

RESEARCH FOR INNOVATION AND SUSTAINABILITY

STRATEGY FOR THE RESEARCH COUNCIL OF NORWAY 2015–2020



PREFACE

The Government expects the Research Council of Norway to play a stronger role as a change agent in the Norwegian research system. This role must be exercised with the trust of, and in cooperation with, autonomous institutions that are pursuing their own independent goals and strategies.

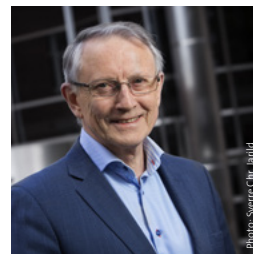
The strategy *Research for Innovation and Sustainability* is the product of active collaboration within the Research Council's governing bodies and incorporates input from an extensive external consultation process. This provides a democratic basis which ensures that the strategy's scientific assessments and priorities have broad support in and adequately reflect the targets of the Norwegian research and innovation system as a whole.

The Research Council would like to thank all participants for the many valuable viewpoints put forth in connection with drawing up this strategy document.



Henrik O. Madsen

Henrik O. Madsen
Chair of the
Executive Board



Arvid Hallén

Arvid Hallén
Director General

THE ROLE OF THE RESEARCH COUNCIL



»» The Research Council seeks to promote an integrated R&D system that supplies high-quality research, develops knowledge for dealing with key challenges to society and the business sector, fosters dynamic interaction within the R&D system nationally and internationally, and creates a framework for learning, application and innovation. The Council also works to identify overall research needs and propose priorities that have been defined through the active involvement of its governing and advisory bodies and wide-ranging external consultation. The Research Council is to take advantage of its unique position in the research and innovation system to create added value by taking on tasks that individual research institutions cannot realise on their own.

The Research Council's sphere of action encompasses all subjects and disciplines, all thematic areas and all aspects of society, from basic research to research-based innovation and

commercialisation. Research funding allocated via the Research Council's competitive arenas may be awarded to all qualified research environments, companies and public entities. Activities extend across the regional, national and international levels.

The Research Council has drawn up three main strategies since it was established in 1993: *Research for the Future* (1996–2003), *Research Expands Frontiers* (2004–2008) and *In the Vanguard of Research* (2009–2014). Common to all of the previous strategies is that the overall vision has been tied specifically to research as a goal in itself, with somewhat less focus on the role of research in society. The responsibility for facilitating a framework to allow research to develop on its own terms remains unchanged, and comprises a key component of the Research Council's activities. However, societal challenges must be given an increasingly greater role in setting the research agenda, precisely because

research and innovation are becoming a more critical part of solving the challenges facing trade, industry and society at large. The new overall strategy more explicitly stresses the role of research in society, and the broader societal mission of the Research Council.

The strategy will provide the platform for the Research Council's various strategic documents. The Research Council has drawn up a number of strategy and policy documents in key areas. These provide a more detailed, in-depth presentation of the strategy's priority areas, which are in turn quantified and adjusted in the annual budget proposals.

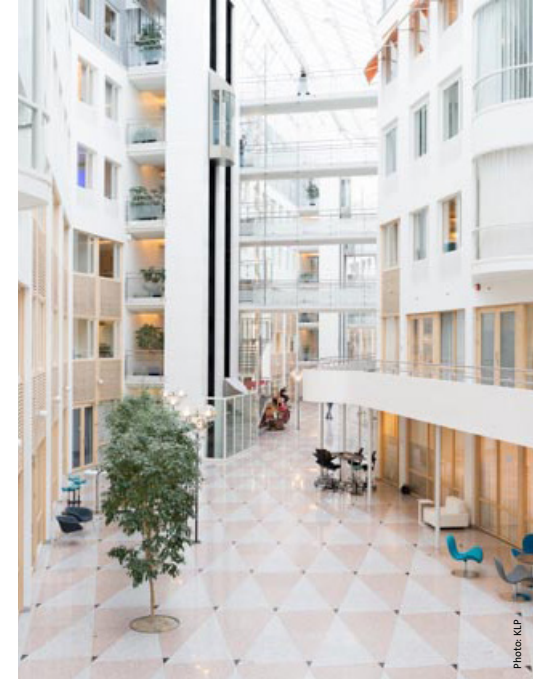
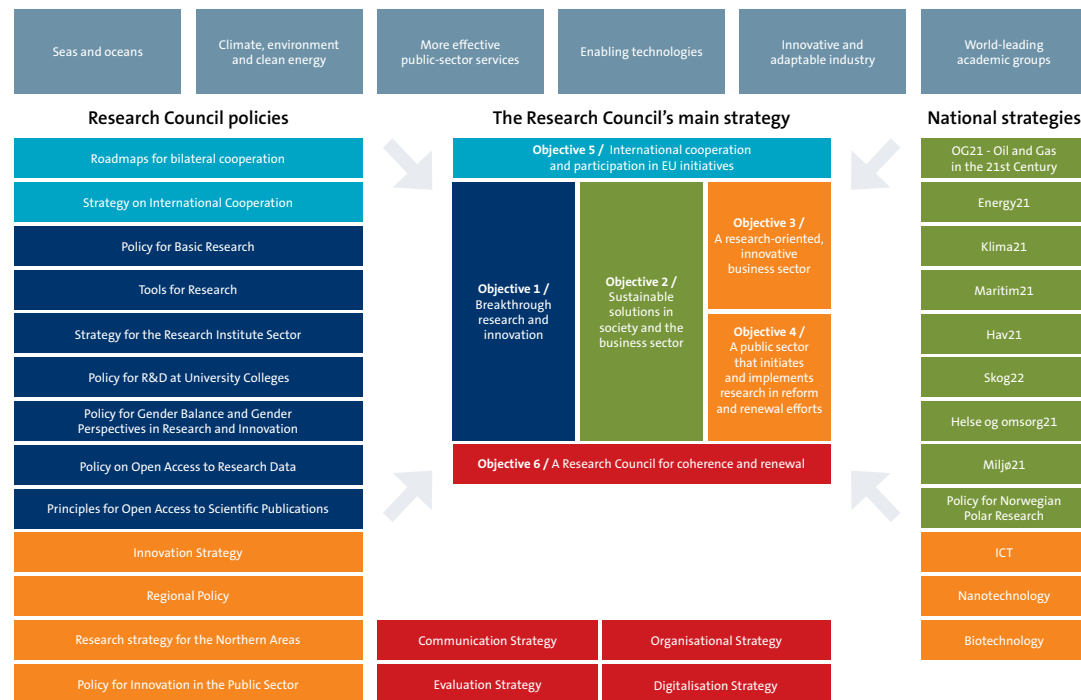


