![The Research Council of Norway logo]

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Terms of reference
Study to establish methodology to assess the societal impact of research and research-based innovation activities funded by the Research Council of Norway

Policy makers and the public have increasingly larger expectations towards what research and innovation can deliver in terms of solving societal challenges on a national and global level, as well as to contribute to the transformation of private and public sectors (see e.g. OECD's review of Norway's Innovation Policy 2017). These expectations make it pertinent to assess the actual impact of research and innovation regarding solutions to challenges and transforming the economy and society.

The Research Council of Norway (RCN) funds research and research-based innovation across all scientific fields and by a wide variety of instruments. The funding targets universities, research institutes and businesses alike, and covers the full range from fundamental research to market-near innovation and innovation in the public sector. A large part of RCN's funding targets societal challenges based on an intervention logic model and the projects funded are expected, in addition to their scientific quality, to contribute to the solution of these challenges. *This study will primarily focus on research addressing societal challenges, acknowledging that a clear demarcation of research addressing such challenges and research for other purposes is not always possible to establish.*

RCN operates its funding activities according to an intervention logic model. Expected results and impacts of RCN's funding programmes is part of the model. To achieve a greater impact on how society develops and especially towards societal challenges, RCN has recently aligned its evaluation criteria for project proposals with those applied in Horizon 2020, with the three criteria Excellence, Impact and Implementation[1]. This implies that in most of RCN's funding instruments impact is one out of three criteria peer reviewers are assessing when evaluating project proposals for funding. It implies also that over the coming years RCN will collect a large body of proposals where researchers describe the potential impact of their research projects (RCN receives approximately 5000 proposals annually). The description of potential impact from project proposals might, together with other information, form the basis for identifying impact, acknowledging that the impact can emerge elsewhere and in other forms than intended.

To be able to better understand the impact research projects have and to improve its guidance on how to achieve impact, RCN launches this study to establish a suitable methodology to assess the societal impact of the research funded. Admittedly this will be a demanding task. Some problems of impact assessment are well known from the literature (e.g. time lag from research to impact, attribution in complex processes, impact change over time, dynamic relationships between

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[1] https://www.forskningsradet.no/en/processing-grant-applications/processing-applications/processing-of-grant-applications/

researchers and users of research etc), while RCN's broad portfolio and use of many instruments also add to the complexity. *Still we expect it to be possible to develop a cross-spanning methodology or a methodological tool box to collect data and assess the impact of the research funded.*

Overall, this study is expected to deliver (see also list of expected deliverables page 6):

- A methodological framework to identify and assess societal impact of research relevant for solving societal challenges
- Focusing research funded by the Research Council of Norway, but not exclusively so
- Identify, categorise and analyse actions, mechanisms or pathways inducing impact, for possible learning and to guide future moves to increase impact
- Provide empirical evidence of impact based on testing the suggested methodologies on at least two societal challenges
- Provide advice for a permanent system to assess impact of RCN funded research and research-based innovation

Framework

The aim of the study is to identify and assess the societal impact research and research-based innovation activities[2] performed by the professional community of knowledge producers (academia, research institutes, firms and others) has on the environment, economy, technologies, policies, culture and practice across society. This includes also identification of the mechanisms leading to impact.

What type of impact research and innovation activities have on society and the ways the impact is induced will be dependent on many factors, among them the fields of science, characteristics of the research organisations and the individual researchers, types of interactions between researchers and society and characteristics of the parts of society impact is exerted on etc. It can thus be fruitful to think of impact as a relationship between a multidimensional knowledge system on the one side and the multidimensional society on the other, and that impact is shaped through many and complex social relationships between various parts of the knowledge producing system and various parts of society. These social relationships will have varying features depending on characteristics both of the parts of the knowledge system and the parts of society involved, as well as of processes of interaction between the systems. Adding to the complexity is the fact that these processes and relationships are not always stable, but characterised by developing interactions, co-creation, feed-back loops etc.

Research results (publications, patents, educated PhDs etc) are the necessary basis for impact. A knowledgebase categorised along several dimensions can thus be a starting point for identifying what types of impact is related to various parts of the knowledgebase and how impact is realised from the various parts of the base. A functional characterisation of the knowledgebase can be a necessary step to establish a methodology for assessing impact, but is not the main purpose of the study as ways of categorising research results already exist, e.g. in terms of scientific fields,

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[2] RCN funds research and research-based innovation activities with the aim of making seamless flows of knowledge. It is thus not feasible to make strict distinctions between them. Below the terms 'research', 'science', 'research system' etc also include related innovation activities.

bibliometrics, types of patents etc. RCNs database on funded projects includes many dimensions that can be useful in identifying projects' characteristics.

The quality of research might have an influence on societal impact, implying that high quality research likely will have a greater and more widespread impact than research of inferior quality. This can however not be assumed to be generally verified and the study can thus not be confined to high quality research alone (deemed so by institutional or individual reputation, evaluations, number of citations etc), but should allow for assessing impact of all research regardless of its quality. However, if deemed possible research quality can be part of the characterisation of the knowledgebase.

