

Empowering ideas for a better world

Strategy for the Research Council
of Norway 2020 – 2024

About the The Research Council of Norway

The Research Council of Norway is the national funding agency for research and experimental development (R&D) and R&D-supported innovation. The Research Council serves as a key research and innovation policy actor nationally and internationally, a strategic investor, a visible and inclusive stakeholder in society and a knowledge-based advisor. These activities lay a foundation for developing dynamic research and innovation communities that can compete successfully in international arenas, generate new insight, contribute to value creation and address the societal challenges facing Norway and the world community. The Research Council works to foster new ideas, promote ground-breaking research and radical innovation and cultivate a society in which research is used and shared.



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Strategy for the Research Council of Norway 2020 – 2024

The world is facing enormous challenges. Foremost among these are challenges involving the climate, species diversity and resource consumption far beyond the Earth's tolerance thresholds combined with problems related to growing inequality, polarisation and exclusion. In addition, Norway has significant national challenges to resolve. In coming years, the role of the oil and gas industry will decline considerably as we transition to a more sustainable society. Norway will need to strengthen existing sustainable industries and businesses and foster new sustainable growth. The need for restructuring has become even more pressing in light of the impacts of the COVID-19 pandemic.

Rapid and comprehensive social change will be needed if we are to succeed in realising government objectives for restructuring and sustainability. The Norwegian business and public sectors must be equipped with effective instruments for achieving these objectives, both to ensure economic and environmental sustainability and to safeguard good health and welfare for individuals and society at large. Proficiency in the design, use and development of digital technologies will be an increasingly crucial component of value creation and competitiveness. At the same time, there is a need for greater insight into the impacts of the digital transformation on the ways people live, work and communicate.

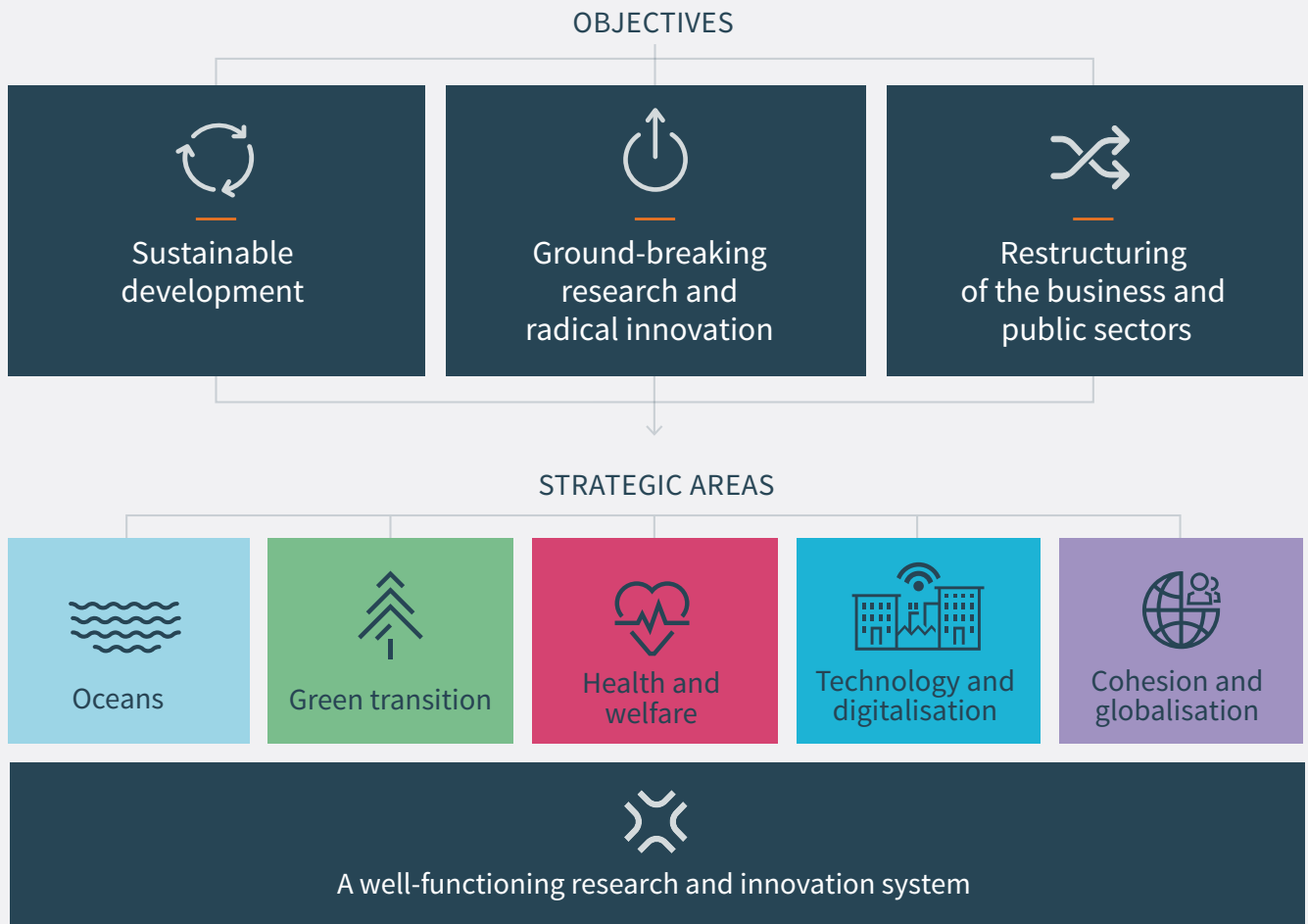
Globalisation forms an essential part of the basis for economic and political interaction, but is hampered by obstacles such as trade barriers, protectionism, geopolitical instability and conflict. Democracy, too, encounters stumbling blocks, and there is a need for research that promotes productive international cooperation and robust democracies that enjoy a high level of trust and legitimacy among their people.