Photo: KLP

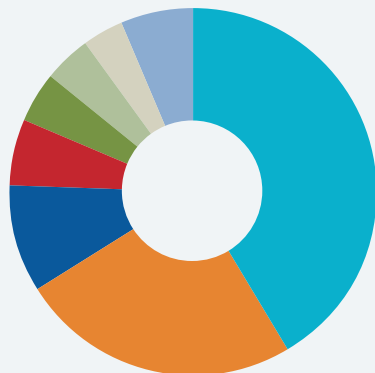
The Research Council serves as the Government's advisor on research policy, but is at the same time the implementer of political and scientific priorities. Thus, the strategy provides recommendations for the Council's own activities as well as input for the authorities and research sector stakeholders. In this way, the strategy will help to follow up the Government's *Long-term plan for research and higher education*.

Strategy overview – plans, strategies and policies that form the foundation for *Research for Innovation and Sustainability*

Long-term plan for research and higher education 2015–2024



Budget - funding by discipline
(NOK 8.5 billion in 2015)



- Education and Research
- Trade, Industry and Fisheries
- Petroleum and Energy
- Agriculture and Food
- Climate and Environment
- Health and Care Services
- Foreign Affairs
- Miscellaneous

The Research Council channels nearly 25% of the public funding for Norwegian R&D.



CHALLENGES



INCREASED SUSTAINABILITY

By far the greatest challenges in coming years will be to safeguard the Earth's climate and environment, and to promote increased sustainability in economic and social development. The Research Council has focused considerable effort in the areas of climate, the environment and renewable energy. The task is to strengthen activities in these areas as well as to incorporate sustainability perspectives in other priority areas. Inherent in this is a need to promote a green business sector, increase the sustainability of the welfare society and solve problems related to ensuring better health in an ageing society. There is also a need to improve understanding of how to ensure good governance and adequate equity in a sustainable society.

MORE INNOVATION

Research-based innovation will be pivotal to the development and restructuring of the Norwegian business sector, and thus the Research Council also plays a role as a business policy actor. Achieving the two per cent target for research and development in trade and industry will require greater mobilisation and increased funding from the Research Council. The ambitions to achieve a more innovative public sector imply that the Research Council must also take more active steps to facilitate new technology solutions and social innovations. The Research Council is faced with greater expectations for research to generate results that can be used in trade and industry, in the public sector, and in policy development.

MOVING THE RESEARCH FRONTIERS

Fulfilling aspirations to achieve more world-leading research in Norway means cultivating talented researchers and research groups that

can move the research frontiers within their subject fields and thematic areas. The challenge lies in identifying the most groundbreaking research that carries the greatest potential for radical innovation and social benefit. It is essential to develop more effectively targeted selection procedures, instruments and support methods. Concepts of quality and relevance must be defined in a fashion that makes them better equipped to identify breakthrough projects.

The challenges facing society give rise to a vast need for knowledge. The Research Council must promote greater research activity in priority areas within a context of increased national and international interaction. These efforts must be directed at fostering high-quality research as well as ensuring a satisfactory balance between subjects and thematic areas. There must also be adequate opportunity to obtain funding for research that lies outside thematic priority areas. These challenges must be resolved within the



Photo: Sverre Chr. Jørd



Photo: Sverre Chr. Jørd

sector-based funding framework established for the Research Council, in which the ministries stipulate their own priorities and knowledge needs.

GLOBAL PARTICIPATION

The scope of the Research Council's remit is expanding as the national R&D system becomes increasingly integrated with the EU and the rest of the world. The task of encouraging greater participation in a joint international research market has become more critical. When the overall funding framework is increasingly co-created with international stakeholders, it becomes more complicated to set the dimensions and targets for national efforts. There is a shift taking place in the latitude for action, and it is becoming more important for the Research Council to take part in shaping the overall international research effort.

BETTER COORDINATION

The activities of the Research Council must be in alignment with the institutions' own priorities if they are to succeed. More autonomous, strategically-oriented institutions are making a greater effort to strengthen their own positions nationally and internationally by means of close interaction between research, education, dissemination and innovation activities. This requires an expedient distribution of tasks between the Research Council, the institutions and the allocating authorities. The distribution of tasks is influenced by among other things the balance between funding channels, the targets for and scale of the efforts, as well as the reliability of funding opportunities from the Research Council.