There are many mechanisms bringing about societal impact from research. Publishing and disseminating research results is one way to acquire impact, and researchers often engage proactively in disseminating their results to achieve impact. On the other side, those outside the knowledge system might proactively seek out knowledge for their own problem-solving, e.g. a policy maker is reading a scientific paper and includes the findings in a proposition for a new policy. Users of research might also acquire knowledge by funding the research being undertaken (by contracts or grants).

The study should thus not take a narrow view on how impact occurs and consequently be open to investigate a wide variety of mechanisms leading to impact. *One aim is then to identify and as far as possible categorize a set of actions or mechanisms leading to impact (sometimes termed 'pathways to impact' and connect these to where in society the impact occurs.* Both researchers and the societal actors that the research have an impact on, should be able to recognize and understand the actions and mechanisms identified as this typology of impact might serve as part of the identification of impact as such. As changes in broad societal areas can have long time lags and appropriation can be difficult, it might be necessary to consider intermediate phases in the impact process anticipating later impact or to identify proxies for later impact.

The pathways to impact might have different qualities, some might be better suited for making an impact than others, probably depending on factors such as the fields or science involved, the societal organisations involved, the specific issues discussed etc. The methodology developed should thus pay attention to the qualitative aspects of impact and be able to make distinctions between productive and less productive pathways to impact. Part of this will be identification of factors hampering or affecting impact negatively.

The meaning of impact of research will to some extent vary with the types of research involved and on what processes and parts of society the impact is related to. This is probably due to the inherent complexity of science and research-based knowledge itself as well as of the complexity of society. It is thus necessary to acknowledge that science may have an impact on various levels; individuals, organisations and firms, nations, and even globally. Further, impact can be on firms and on the economy in total, on technological development and use of technology, on public institutions services and policy, on the quality of life, and the institutions involved, creativity, on how individuals and society is understood, the interpretation of culture and history etc.

It should also be noted that impact can be on a scale from negative to positive, and that some research will have no identifiable impact on society. Even if research in general is done with the intention of contributing in a positive way to society, the best of intentions do not prevent results

from being used in a negative way or have undesirable and unintended negative consequences. It should also be acknowledged that research might be undertaken with the sole ambition of expanding our knowledge of nature and society, having no direct impact on society in the foreseeable future. *The categorisation of impact should allow for assessing impact in terms of being positive, negative or missing.*

Data collection

RCN envisages to use the methodology as a basis for a permanent system of data collection and assessment of impact. This permanent system will, as a next phase, be established either internally to RCN or be commissioned to an external provider. *The provider should outline the key features in establishing and executing such a permanent assessment system, pointing also to possible positive and negative consequences of the choices made.* The features described and evaluated should include requirements for data, analytical approach, technical solutions for data handling etc. The permanent system should not be proprietary or in any way require to be handled by a specific operator.

To make assessment possible, the needs for data have to be defined and a strategy for data collection devised. The data collection is expected to form the backbone of the future assessment system, and should thus satisfy several criteria:

- As far as possible reuse existing sources of data and/or automatic data collection to reduce the response burden of scientists and societal actors, while the possibility of collecting new data explicit for this purpose should not be excluded. Novel approaches utilising AI, machine learning, altmetrics and other advanced strategizes are welcomed. Part of the data collection can be suggested incorporated in RCN proposal and reporting systems but excessive reporting from scientists and their institutions should as far as possible be avoided.
- Data collected should be robust and make assessment possible over time. Past experiences (e.g. the UK REF, RCN evaluations) suggest qualitative impact narratives are useful, while other useful approaches have been quantitative (e.g. firms return from investments in R&D). Flexible strategies for data collection might thus be necessary.
- The data collection strategy should be flexible enough to allow for assessing impact on shifting issues and political priorities. What is considered the most pertinent societal challenges is shifting as well as what are the most important issues to be solved within a challenge. Impact will also develop over time depending on the absorption of scientific knowledge in society.

A preliminary data collection and analysis proving the possibilities for assessing impact on minimum two distinctively different societal challenges, should be part of the study. Data collection should test the feasibility of collecting data and make assessment based on these data. The data collection should verify the usefulness of the methodology and inform further recommendations on data to be collected and their usefulness for doing analysis.

Societal challenges can be described and demarcated in many ways. RCN funds research and research-based innovation towards a broad set of societal challenges, among others:
- Climate change, their consequences and development of technologies and other actions to reduce climate change

- The environment and sustainable development, including sustainable food and energy production
- Welfare, demographic changes, societal security and cohesion, changes in global relations
- Renewal of the business and public sectors towards sustainable economy and society

Societal challenges are complex in the way that they are interlinked and affecting many parts of society. Those mentioned above are broad and can be split into more detail, but still *serve as an illustration of areas of society that can be addressed by the study.* However, the study does not have to focus the challenges mentioned above specifically, others may be selected, or more specific demarcations introduced. It should be noted that health and care is explicitly outside the scope of this study as impact in this field will be handled separately through other means.