The UN Sustainable Development Goals play an increasingly important part in the research and innovation system. The complexity of the challenges involved will require better structures for research and cooperation across sectors, funding sources and countries. At the same time, these compound challenges make it even more imperative to view basic research, applied research, innovation and value creation as part of the same whole. Steps must be taken to enhance the framework for effective interdisciplinary and cross-sectoral cooperation, and to allocate more resources for radical innovation based on research.

There is a trend in various parts of the world to make publicly funded research and innovation openly accessible and incorporate a wider set of actors into the activities. Such openness can increase the impact of the results both in the research community and in society at large, and efforts to encourage an open research culture should be strengthened. At the same time, the global societal challenges require us to build closer cooperation with research and innovation communities in countries that do not have the same kind of transparency in these processes.

In addition to these targeted ambitions for research, the fundamental quest for new and deeper insight is valuable in and of itself. Independent knowledge development in keeping with ethical standards for research is a prerequisite for a free and open society firmly based on human rights. At the same time, academic freedom is under pressure in many countries and public trust in science is being undermined. The fight to preserve respect for research-based knowledge and research integrity is essential to provide a sound framework for basic research and for strong, independent academic institutions. This is a fight we cannot afford to lose.

It is within this framework the Research Council has defined the overall targets for the organisation's activities over the next five years:



This strategy sets out the Research Council’s overall priorities with regard to the objectives and the five strategic areas. Further details of the strategy are provided in portfolio plans and action plans drawn up for each target and strategic area.

To ensure success in implementing the strategy, the Research Council will further develop its activities in the following areas:

- Conducting active portfolio management and refining processes for funding announcements and grant proposal review
- Increasing mobilisation towards Horizon Europe through broad-based cooperation
- Measuring and publicising the results and impacts of research and innovation

- Acting as a strong, visible player for restructuring that encompasses Norway as a whole
- Establishing effective research and innovation initiatives that address major societal challenges
- Providing well-grounded, clear research and innovation policy advice

As part of the effort to develop high-impact research and innovation initiatives, the Research Council will launch a broad-based, inclusive, forward-looking process in 2020 to identify key Norwegian focus areas for the future. The results of this process will form the basis for the Research Council’s input to the 2022 revision of the *Long-term Plan for Research and Higher Education 2019-2028*, and for the Council’s internal activities to further develop and target the initiatives involved.

Objectives

The Research Council has three primary objectives for the strategy period: sustainable development, ground-breaking research and radical innovation, and restructuring in the business and public sectors. These largely mirror the three main objectives of the *Long Plan for Research and Higher Education 2019-2028*, and the main objectives of the EU Ninth Framework Programme for Research and Innovation, *Horizon Europe*. The strategy sets out the course for the Research Council's activities to achieve the government's objectives for research and innovation.



Sustainable development

The Sustainable Development Goals (SDGs) adopted by the UN in 2015 represent a global work plan to eradicate poverty and hunger, improve health and education for all, combat inequality, and better understand and mitigate the negative effects of environmental and climate change by 2030. Norway is in an excellent position to contribute actively to the international effort to achieve the SDGs. We have a well-developed research and education system, knowledge environments that are world leaders in relevant areas, well-established research infrastructure and a high level of participation in international research cooperation. We have a well-developed public sector and an internationally oriented business sector that is highly qualified in key areas where the SDGs offer potential for value creation.

Success in realising the SDGs will depend on a stable framework for high-quality research efforts and targeted activities to facilitate innovation. The Research Council will work actively in the five strategic areas of Oceans, Green Transition, Health and Welfare, Technology and Digitalisation, and Cohesion and Globalisation to further develop investment priorities and assessment dimensions within a sustainability perspective.

The complex nature of the SDGs makes it essential to rethink Research Council instruments. Several of the SDGs require systemic changes, and isolated individual measures will not be sufficient. To ensure the application of a wide range of instruments that mutually support one other, it is necessary to view research and innovation efforts in the context of other instruments that can help to realise the SDGs, such as regulatory measures, financial incentives, etc. Research and innovation efforts must facilitate digital and technological breakthroughs that can move society in a more sustainable direction, as well as generate a deeper understanding of the role that social, ethical, cultural, educational and legal aspects will play in this restructuring.