Research policy must increasingly be viewed within the framework of the knowledge triangle, where education, research and innovation are parts of an integrated whole. The Research

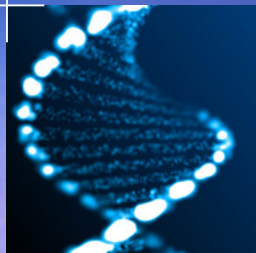
»» THE STRATEGY HAS ITS POINT OF DEPARTURE IN TWO OVERARCHING CHALLENGES: SOCIETY MUST EXPAND ITS INNOVATION CAPACITY, IN BOTH THE PRIVATE AND THE PUBLIC SECTORS, AND IT MUST ENHANCE SUSTAINABILITY IN ALL AREAS.

Council must further refine its position as a key stakeholder in the research system by developing instruments that add value to research environments, trade and industry and the public sector, and by incorporating broad-based external consultation in the development of policy advice and priorities relating to research. The Research Council must work to articulate a more clearly-defined, common direction within the national research and innovation system. This necessitates setting high standards for the Council's efforts to expand the knowledge base for research and innovation policy and to promote a well-functioning dialogue with research and society.



THE FRAMEWORK OF OBJECTIVES

»» *Research for Innovation and Sustainability* is a strategy for the Research Council's activities in the 2015–2020 period. The strategy has its point of departure in two overarching challenges: Society must expand its innovation capacity, in both the private and the public sectors, and it must enhance sustainability in all areas. Dealing with these challenges constructively will require strong, pioneering research environments that must be able to compete and develop within an international and global framework. As part of the effort to deal with these challenges, six objectives have been defined for the strategy period.



Objective 1

Increase investment in breakthrough research and innovation.

Objective 2

Enhance research for sustainable solutions in society and the business sector.

Objective 3

Cultivate a more research-oriented, innovative business sector.

Objective 4

Promote a public sector that initiates and implements research in reform and renewal efforts.

Objective 5

Increase international cooperation and participation in EU initiatives.

Objective 6

Serve as a strategically-oriented research council that facilitates coherence and renewal in the research system.

The strategy describes key action points for the Research Council relating to these six objectives. The action points involve strengthening and further developing ongoing activities as well as introducing new activities. Particularly important focus areas during this strategic period are to:

- > Strengthen initiatives targeted towards young research talent and the best research groups.
- > Reinforce sustainability perspectives in the Research Council's thematic initiatives.
- > Facilitate research-based innovation across the entire range of Norwegian trade and industry.
- > Increase research-based innovation within the municipal sector.
- > Promote greater participation in and funding from Horizon 2020.
- > Strengthen activities aimed at providing knowledge-based advice and simple to use, readily accessible funding instruments.

Objectives



OBJECTIVE 1 / INCREASE INVESTMENT IN BREAKTHROUGH RESEARCH AND INNOVATION

The quality of Norwegian research is high. However, there is potential to raise the number of top-level scientific environments and researchers that can deliver groundbreaking research. This is necessary to expand the frontiers of science, to enable us to find solutions to major societal challenges and to lay the foundation for future value creation. The Research Council must enhance the quality of and capacity in the research community, and work towards the advancement of a research system that provides relevant knowledge and facilitates research-based innovation in the public and private sectors. >>



OUTSTANDING RESEARCHERS AND RESEARCH GROUPS

Research is an independent, creative force in society. It is fuelled by curiosity, often with no fixed goals for specific benefits in the short or long term. The institutions face challenges in connection with enhancing quality in research, recruiting the best talents from the pool of men and women researchers, and coping with the development of scientific fields that are increasingly dependent on access to and use of vast amounts of data and advanced scientific equipment. The institutions must cultivate strong focus areas that help to position them in the national and international research arena. Research groups are also expected to contribute more tangibly to solving social problems and innovation challenges. At the same time, high quality training programmes must be ensured by facilitating suitable links between research and education.

High quality in research leads to deeper insight, greater opportunities, new solutions and the ability to work together with the best in the field. The best researchers come from dynamic, scientific environments that cooperate internationally, often across dividing lines between disciplines. They have access to long-term funding, a wide array of top-standard scientific equipment, and open access to results from cutting-edge research. They work in institutions with a strong, legitimised leadership that has defined clear research objectives, that attaches importance to recruitment and mobility of people and ideas, and that expects quality across the board.

BREAKTHROUGH BASIC RESEARCH

The Research Council must respond to the quality challenge in Norwegian research by helping to foster outstanding researchers and research environments, whether these are found in universities, research institutes, health trusts

or university colleges. There is a need to invest more in long-term, breakthrough basic research by providing support to high-risk research in the interface between subject fields, disciplines and thematic areas. This will require new forms of support and new mechanisms for identifying the most pioneering research, which will in turn entail further refining funding instruments such as *the FRIPRO funding scheme for independent projects*, the various *centre schemes*, and even the *Large-scale programme initiative* in this direction. It is essential to encourage more international cooperation with the best researchers and research groups to enable Norwegian researchers to compete in international arenas such as the European Research Council.

The funding instruments must be better aligned with the basic allocations to the universities and supplement the quality initiatives that institutions implement themselves. This implies predictability in initiatives and funding announcements, a wide

enough range of funding opportunities, more appropriate periodisation of larger-scale recurring initiatives, co-funding of key priority areas and financial parameters that facilitate a constructive distribution of tasks between the Research Council and the institutions.

