facilitates comparison. For activities that cannot be documented through databases and registers, a narrative can be used. One such example is the Research Council of Norway's use of impact cases in its research evaluations. The aim of such a narrative is to provide a summary presentation. 'Narrative' must not be confused with 'reflection' (see below).

4. *Reflection*

The fourth column in the matrix concerns the applicant's own reflection on the various activities. The idea is that the applicant uses this column to give a subjective assessment of their own results and competencies. The aim is to facilitate interaction between the documentable and/or measurable quantities in column 3 and the applicant's qualitative assessment of these. This will ensure that quantitative measures and bibliometrics are only a part of the whole. A NOR-CAM-formatted CV will be a combination of lists of metrics, often expressed quantitatively, but also in the form of short narratives, as well as reflections on each of these.



What needs to be done?

Several actors must work together to bring about a transition in line with the working group's proposal. This is briefly described in the introduction under 'Who does what?'. One advantage is that the proposal does not differ significantly from current regulations and guidelines for appointments, promotion and research funding. However, a change in culture is needed to ensure that the guidelines are followed in practice. This must be combined with a comprehensively structured system and concrete changes in the incentive structure.

However, we recognise that transition will be difficult without a corresponding development in the infrastructure for documentation, data retrieval and inclusion of the various activities in NOR-CAM. We have a long way to go in this area, especially in relation to documenting results and competence in areas B, D and E in the matrix. The framework and the toolbox must therefore be based on the systematic, and preferably automated, collection of data in as many of the areas in the matrix as possible. Published works can already be retrieved in the Norwegian CRIS system. Many academic staff already register other activities in this system, such as the publication of textbooks, media contributions and datasets, and this needs to be more automated than is currently the case. There is also a lot of information available about academic staff's teaching and supervision activities in the Common Student System (FS), even though this only covers the scope of teaching in principle. Retrieval of this information should also be simplified. It would be desirable to achieve this in other areas as well. An example of a specific proposal is the development of an 'automagic CV system'.

Development of an 'Automagic CV'»

Academic staff spend a lot of time manually editing CVs for various purposes. Most institutions and funding providers have different templates, despite requiring much of the same information. A user-friendly system needs to be developed that academic staff can use to document their various competencies and results throughout their careers. The goal is that such a system can be used for job and promotion applications, and for project applications to the Research Council of Norway, the EU and others.

The working group believes that a system should be developed where users can extract documentation about a wide range of their own results and activities. Much of the information is already available, so the challenge is to collate it in a user-friendly way. If such data could be collected and retrieved within one system, it would be a huge benefit to academic staff members, and would undoubtedly facilitate the transition to new assessment practices. It would also simplify the work of human resources departments in the institutions considerably. The working group envisages a website with secure log-in (via Feide),

where the user can select relevant competency areas and results, and then generate versions of their own CV, adapted for different purposes.

The Norwegian Directorate for ICT and Joint Services in Higher Education & Research is currently developing national authority registers together with the higher education sector and other actors. These will form the 'foundations' for data and for universal registration and the linking of existing data. The directorate should therefore prioritise the implementation of a user-friendly 'competence register function/automagic CV'. A national infrastructure of this nature should be developed in line with international standards used by EuroCRIS etc. We note that the Norwegian CRIS system already has a CV capability, but it is rather limited and requires manual registration. It is also not integrated with publication lists in this system. In other words, Norwegian CRIS is not ideal for researchers creating CVs.

³² A tentative illustration of this type of functionality can be a Word plug-in (e.g. EndNote, which most researchers are familiar with), which automatically reformats notes, bibliographies and indexes to meet the requirements of the journal a researcher is submitting their manuscript to.