To better address major global societal challenges, the Research Council will further refine its funding instruments for research and innovation, and increase efforts to facilitate collaboration across countries, academic disciplines, sectors and funding

sources. We must experiment more widely with research and innovation missions that have clearly defined goals and time-frames, and that incorporate broad-based involvement and employ a broad range of instruments. We need to provide greater latitude for trial initiatives, and for testing, learning and scaling up well-functioning solutions.

The SDGs are to be achieved by 2030. It is therefore urgent to strengthen national and international cooperation on research and innovation. At the same time, the SDGs hold concrete potential for value creation for the Norwegian business sector, and they provide direction and focus for restructuring the Norwegian public sector.

THE RESEARCH COUNCIL WILL TARGET ITS EFFORTS TO PROMOTE:

- Increased international research and innovation cooperation to address global societal challenges in areas where Norway is particularly well-equipped to make a difference
- Pioneering research and innovation efforts for sustainability across subject fields, sectors and funding sources
- Reorientation of research and innovation efforts in the five strategic areas in a more sustainable direction

Ground-breaking research and radical innovation

The Research Council seeks to enable the Norwegian research community to participate actively in advancing the international research front. Achieving this requires long-term, stable investment in basic research and the establishment of outstanding academic institutions, as well as a framework for creative collaboration across disciplines. Ground-breaking research has its origin in broad-based, high-quality incremental research. Therefore, initiatives to encourage pioneering research also entail acknowledging the importance of a broad focus on outstanding basic research.

Moving the innovation front forward also requires investment in basic research and strong research environments. Top scientists are an important driver of innovative ideas which, in the long term, can lead to radical innovations that replace existing products, designs, processes, ways of working or systems, and that generate substantively new and unique knowledge. Businesses that cooperate with qualified research environments produce more patents and more significant technology than those that do not. In addition, many of the best research groups contribute indirectly to innovation, for example through research-based education of skilled candidates who are subsequently employed in business and government administration, or who start their own companies based on research findings. The Research Council will establish effective structures for innovation and commercialisation processes that can channel research activities through the entire pathway from research and development to market.

A career in research must be attractive to a wide array of younger researchers or it will not be possible to build outstanding academic environments. The competition for research talent is global and growing. Predictable funding and prospects for permanent employment enhance the appeal of a research career. At the same time, the career path must allow mobility between the research community and society and the business sector. The Research Council's instruments are intended to encourage institutions to implement researcher recruitment and career development processes that promote gender balance and diversity.

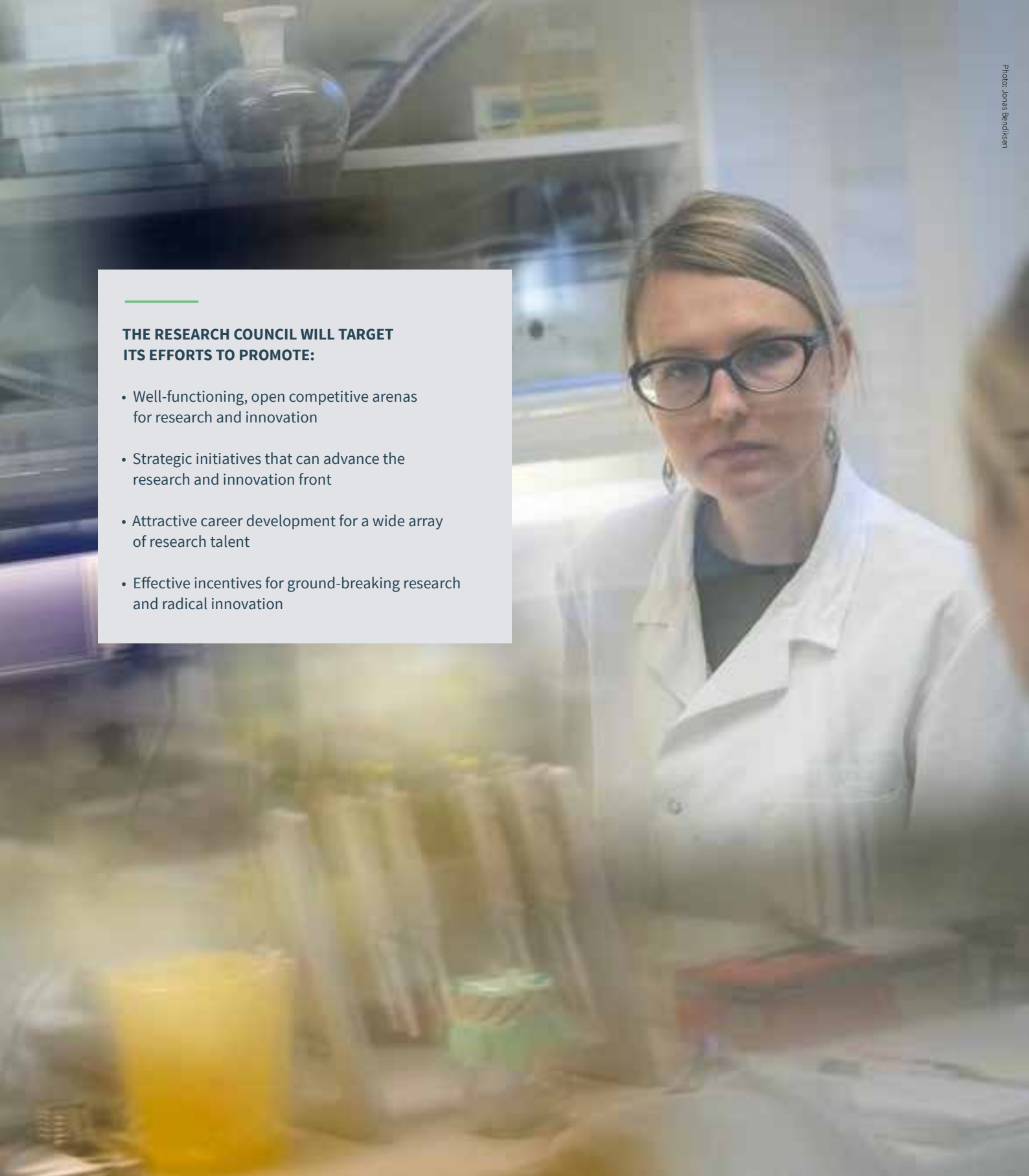
The Research Council will employ open and targeted competitive arenas and international funding cooperation to provide flexible funding that can help to advance the research front and generate radical innovation. This is essential to promote the development of fundamental new insights, to enable Norway to attract investment from an increasingly knowledge-based and globally oriented business sector, to continue the development of a well-functioning public sector, and to expand the ability to find solutions that help to achieve a sustainable society. The Research Council will work to increase funding to the research budget and to allocate a greater share of public research funding to the best research groups via open national competition.