RESEARCH RESOURCES AND INPUT FACTORS

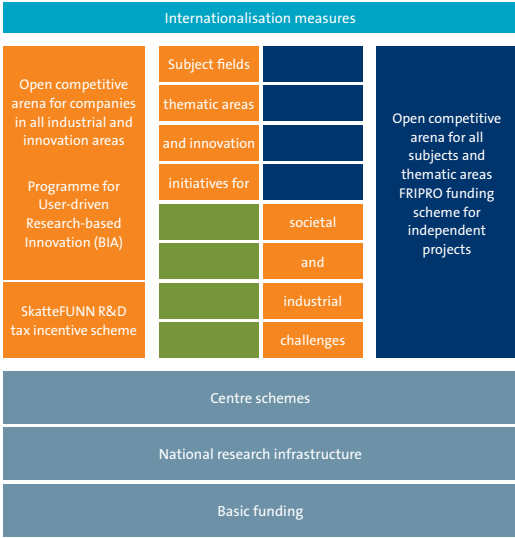
The target for research and development to amount to three per cent of the gross domestic product (GDP) set out in the *Long-term plan for research and higher education*, necessitates the expansion of capacity, productivity and cooperation within the research system. Achieving this ambition will be dependent on increasing the number of researchers significantly, ensuring that top (Norwegian) research talents choose to pursue a career in research, and better exploiting the potential to recruit more women researchers to senior-level positions. This means there must be access to advanced laboratories, equipment and databases that can enhance productivity

and quality in research efforts. Building dynamic research groups will take concentrated resources, but it will also require more effective use of the overall resources in the national and international research system through competition, cooperation and distribution of tasks. To increase capacity we have to increase investment, which entails public appropriations that exceed one per cent of GDP.

RELEVANT RESEARCH AND ADEQUATE SCIENTIFIC RANGE

The research system must supply relevant, high-quality knowledge to education, trade and industry and the public sector. The universities, research institutes, health trusts and university colleges each contribute to this in their own way. Society's more concrete, short-term knowledge needs may conflict with the need to work within more broadly-defined areas over a longer period of time. Knowledge needs may also challenge the discipline-based organisation of the university environments and structure of the research

Funding instrument framework – a wide array of funding opportunities and competitive arenas at the Research Council



institute sector. It is important to design mechanisms that can more successfully reconcile the need for thematically targeted activities with the need for an adequate scientific range. The Research Council must work to achieve more thematically open programme initiatives that stipulate fewer guidelines and have greater room for basic research, thematic centre initiatives that generate new interdisciplinary focal points at the institutions, and robust research institutes that are well adapted to the commissioning market.

RESULTS AND KNOWLEDGE DISSEMINATION

The research community comprises society's greatest knowledge pool and is expected to deliver research results that lead to learning and impacts for all segments of society. Communication with relevant groups is to be an integral part of the research process. For research to lead to innovation, create value and yield benefits for society, its results must be more widely applied. The challenges lie in how results are spread,

communicated and developed in a dialogue with the users, as well as the degree to which the projects are supported until the results are put to use. The universities and research institutes must, in cooperation with the companies, be given adequate means to take full advantage of the potential for innovation and commercialisation. Public-oriented dissemination activities must be enhanced through the use of new methods, in order to increase the spread of knowledge in society and public involvement in research.

THE RESEARCH COUNCIL PROPOSES THAT:

- Public appropriations to research should reach 1.2 per cent of GDP by 2020, and the Research Council's share of this should be increased.



THE RESEARCH COUNCIL WILL WORK TO:

- Strengthen investment in long-term, breakthrough, basic research by encouraging interdisciplinarity and designing new support and selection methods.
- Develop more open thematic initiatives that can reconcile the need for thematically targeted efforts with the need for adequate scientific range.
- Ensure that the best young talents, women and men alike, are given good conditions for pursuing research.
- Improve the gender balance in research, and promote the incorporation of gender perspectives in research programmes and activities.
- Fulfil the Research Council's specific strategic responsibility for the research institute sector by cultivating relevant, robust institutions.
- Strengthen national research infrastructure in priority areas and make the best possible use of the joint European infrastructure cooperation.
- Promote the use of research results through dissemination of knowledge and cooperation with the business sector and society at large.



OBJECTIVE 2 / ENHANCE RESEARCH FOR SUSTAINABLE SOLUTIONS IN SOCIETY AND THE BUSINESS SECTOR

The greatest challenges facing tomorrow's world involve ensuring greater sustainability in economic and social development and safeguarding the Earth's climate and environment. Resolving these challenges will require research and innovation. The Research Council has a responsibility to prioritise relevant, high-quality research that promotes more sustainable solutions in trade and industry and society at large, and must at the same time lay the foundation for international cooperation on these challenges. The Research Council's strategic initiatives comprise the most important tool within the research system for building expertise and top-calibre research capacity for dealing with specific areas and problems.



The sustainability goal is linked to a society whose state is reproducible over time, where the concept of natural cycles is incorporated into all spheres, and where importance is attached to global thinking and a long-term generational perspective that diminishes risk to society. The backdrop for this is a planet facing major problems related to climate change, hazardous substances, and the need to safeguard ecosystems and natural resources. The need for greater sustainability also applies to the realm of social and economic development, in areas such as health, education, governance of society and equitable distribution. This entails a wide range of challenges as well as opportunities for Norwegian research, trade and industry, and the public sector. A more clearly defined sustainability agenda may increase competitiveness and improve resource utilisation, and can in addition create a framework for developing new, dynamic research environments. Sustainability perspectives and the precautionary principle

must be incorporated more directly into research and innovation efforts, and the research activities funded by the Council must be assessed in light of their contribution to a sustainable society.