RCN has recently introduced societal impact as one of its evaluation criteria for selecting projects[3], and RCN will in the future thus have data on expected outcomes and impacts both from proposals accepted and those rejected. Further, in the future also the administrative reports from funded projects will have a section describing impact as seen from the researchers' side. RCN will make its internal data on project proposals and funded projects available for the study. As part of the study, RCN welcomes suggestions for how to improve its own reporting to better facilitate data for impact analysis.

Analytical approach

The provider is expected to outline an analytical approach to identify and characterize impact, making it possible to understand the significance of the impact. The REF conceptualises the significance using 'reach' and 'significance' as two dimensions of impact (REF 2021, Panel criteria and working methods):

- **Reach** will be understood as the extent and/or diversity of the beneficiaries of the impact, as relevant to the nature of the impact. Reach will be assessed in terms of the extent to which the potential constituencies, number or groups of beneficiaries have been reached; it will not be assessed in purely geographic terms, nor in terms of absolute numbers of beneficiaries. The criteria will be applied wherever the impact occurred, regardless of geography or location, and whether in the UK or abroad.
- **Significance** will be understood as the degree to which the impact has enabled, enriched, influenced, informed or changed the performance, policies, practices, products, services, understanding, awareness or wellbeing of the beneficiaries.

All impact can probably to some extent be characterised by these two dimensions. There can however be other ways of characterising impact being more fruitful, e.g. depending on the field of science. *The tenderer is thus expected to develop analytical categories expressing the significance of the impact made, implying that it should be possible to discern between various levels of impact, and to suggest how the impact can be communicated, e.g. by descriptions/narratives, by indicators, grading, a combination of these or other approaches.*

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[3] See section on *Outcomes and impacts* at this site: https://www.forskningsradet.no/en/apply-for-funding/writing-grant-applications/learn-more-about-the-application-form/

As mentioned, RCN has recently introduced potential impact as a criterion for project selection and the analytical approach established should make it possible to assess if projects fulfil the potential impact outlined in the proposals. The approach should consider that:

- Impact rarely emerges from single research projects and an approach including a portfolio of projects will likely give better results than a project-by-project approach. RCN manages proposals and funded projects using a portfolio approach[4], and the analysis provided should as far as possible be commensurable to the RCN portfolio approach. Including research undertaken with funding outside RCN can also be necessary to give the complete picture.
- The analytical approach is not intended to be part of an evaluation of the projects' real impact compared to the intended. The real impact can be different from the intended, both less and greater than expected, and there can be many reasons for this, many outside the control of the researchers. Rather, the analysis should give evidence for what are the best pathways to impact, what are the obstacles encountered and what can be done to remove them.
- It is desirable to get recommendations regarding how the design of funding instruments can be improved as to increase the impact of the projects funded. There might be systematic differences between projects funded by various instruments in their ability to create impact, e.g. due to different requirements regarding collaboration between actors and involvement of users of research which can lead to differences in the relationship between researchers and society, having effects on impact.

Reference group

The project team is expected to develop the study in close collaboration with RCN and RCN will establish a reference group for the study, including internal and external experts. RCN has over the last years experimented with various approaches for impact assessment, including case methodology inspired by the British REF, econometric studies, approaches based on surveys and interviews as well as approaches tracking resources for research, outputs etc leading to the present state. There is thus a knowledge base in the organisation for some methodologies for impact assessment, which can serve as a fundament for discussing the methodologies suggested for the study.

Deliverables

The following deliverables are expected:

Deliverable	To be delivered month
1. **Inception report**. Outlining the framework of the study, including detailed work-plan.	1
2. **Short literature review** focusing methodologies applied to identify and assess impact of research. The aim of the literature review should be to categorise various methodologies in use, including assessment of strengths and weaknesses of the methodologies.	2

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[4] https://www.forskningsradet.no/en/about-the-research-council/Tasks-and-organising/portefoljestyrer/

3. **Conceptual report:** Report outlining the conceptual framework chosen for data collection and analysis.	3
4. **Methodological report**: Recommendations for a methodology and analytical approach for a permanent system to assess impact of RCN funded research and research-based innovation. The pros and cons of the suggested methodology (-ies) should be clearly stated.	6
5. **Final report**: Report summarising prior reports, including empirical evidence from data collection and analysis of impact for at least two societal challenges. Overall recommendations for future assessment of impact from RCN funded projects.	10

Selected literature

There is a vast literature on societal impact of research. The below selection are examples selected partly to illustrate various methodological approaches and partly refer to literature reviews.

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OECD (2017), *OECD Reviews of Innovation Policy: Norway 2017*, OECD Reviews of Innovation Policy, OECD Publishing, Paris, https://doi.org/10.1787/9789264277960-en.

OECD (2019), "Reference framework for assessing the scientific and socio-economic impact of research infrastructures", *OECD Science, Technology and Industry Policy Papers*, No. 65, OECD Publishing, Paris, https://doi.org/10.1787/3ffee43b-en.

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