The Research Council has signed the DORA Declaration and employs a broad interpretation of research quality in its grant awards. The Research Council will work to promote greater reliability and reproducibility of research results, and to ensure that research is carried out in compliance with basic ethical standards for research. This is important both to provide maximum benefit to society from research investments and to enhance public trust in science.

Achieving greater investment in ground-breaking research and radical innovation will require incentives for interdisciplinary and cross-sectoral cooperation. Radical and ground-breaking projects are often perceived as being high-risk, and it must be expected that some will fail. It may therefore be necessary to design dedicated instruments for particularly bold research and radical innovation that entail high risk.

**THE RESEARCH COUNCIL WILL TARGET
ITS EFFORTS TO PROMOTE:**

- Well-functioning, open competitive arenas for research and innovation
- Strategic initiatives that can advance the research and innovation front
- Attractive career development for a wide array of research talent
- Effective incentives for ground-breaking research and radical innovation



Restructuring of the business and public sectors

There is a widespread need to increase the pace of research and innovation efforts in and for Norway's business and public sectors. The Norwegian economy needs to be diversified, and new business opportunities must be identified and further developed to reduce the dependency on oil and gas. Digital technologies will play an increasingly pivotal role in global restructuring and competitiveness. Greater importance must be attached to research-based business development within a global competitive framework, and the public sector must be restructured to ensure a sustainable welfare society. The country as a whole must be actively encouraged to take part in this comprehensive effort.

The Norwegian business and public sectors are both highly innovative, but innovation activities are often experience-based and tend to involve cooperation with partners that share the same problems and frame of reference. While this type of innovation is effective in implementing incremental change, more targeted research-supported innovation is needed to generate the radical transformations required to address global societal challenges.

The Norwegian business sector has stepped up its research activity, although the investments remain unevenly distributed. Some industries, such as the maritime industries and the health industry, are far more research intensive than others. The Research Council will work to make it easier for businesses throughout the country to implement research-based knowledge and technology, and thus to expand the potential for value creation in existing as well as newly established industries. The Research Council will lay a foundation for greater cooperation between research communities and businesses, and facilitate research-based education of qualified candidates who can enhance the ability of the business sector to exploit research-based knowledge.

By providing effective incentives and support schemes for the commercialisation of research, the Research Council will create a framework in which research activities can develop and benefit more directly from Norwegian areas of strength. In this area, too, the Research Council's instruments must be closely aligned with the instruments of other relevant actors at the regional, national and international levels.

As in the business sector, there is uneven distribution in research and innovation investment in the Norwegian public sector. This is in part because the public sector provides few incentives for research or the sharing of innovative solutions, which limits the ability to implement new solutions on a larger scale. Another problem is that research activities today do not adequately reflect the full scope of knowledge needs and welfare challenges faced by municipal, regional and state stakeholders. The Research Council will therefore work to enhance the Norwegian public sector's ability to innovate and make wider use of research-based knowledge and new technology.