NATURE, CLIMATE AND THE ENVIRONMENT

The basis of human existence is under pressure due to the climate crisis, destruction of nature and skyrocketing energy needs. Greater investment is needed in knowledge about renewable energy solutions, environment-friendly transport, reduced pollution, energy-efficient buildings, sustainable cities and the ramifications of climate change to be able to reduce emissions of greenhouse gases. More fundamental insight into the climate is essential to be able to assess impacts and adaptation needs. A greater understanding of cultural, political and social factors will also aid the development of the zero emissions society. There is a need for more research on biodiversity, ecosystem services, landscapes and the natural environment and



the spread of hazardous substances. Norwegian research must seek to find new energy solutions in key focus areas such as solar cells, offshore wind power, hydropower, bioenergy, flexible energy systems and energy utilisation, in addition to further investment in carbon capture and storage.

NATURAL RESOURCES

Norway has strong natural resource-based industries. More investment in marine and maritime research, as well as research on petroleum and mineral resources, has the potential to increase value creation significantly. More attention must also be focused on the bioeconomy in order to fully utilise biological resources in the production of food, products and energy in sustainable circuit systems. Research activities must be targeted towards basic research, recruitment, technology development, resource management and the environment. By investing in more knowledge and better utilisation of the nation's natural resources, Norway can enhance its

competitiveness and at the same time promote sustainable solutions and green growth.

HEALTH, CARE AND WELFARE

The proportion of elderly among the population will increase dramatically after 2025. The demographic shift will place the entire economy under pressure. Challenges in this context involve changes in the disease burden and need for care services, the quality and productivity of these services, access to labour and business developments in health, care and welfare technology. In addition, the population has increasingly greater expectations regarding what the health and welfare system can provide. Dealing with these issues will require a more concentrated research focus on health services and new technology, on diseases that affect the elderly in particular, and on innovation in the public sector. Medical research on widespread diseases must be strengthened. There is also a need for knowledge that can help to bolster the labour

force, by enabling people to work longer and by preventing early disability and drop-out from upper secondary school. Furthermore, measures must be designed to encourage more participation from trade and industry in research, technology development and innovation in the health and care sphere.

EDUCATION AND LEARNING

Norway has a highly educated population that is well adapted to working life, but the educational system must be further refined to ensure optimal utilisation of resources. An effort must be made to design a more robust, flexible educational system that is adapted – throughout the entire span from basic education, higher education and lifelong learning – to the needs of working life, to cultural and global challenges, as well as to the life choices of the individual. More knowledge is needed about development and learning among children, young people and adults, from pre-school to higher education;

about professional practice, management and organisation of the services in the field of practice; and about the structure and organisation of the educational programmes.

CULTURE AND GLOBALISATION

Countries and societies are becoming increasingly intertwined, and change processes and trends in other parts of the world have a growing impact on Norwegian society. Greater understanding of political culture, social trust, international conflicts, majority and minority relations and the administration of the multi-cultural society is necessary. There is a need for research-based knowledge about how the changes affect Norway's relations with other parts of the world, and about how Norway can use its policies to affect the global change processes. A broad understanding of the cultural prerequisites for social development is required. A targeted humanities and social science initiative would give new strength to this area.

GOVERNANCE AND DISTRIBUTION

Norwegian society is characterised by equitable distribution, equal opportunities, a high level of trust, democratic participation and governance, and a working life based on equality and common goals. This has been achieved through knowledge and social innovations that have spawned constructive, effective and democratic systems that pave the way for a well-functioning market and public sector. It is necessary to gain better insight into the prerequisites for more equitable distribution, effective governance and a well-functioning working life; for conditions that generate trust and security; and for increased inclusion and democratic participation. Key areas of research include the functioning of the financial market, corporate social responsibility, the organisation of public health services, further development of the public sector and the path forward to a more sustainable society.



THE RESEARCH COUNCIL WILL WORK TO:

- Incorporate the contribution of research to a sustainable society into the assessment framework in relevant areas.
- Strengthen research on the climate, the environment and environment-friendly energy.
- Strengthen research for the development of resource-based industries, particularly industries based on marine resources.
- Strengthen research activities relating to schools, education and learning.
- Strengthen research and innovation in the health, care and welfare sectors, especially in areas related to the labour force participation rate and the rising proportion of elderly in society.
- Promote research in Norway that is targeted towards finding solutions to global challenges.
- Strengthen research activities related to governance and distribution challenges.



OBJECTIVE 3 / CULTIVATE A MORE RESEARCH-ORIENTED, INNOVATIVE BUSINESS SECTOR

Future value creation, competitiveness and the effective utilisation of national resources will be dependent on a research-oriented business sector. Norwegian trade and industry is knowledge and research-based to a large extent, but the distribution of research and innovation activities is skewed as a result of the nation's industrial structure. To increase value creation and new knowledge-based industrial activity, the Research Council will promote research-based innovation in all segments of the business sector, and will encourage the entire research and innovation system to support this through coordinated activities. Research-based innovation must be a springboard for companies to move Norway towards a green, sustainable tomorrow. >>



RESEARCH-BASED INNOVATION

A broad-based effort to encourage more companies to utilise research and innovation activities as part of their renewal measures is essential. Companies that already carry out research must intensify their focus on research and innovation. This will increase the knowledge component of services, products and processes. The challenge lies in mobilising companies across the spectrum, especially in branches and fields which have no existing tradition for incorporating research-based innovation as part of their renewal efforts. The rights-based SkatteFUNN R&D tax incentive scheme must be revamped to cultivate a broader array of research-based innovation activities adapted to small and medium-sized enterprises. Regional incentive measures, the Programme for User-driven Research-based Innovation (BIA), the Industrial Ph.D. scheme, as well as competence brokering and project workshops are all important means of encouraging participation and increasing the

qualifications of new companies. Suitable, relevant research and educational environments must be accessible to provide companies and industrial clusters with the expertise they need through cooperation, mobility and shared learning arenas.

ICT, BIOTECHNOLOGY AND NEW MATERIALS

The Research Council's initiatives must contribute to research-based renewal of existing trade and industry and the development of new companies based on research results with major innovation potential. The technological priority areas *ICT, biotechnology and new materials* have great potential for innovation in many different research areas and subject fields, and are thus critical for designing new services and products. There is a need to strengthen recruitment and basic research, especially within ICT, as well as to build more dynamic research groups and generate new growth-enhancing technology through industry-oriented research.



Photo: Ulf Kierkegaard, Helse og Rehabilitering

GREEN INDUSTRY

Renewal within the resource-based industries is also required, in order to link knowledge and resources and form stronger national advantages. Expanding research-based value creation in the fields of energy, oil, mineral and bioresources will increase profits from natural resources and at the same time provide solutions towards the green transition. Service provision, health, welfare and education are also areas in which there is great potential to develop new, smarter and more user-friendly products and services targeted towards the private market and public services alike. Across all industrial areas, research must help expand green competency, reduce environmental pressures and restructure production towards a state in which resources remain in a sustainable circuit.

INDUSTRY-RELEVANT RESEARCH

Companies' renewal ambitions necessitate appropriate links between many different actors.

It is of primary importance to ensure good interaction in the knowledge triangle between business, education and research. The Research Council must work to ensure that universities, research institutes, health trusts and university colleges build up relevant expertise in a wide range of subject fields and thematic areas, and that they come up with research ideas that awaken the interest of trade and industry at the national and regional levels. A responsive exchange between business and research institutions is crucial, both to define new research needs and to exploit research results. Regional initiatives and actors must promote cooperation and knowledge exchange based on local resources and needs, which will in turn enhance competitiveness in national and international arenas. It is vital for companies to take part in international cooperation, as this will give them access to new expertise, technology and resources for their research-based renewal efforts. Increasing participation in the EU

»» THE RESEARCH COUNCIL WILL SERVE AS A DRIVING FORCE FOR CHANGE AND RENEWAL, PROVIDING KNOWLEDGE-BASED ADVICE, DEVELOPING STRATEGIC INSTRUMENTS, AND ENCOURAGING EXTERNAL INVOLVEMENT AND DIALOGUE.

framework programmes and other international research cooperation is central in this context.

SIMPLIFIED SUPPORT SCHEMES

Companies need reliable support schemes and a predictable research and innovation policy in order to invest in research. They hesitate to invest because the risks are too high, the incentives too weak, the support schemes too complicated and inaccessible, and the question of who has the rights to the research results is not always easy to clarify. More needs to be done to design a coherent framework of funding instruments that provides effectively targeted incentives and the necessary risk mitigation, and that is simple to use and readily accessible to all types of companies throughout the country.

APPLICATION AND COMMERCIALISATION

The business sector's R&D efforts must be applied in practice if the research is to lead to increased value creation, productivity and competitiveness. Many promising results from company activities are not fully utilised, and research results with high innovation potential from universities and research institutes do not receive adequate support in the process towards commercialisation. A sound support framework must be provided for experimental development, pilots, proof-of-concept funding, demonstration of solutions and commercialisation to facilitate an optimal application chain from research to finished product or service.



Photo: BAUFRESS TECHNOLOGIES



THE RESEARCH COUNCIL WILL WORK TO:

- Refine the SkatteFUNN R&D tax incentive scheme, expand the competitive arenas for companies and make the Industrial Ph.D. scheme rights-based.
- Strengthen the technological priority areas that have the greatest potential for innovation in trade and industry, particularly within the field of ICT.
- Expand the knowledge base in universities and research institutes related to resource-based industries and service provision.
- Use the centre schemes to develop dynamic research and innovation environments.
- Enable trade and industry to establish ties with the best research and innovation groups nationally and internationally.
- Extend support to promising projects all the way through to commercialisation.
- Increase user-friendliness by designing simpler, more readily accessible instruments and funding schemes.

OBJECTIVE 4 / PROMOTE A PUBLIC SECTOR THAT INITIATES AND IMPLEMENTS RESEARCH IN REFORM AND RENEWAL EFFORTS

Innovation is being carried out at all levels of the public sector, and many actors are taking part. A well-functioning public sector is essential to value creation in the business sector, provision of services to inhabitants, and the scope of activity in civil society. To promote innovation and greater value creation, the public sector must become more research-oriented. Challenges to achieving this include a need for clearer incentives, greater competency, an integrated knowledge system and better implementation of innovative solutions. The Research Council must work to encourage the public sector to develop, use and request research to promote better insight, services and solutions in the public sector.



Photo: Anne G. Jørgensen

RESEARCH-BASED SERVICE DEVELOPMENT

Innovation challenges in the public sector involve the need for better services and professional practice; more efficient public planning and administration; development demands in health, welfare and education; physical infrastructure and information systems. The sector is subject to political controls, and is characterised by multiple administrative levels and many small entities. The lack of competition and a market means that innovation efforts are not implemented within a systematic framework but are instead dependent on individuals, and are accompanied by a variety of problems relating to competency, risk, cost and scalability.

The broad and comprehensive tasks assigned to the municipalities require knowledge development across the full breadth of the public sector's sphere of responsibility. More research is called for in core areas of relevance for the provision of public services, such as health and welfare,

education and conditions under which children and adolescents grow up, as well as urban planning, transport, physical infrastructure and security. There is a need for knowledge relevant to planning processes in connection with public procurements, emergency preparedness and service development, and for organisation of working life, gender equality, governance and leadership. Dedicated initiatives for public innovation must be deployed alongside initiatives to increase the use of innovation projects for the public sector in relevant areas.