The business sector is dependent on a well-functioning and innovative public sector, and the public sector is dependent on fruitful interaction with the business sector to develop new solutions. The public sector can take a more proactive role in facilitating innovation in the business sector and society at large. Innovative public procurement, for example, offers an opportunity to challenge and develop the supplier market while equipping the public sector with solutions better suited to its needs. The public sector is also in possession of comprehensive data sets which, if they are made more widely accessible for research purposes, could potentially foster renewal in business and society. The Research Council will therefore provide and further refine instruments that promote constructive cooperation between public entities and stakeholders in the business and research sectors.

THE RESEARCH COUNCIL WILL TARGET ITS EFFORTS TO PROMOTE:

- Increased global competitiveness through research-based development of existing businesses and the establishment of new businesses across the country
- Increased commercialisation of research results
- Restructuring of the public sector throughout the country through research-supported knowledge development and innovation
- A public sector that lays a foundation for effective innovation in the business sector
- Adequate access to and utilisation of public data for research and innovation



Strategic areas

The Research Council has defined five strategic areas that will require targeted efforts during the strategy period. These areas largely correspond to the long-term priorities in the *Government's Long-term Plan for Research and Higher Education 2019–2028*. A well-functioning research and innovation system is essential to realising the objectives of the long-term plan. The Research Council will bring together the research and education communities, the business sector, the public sector and civil society in creative collaboration that produces high-quality research and innovation and contributes to restructuring and sustainable development.

Oceans

The oceans offer great potential to meet the world's food, energy and transport needs in a sustainable way. Norway has world-leading ocean industries in petroleum, aquaculture, fisheries and shipping. These are also areas in which Norwegian research institutions have a high level of expertise. At the same time, the ocean is relatively unexplored compared to many other parts of nature.

While the world's oceans have vast nutritional potential, they are also under enormous pressure due to climate change, pollution and increased utilisation of marine resources. It is crucial to understand how marine ecosystems respond to ocean warming and acidification in order to design measures to mitigate this. Integrated ocean management must give adequate consideration to climate change and biodiversity in order to ensure clean, rich oceans. Reduced ice cover in polar regions is increasing geopolitical attention on the marine areas in the north and opens up possibilities for increased resource utilisation and new transport routes. Norway's location means that we must take special responsibility for knowledge-based development in the High North, particularly as regards the environment, the impacts of climate change and sustainable business development.

Norway contributes widely to knowledge about the oceans and thus also to insight on how to administer the global ocean economy sustainably. It is important to use and expand this knowledge through



national and international research cooperation between business, research and the public administration. There is a need for historical, aesthetic, ethical, legal and social science research related to oceans and coastal communities in order to gain an overall understanding of sustainable development and management, and to safeguard Norwegian, Arctic and Antarctic interests. The Research Council will work to ensure that a greater proportion of national research funding related to oceans is awarded through open national competition, and to strengthen incentives for international cooperation. The Research Council will take active steps to encourage increased international activities under the UN Decade of Ocean Science for Sustainable Development.

The ocean industries are to encourage green growth and a low-emissions society, and there will be great potential for value creation in solutions that can reduce the industry's environmental impact. Research to promote climate- and environment-friendly ocean-based business activities

must therefore be given greater focus. Norway is a leader in digital solutions at sea and autonomous vessel technology, and is well-positioned to participate in the market for green shipping and maritime operations. Development of technology for renewable energy such as offshore wind, CO₂ storage under the seabed and reduced emissions from oil and gas production also provide a basis for competitive ocean industries. Norwegian technology expertise and experience from petroleum activities will play an essential role in addressing challenges relating to deep-sea mining.

To ensure the continued development of a competitive, sustainable aquaculture industry, technological advancement must to a greater extent accommodate the constraints of biology and incorporate an adequate understanding of political and legal interests. This requires constructive cooperation between research and innovation institutions across disciplines and sectors. Cooperation between the ocean industries, and between ocean and land-based sectors, can promote

THE RESEARCH COUNCIL WILL INVEST IN RESEARCH AND INNOVATION TO PROMOTE:

- Clean, rich oceans
- Sustainable management of oceans and coastal areas
- Safe and healthy seafood
- Competitive Norwegian ocean and seafood industries

the development of new value chains, enhanced utilisation of materials and raw materials, and the emergence of a circular economy.

The Research Council will facilitate the development of better knowledge about marine ecosystems in oceans and along the coasts. This knowledge is essential for achieving sustainable fisheries, aquaculture and new industries, for example based on bioprospecting. In order to ensure knowledge-based, sustainable ocean management and the development of sustainable ocean industries, the Research Council will also fund activities to learn more about the cumulative impacts of different types of pollution such as hazardous substances and plastics on marine life and, by extension, on health and society. These activities are to include basic and industry-oriented research, and marine research must in general incorporate social science, humanities and legal perspectives to a greater extent than previously.

Green transition

Achieving the world's climate goals will necessitate rapid, wide-ranging changes to society. For an oil and gas exporting nation such as Norway, this poses certain challenges but also entails new opportunities. Norway has a strong position in many of the research and innovation areas of importance to achieving ambitious climate targets, including renewable energy, carbon capture and storage, green shipping, environmentally friendly industrial products and digital solutions. Norwegian technology and industry have the foundation needed to acquire new market shares and at the same time help to cut global emissions, but this will require targeted escalation of research and innovation efforts.