COMPETENCE-BUILDING

The volume of and incentives promoting research-based innovation in the public sector are inadequate. There is a need for long-term competence-building that can establish an improved practice for utilising and seeking research-based innovation in renewal efforts. There are too few researchers working in the sector to support innovation efforts at present.

Increased investment in the Public Sector Ph.D. scheme is necessary, but recruitment of doctoral candidates must also be a key element in thematic initiatives that address innovation challenges in the public sector. Professional practice is not sufficiently research-based, and there is a need for improved cooperation between researchers and practitioners. Practice-based R&D must be strengthened, as well as research on different professions where practitioners cooperate with researchers in the field.



A KNOWLEDGE SYSTEM FOR THE PUBLIC SECTOR

The knowledge system for research and innovation must be expanded to ensure that it is better exploited and becomes a more targeted, integrated resource for the municipal and state sector. The current system lacks funding instruments, expertise, and is in need of clearer specialist groups at the international level, better ties to the public sector and better mechanisms for user participation in the design of relevant research projects. It is important to cultivate stronger research institutes and university colleges with the capacity and competency to meet public sector knowledge needs.

The knowledge system must be developed through initiatives that cover the full range of needs for research-based innovation at all levels of the public sector. Specialist groups in some service areas can be expanded under the scheme for Centres for Research-based Innovation (SFI). In addition, more attention must be directed at

public sector knowledge gaps in initiatives addressing major societal challenges. Steps must be taken to facilitate participation in international research cooperation in areas of relevance to the public sector. Competence brokering must be used to link users and researchers more closely together. Initiatives in which the public sector can share responsibility for funding as well as cooperate on further developing the knowledge system for the state and municipal sectors must be actively encouraged.

IMPLEMENTATION OF INNOVATIVE SOLUTIONS

Barriers to the use and dissemination of results from research and innovation include the large number of small entities, the widely diverse tasks, requirements for a rule-based management system, strong subject field and professional communities, and an organisational culture that is not very willing to take risks. The research and innovation system must do more to increase the use and dissemination of research results to the

public sector by designing better systems for knowledge sharing, testing research results in collaboration with stakeholders, and implementing innovative solutions broadly throughout the sector. An effort must be made to increase policy-oriented research and to spread new knowledge via more research-based professional education and practice, and by increasing the number of researcher positions in the sector. Greater advantage must be taken of the business sector's ability to contribute to public sector innovation by increasing knowledge about challenges in the public sector and a more appropriate management of public procurements. There is also a need for increased knowledge about the public sector's various spheres of activity.



THE RESEARCH COUNCIL WILL WORK TO:

- Establish dedicated initiatives that promote innovation and service development in the municipalities, and encourage cooperation with the business and voluntary sectors on such initiatives.
- Contribute to long-term competence-building in the public sector through measures such as an expanded Public Sector Ph.D. scheme, to ensure that the sector increasingly develops, utilises and seeks out research-based innovation.
- Increase research on professional practice and education.
- Launch centre schemes in key areas of public sector service delivery.
- Help to develop a knowledge system that is better adapted to the research and innovation needs of the public sector.
- Design initiatives that enable the public sector to share funding responsibility for research-based innovation in the public sector.
- Contribute to information dissemination, demonstration and implementation of new and improved solutions, also by means of innovative public procurements.

OBJECTIVE 5 / INCREASE INTERNATIONAL COOPERATION AND PARTICIPATION IN EU INITIATIVES

The most dominant feature of social development today is globalisation. This entails greater interdependency among nations and diminished ability to solve the challenges of the future solely through a national effort. This implies not only a greater need for international cooperation as well as greater competition for labour, markets and resources, but also increased access to technology, competency and new markets that will bring new opportunities for research and innovation. Participation in a common European research market must be expanded and bilateral cooperation intensified. >>



CLOSER INTERNATIONAL COOPERATION

The national research, education and innovation systems are becoming more and more closely intertwined. Experience from international cooperation and time spent abroad have become a more important qualification for participating at the frontiers of research. Collaboration on problems, methods, infrastructure and resources raises the quality of the work of all participants. This promotes greater research activity to address major societal challenges and spreads the risk associated with larger-scale investments. In parallel, a common international research market is emerging where there is competition for research talent, cooperation partners and ideas.

HORIZON 2020

Participation in Horizon 2020 is intended to enhance the quality of research, increase competitiveness in trade and industry, and contribute to solving global challenges. The emergence of a common European Research Area will

entail increased alignment or coordination between national and European initiatives. Targeted incentive schemes must be designed to ensure that European cooperation is taken advantage of in all segments of the research system, as a step in realising the ambitions of the national EU strategy. Good Norwegian research groups, well-designed programmes and high-quality research infrastructure can make Norway an attractive country for hosting, collaborating on and investing in research.

ROADMAPS FOR BILATERAL COOPERATION

More must be done to exploit the potential of Nordic cooperation and bilateral cooperation must become more targeted. This entails drawing up a roadmap for bilateral cooperation that identifies key partner countries, areas of collaboration and common research opportunities, in addition to creating a framework for increased institutional cooperation. The US, Canada and Japan are home to several of the



world's leading research groups, and constitute important international partners. The emergence of new research stakeholders paves the way for new cooperation opportunities. Countries such as China, India, Russia, Brazil and South Africa have undergone rapid development and will open new possibilities for bilateral cooperation with countries outside Europe. Such cooperation will also involve strengthening efforts that serve to expand research capacity in developing countries.