There is a need to generate more knowledge to understand and forecast the effects of climate change and to prevent negative impacts on nature, people and society. The knowledge developed must enable the world to adapt to the changes that a warmer climate entails. There is also a need to strengthen research efforts targeting a wider set of environmental threats than just climate change. A recently published report by the UN Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services states that the loss of biodiversity is accelerating and that a large proportion of the Earth's species are threatened with extinction. Transitioning to a circular economy with sustainable production, services and consumption will be a crucial step in ensuring a more climate-friendly society

and preventing encroachment on nature. The redistribution and use of land area for road and housing construction, industry and industrial purposes, for example, is the single factor that has the largest impact on land-based biodiversity. Urban development, agriculture and food production also have major environmental impacts and more knowledge and innovation will be needed to achieve sustainable land-use and agriculture, and environmentally friendly cities.

In general, there is a need to learn more about the pressures placed on the environment and people's livelihoods from climate change, pollution and loss of biodiversity, both individually and combined. Climate change and loss of biodiversity are closely related and call for many of the same solutions, but it is also important to explore the conflicts that may arise between the fulfilling the need to find climate solutions versus to protect the natural surroundings. Research is needed on the kinds of cultural, social, legal and economic changes that will be required in the transition to a greener society, including knowledge of people's attitudes and behaviour, and how best to address social justice in a global shift towards a climate- and environment-friendly society.

The Research Council will design instruments that can facilitate restructuring and adaptation to environmental and climate change, including initiatives with clearly defined goals related to the time-critical challenges the world is facing.

There is a need for research and innovation that accommodates more integrated approaches, from value chains to circular models, from waste to residual raw materials and from fossil to non-fossil solutions. In general, there is a need to move away from a silo-based orientation towards interdisciplinary and cross-sectoral efforts to solve problems. Initiatives under the Research Council are to incorporate fundamental sustainability perspectives across disciplines and thematic areas.

THE RESEARCH COUNCIL WILL INVEST IN RESEARCH AND INNOVATION TO PROMOTE:

- A rapid transition to a zero-emissions society and effective adaptation to climate change
- A circular economy based on sustainable production, services and consumption
- A sustainable bioeconomy and responsible management of the environment, natural resources, nature and land areas
- A competitive business sector that delivers green energy, climate and environmental solutions to global markets



Health and welfare

Demographic and social changes in the Norwegian population and globally make it necessary to reassess how to ensure good health and access to welfare services. Increasing life expectancy and low birth rates mean that the proportion of elderly in the Norwegian population will rise steeply in the years to come. At the same time, there are major challenges to address related to social inequality in health, education and living conditions in general.

The provision of adequate health and welfare to a diverse population will require more research-based knowledge to aid in the design of effective measures to reduce inequalities in living conditions and health. This includes ensuring satisfactory living conditions and educational opportunities for children and young people, and promoting good health from a young age. It is essential to develop welfare solutions as well as digital and technological solutions that enable a greater proportion of the elderly to live independently at home for longer, and to invest in more research on geriatric health. In light of the ageing population and a decrease in the active participants in the labour force, maintaining a sustainable health care system will require more widespread use of digital tools and robots.

There is a need to strengthen the knowledge base for broad-based, cross-sectoral public health efforts, including increased research and innovation to support health-promoting factors and

prevention, such as reduced inequalities in living conditions, a safe and healthy diet, good mental health and physical activity. There is also a need to know more about the best ways to protect the population from threats to health. Climate change and changes in biodiversity, for example, will increasingly be the key drivers of new and escalating health challenges globally, including more frequent outbreaks of epidemics and pandemics. Research on global health is crucial to generating new knowledge, technology and solutions that can reduce the disease burden in developing countries, as well as to enhancing understanding of potential threats to national public health in Norway.

The ability to provide satisfactory health services for all segments of the population will be founded on investment in basic research to understand how the body works and translational research to convert this knowledge into treatment. Developments in artificial intelligence, bioinformatics and genetic engineering provide new and previously undreamt of possibilities, such as in personalised medicine. At the same time, these developments present new ethical challenges. It is therefore essential to integrate social science, legal and humanities research into the life sciences. The Research Council will create a framework for responsible research and innovation related to all aspects of personalised medicine and experimental treatment.

The Research Council will work to improve and facilitate the exploitation of the large-scale data resources in the health sector, and lay a foundation for good national and international research infrastructures for health data and digital tools in the life sciences. To adequately address health challenges and strengthen the health industries, targeted efforts must be focused on promoting research and innovation cooperation between business, health and research that better incorporates relevant user perspectives.

Norway has high labour force participation compared to other OECD countries. However, changes to the labour market, brought about by digitalisation and automation, for example, are altering labour needs and posing greater requirements for education and competence. Action is needed to maintain high-quality basic education for the population as a whole and to uphold high participation in the labour force in the face of demographic and social change. It will be essential to invest in research on the prerequisites for an inclusive working life, including measures to develop educational programmes and prevent drop-out, as well as to reduce early disability and sickness absence.

**THE RESEARCH COUNCIL
WILL INVEST IN RESEARCH
AND INNOVATION TO
PROMOTE:**

- Satisfactory and sustainable health care for all segments of the population
- Strong, competitive health industries
- Reduced exclusion and high participation in the labour force
- A sustainable welfare system adapted to a demographic changes



Technology and digitalisation

A large proportion of innovations today are products and processes based on new digital solutions, the use of digital technologies and digitalisation in general. Many traditional Norwegian companies digitalise their entire value chain and define themselves as IT companies independent of their branch of industry. The public sector is seeking renewal of its services based on the fundamental capabilities of information technology. Data and digitalisation are driving social change, research and innovation, and form the basis for personalised solutions, greener solutions, new services, and lower production and service costs. The line between services and products is dissolving, and there is a stronger foundation for automation and quality assurance of processes. The amount of data in the world is rising each year and the Research Council will work actively to promote realisation of the potential of Big Data and digitalisation. At the same time, there is a growing need for research on the long-term effects of the use of Big Data and digitalisation on society, human interaction, culture and business in Norway and the world at large.

Rapid technological development and changes in the use of technologies illustrate the importance of basic research. As an example, recent developments in artificial intelligence have largely been possible due to algorithms that have been available for decades and could be fully applied once it became possible to compile large amounts of data combined with an exponential increase in processing

capacity. The Research Council will help to further develop knowledge, methods and tools adapted to the new technology solutions.

Nanotechnology and biotechnology are rapidly evolving fields that can generate cutting-edge research breakthroughs and radical innovations. Nanotechnology leads to new nanomaterials, nano- and microfabrication of systems and devices that can typically be applied in technology related to electronics and optics, energy/reduced emissions, the environment and health. Biotechnology can be used to promote responsible nature management and restructuring towards circular and sustainable production of biological resources, and entails the use of microorganisms and enzyme technology among other things. Biotechnology also has a central role to play in the development of innovative health services, such as advanced cell therapy, vaccine development and immunotherapy, as well as the use of genetic information in personalised prevention and treatment regimes.

The Research Council will help to build outstanding scientific communities in information technology, nanotechnology and biotechnology, and will promote activities to realise the vast potential that lies in linking basic knowledge and research in these technology areas to domain knowledge in other fields. At the same time, greater attention must be paid to research that can identify and mitigate any negative impacts of

technology development. Technologies can change societies in ways that call for fundamental ethical reflection and a socially responsible approach to research and innovation. Humanities, social science and legal perspectives can help to shed light on the risks and vulnerability associated with technological development and its ramifications for legislation, protection of privacy, sustainable development, societal trust, cohesion and globalisation. There is also a need for more research on human-technology interaction, as this interface will have a significant impact on how new technological and digital solutions are deployed.

The Research Council will intensify research and innovation efforts on digital transformation and new technologies to enable the Norwegian business and public sector to better exploit the inherent potential of global technology development. This will require significant investment in basic research and general competence-building in the business and public sectors. Academic and research institutions in this field will be encouraged to respond to the rising demand for candidates with a high level of technological and digital expertise, while continuing to provide dependable, ground-breaking research.

THE RESEARCH COUNCIL WILL INVEST IN RESEARCH AND INNOVATION TO PROMOTE:

- Value creation and restructuring based on information technology, nanotechnology and biotechnology
- Technology development aimed at solving global societal challenges
- Industrial development and restructuring of the public sector based on linking technology to domain knowledge and designing new business models
- Research-based digital transformation and technology development



Cohesion and globalisation

Globalisation, internationalisation and digitalisation have expanded the openness of economies, enhanced trade and increased cultural exchange, but they have also given rise to new types of criminal activity, methods of espionage and efforts to interfere in democratic processes. Digital infrastructure and social media are also being exploited to promote extremism, xenophobia and anti-democratic ideas. Authoritarian regimes have succeeded in staying in power, but have been challenged by grass-roots democratic rights movements. Understanding this complex picture will require deeper insight into the institutional, cultural and societal prerequisites underlying a global strengthening of democratic rights. Among other things, there is a need to study the societal, social and cultural conditions that encourage or undermine social and political trust, emergency preparedness and the ability to restructure.

The Nordic countries are welfare states that have been characterised by relatively small social differences, a high level of trust in public administration and a strong civil society since World War II. An ageing and more socially and culturally heterogeneous population combined with greater economic inequality can weaken support for and funding of the welfare society, and challenge the legitimacy of democratic institutions. More research on the conditions for an inclusive, diverse and equal society is important to counteract a development in that direction.

Globalisation, technological development, economic interaction and migration offer a wide range of opportunities, but can also raise uncertainty and increase the risk of serious incidents. More research is needed on societal security, including risks related to climate and the environment, natural disasters, pandemics, energy and food security, information and communications security and intentional acts such as terrorism, sabotage and crime.