A GLOBAL RESEARCH MARKET

Globalisation leads to keener competition for companies and poses new challenges to the public sector. Research and innovation efforts in both the public and the private sector must increasingly capitalise on resources in the international arena, especially through participation in Horizon 2020. International research cooperation will enable companies to enhance their competitive positions, and the public sector will meet knowledge suppliers and gain access to

best practice. Globalisation may also enable Norway to make research an export item, both by enabling multinational companies to procure their research from Norway, and by equipping the research community to compete on the global research market.





THE RESEARCH COUNCIL WILL WORK TO:

- Promote greater participation in and funding from Horizon 2020 through effectively targeted support schemes.
- Facilitate increased international cooperation with the best international researchers and research groups, both within the EU and with other priority partner countries.
- Encourage more companies to use international research cooperation to boost renewal efforts.
- Exploit investments in research infrastructure to expand international cooperation.
- Align the scale of national initiatives with relevant international initiatives.
- Target Research Council instruments more clearly towards enhancing international cooperation and outward mobility.

OBJECTIVE 6 / SERVE AS A STRATEGICALLY-ORIENTED RESEARCH COUNCIL THAT FACILITATES COHERENCE AND RENEWAL IN THE RESEARCH SYSTEM

The Research Council's activities seek to add value to society by facilitating research through measures that the various actors cannot realise on their own, by establishing a framework for coherence and diversity in research policy, and by promoting a knowledge society in which research results are put to use. The Research Council will serve as a driving force for change and renewal, providing knowledge-based advice, developing strategic instruments, and encouraging broad external involvement and dialogue. >>



DIALOGUE FOR RENEWAL

Research results represent unknown potential for the future and are by nature a collective public good. This is why the government invests heavily in research. The targets for these investments must be determined on the basis of broad-based open participation of the research sector and society at large. The Research Council provides independent advice and establishes priorities produced in active collaboration with the three-tier system of governing bodies and wide-ranging external consultation. This provides a democratic basis and a comprehensive competence base for the Council's advisory role.

The role of change agent must be exercised with the trust of and in cooperation with other stakeholders, based on open debate and processes in which stakeholders work together towards common goals. The challenge is to supplement the traditional range of participants in the research-policy arena with a broader

spectrum of interests and new actors, including different age groups such as youth and the elderly, and also involving laypersons to a greater degree.

COHERENCE AND DIVERSITY

The Research Council seeks to provide strategic policy advice that promotes coherent research investments while at the same time ensuring there is a diverse range of available funding opportunities. Coherence is achieved by balancing and consolidating various proposals, interests and prerequisites for Norwegian research into integrated recommendations. Diversity is achieved by obtaining advice from the various independent actors in the research system on different subject fields and thematic areas. The Research Council occupies a unique position in the interface between political authorities, researchers, international actors, different interest groups and the public at large. This gives the Council a basis for providing strategic policy advice characterised by coherence and diversity. The challenge lies in



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identifying and finding the right compromise between coherence and community needs, on the one hand, and the needs and opportunities of individual actors, on the other.

KNOWLEDGE-BASED ADVICE

A strong knowledge base is essential for providing advice on research and innovation policy. This places significant pressure on the Council's analytical and advisory capacity, on the overall strategic competency of the organisation, and on its ability to utilise external knowledge and expertise. Evaluation, statistics and design of performance indicators as well as research on research and innovation play a key role in strategic policy advice. There is a need to develop more systematic approaches to knowledge development and use, carry out new types of evaluation, increase the use of foresight analyses and, in particular, to design indicators that can measure the societal impacts of research and the appropriateness of funding instruments.

EFFECTIVELY TARGETED FUNDING INSTRUMENTS

The Research Council's funding instruments are intended to promote momentum for and define the direction of Norwegian research, and to contribute to a well-functioning research system. The development of effectively targeted instruments has helped to promote quality in all processes and schemes. The challenge lies in designing funding initiatives that lead researchers, institutions and companies in the desired direction, support institutions' distinctive characteristics and room to manoeuvre, and further develop a uniform, simple to use, readily accessible system of funding instruments for research and innovation.

SOCIAL RESPONSIBILITY

Research and innovation have become a significant restructuring force in society. The Research Council plays a role in determining what kind of society research may help to generate. The Research Council must assume greater social

responsibility by promoting research activities that will yield benefits for society at large in the long term. This means ensuring that research is conducted in an ethical and socially responsible way, that considerations relating to gender equality and gender perspectives are adequately incorporated, and, not least, that greater importance is attached to how research will contribute to a sustainable society.



USER-ORIENTED

A professional Research Council must be proactive, must have an efficient, well-functioning organisation and must remain keenly aware of its societal mission and role as a change agent. Successful efforts to improve policy advice, funding and meeting places require effective organisational measures that support new ways of thinking. A professional Research Council must also be visible. This entails employing communication activities in a strategic manner and drawing attention to and generating debate about important issues relating to research and innovation policy.

Extensive external participation in Council activities

> Governing level



> Distributing level



> Meeting place





THE RESEARCH COUNCIL WILL WORK TO:

- Renew meeting places by incorporating new actors and interest groups.
- Continue efforts to expand the knowledge base for research and innovation policy, particularly regarding the societal impacts of research and foresight analysis.
- Intensify efforts to design a uniform, simple and readily accessible system of funding instruments.
- Continue efforts to develop an effective, user-oriented administration and management with a clear focus on users.

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