Good insight into global change processes is necessary to be able to understand and influence global development, to contribute to achieving the SDGs and to safeguard the ability to further develop the Norwegian social model. Norwegian interests are linked to, and depend on, international relations and global developments. National sectoral policy, foreign and security policy and development cooperation policy must therefore be viewed together in an overall perspective. There is a need for research-based knowledge regarding Norway's development policy agenda, and for research that can assess this agenda in the context of the rather different development strategies being employed in other countries that have widespread global influence.

Changes in global power constellations and the active participation of authoritarian regimes in international cooperation are challenging the understanding of established values and placing new demands on global cooperative

institutions. Countries will not be able to resolve societal challenges alone, and the individual country's impact will increasingly depend on its ability to influence the actions of other countries and to cooperate constructively at the global level. There is a need for better understanding of social, political and cultural developments in the large emerging regions in the world, as well as how to promote successful international cooperation and Norwegian participation in such cooperation.

THE RESEARCH COUNCIL WILL INVEST IN RESEARCH AND INNOVATION TO PROMOTE:

- Good insight into crucial global change processes and Norway's influence on these
- A robust democracy that enjoys a high level of trust and legitimacy
- An inclusive, diverse and equal society
- Societal security based on effective preparedness and risk prevention



Photo: Ross Sheldon, Unsplash

A well-functioning research and innovation system

The Research Council will use the full range of its funding instruments strategically to bring together research and educational communities, the business sector, the public sector and civil society in creative collaboration. This cooperation must comply with recognised ethical standards for research, and will be distinguished by productive utilisation of the specific abilities of the various actors and the interaction between them, effective use of technology, close ties to relevant international actors and satisfactory access to research infrastructure of extremely high quality. Basic curiosity-driven research must be protected and activities carried out within a stable, predictable framework.

Norway has especially well-functioning research and innovation systems (R&I systems) in a number of areas, including aquaculture, maritime industries, and the petroleum and process industries. These are identified by competent capital, competent labour and productive collaboration between dynamic research and innovation communities. The situation is more problematic in other areas, particularly those in which Norway currently does not have a well-established industrial structure. The Research Council will conduct systematic analysis of bottlenecks and deficiencies in the R&I system and implement targeted measures to achieve effective outcomes, innovations and commercialisation in areas that have wide-ranging potential, and where Norway is uniquely qualified to succeed in global competition.

Well-functioning R&I systems require good collaboration between higher education on the one hand and research and innovation institutions on the other. Research-based education provides the business and public sectors with competent employees who are able to apply or advance research and innovation. It is important to create a solid foundation for cooperation on researcher education between research and educational institutions at the national level. There is a need to activate students to participate more widely in research and entrepreneurial activities, and a sound framework for transitioning from education to research must be established.

Today, international cooperation is essential to promote high-quality research and innovation. Rising research costs and

reduced national research budgets in many countries have made international cooperation on research resources even more critical. International efforts are an integral part of all the Research Council's activities, and particular importance is attached to cooperation with EU research and innovation funds. One of the Council's key tasks is to increase the participation and success rates of Norwegian research institutions, business and public sectors in EU competitive arenas. Under the EU Ninth Framework Programme for Research and Innovation, Horizon Europe, which will start in 2021, the ambition is for Norwegian stakeholders to obtain at least 2.5 per cent of the funding.

The Research Council will work to ensure that research and innovation activities are carried out in compliance with recognised research ethics standards and within a socially responsible framework. This entails taking steps to anticipate long-term ramifications of these activities for society, including any unintended side effects; exploring opportunities and dilemmas in collaboration with users; and adapting activities based on learning along the way. Gender and diversity perspectives must be carefully assessed and integrated where relevant. Different research fields will require different approaches. For example, broad-based user involvement will be very important in certain fields, but less applicable to others.

The Research Council will contribute to open research in accordance with ethical standards for research and in line with the basic principle "as open as possible, as closed as necessary". Open research entails making research articles immediately available with open licenses so that they can be read by everyone, and ensuring that the research data, methods, models and source code underlying research results are made widely accessible to the degree this is possible. Increased transparency can help to raise public trust in research and lead to new research methods, more relevant results, advancement of the research front and radical innovation in the business and the public sectors. The Research Council will work closely with the Norwegian research community to facilitate Open Science.

The Research Council will target its efforts to promote:



Productive interaction between education, research and innovation



High participation in international research cooperation



Ethical and socially responsible research and innovation



Open research and innovation processes that facilitate broad-based access to and verification of results



Relevant, up-to-date and widely accessible research infrastructure

There will be a need for substantial investment in electronic infrastructure and secure storage to achieve open access to publicly funded research data, and to keep up with other trends, such as a greater need to utilise Big Data for research and innovation purposes. The Research Council will contribute to national and international cooperation on high-cost research infrastructure.

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May 2020

Cover photo: Jonas Bendiksen

978-82-12-03858-5 (PDF)

This publication can be downloaded at
www.forskningsradet.no/publikasjoner

