

## Broader impact of research

The Academy of Finland encourages all researchers to consider the impact of their research and to work towards promoting that impact. The Academy asks that researchers assess the impact of their research both at the application stage and in their scientific reports. At the application stage, the impact section of the research plan serves to encourage researchers to deliberate on how their research is linked to more widespread interconnections also beyond the scientific community. As for the scientific report, submitted upon project completion, the researchers should aim to assess the outcomes of the research as well as the potential for further impact.

In the scientific report, researchers should describe the project's impact from five perspectives. These are (in alphabetical order):

- Public services and societal functions
- World views, culture and human understanding
- Economy and commerce
- Health and wellbeing
- The environment and natural resources.

There is also a separate heading for impact that manifests itself in other ways.

The purpose of this framework of perspectives is to give structure to and improve the comparability of the researchers' assessments. This is important as we use the data also to form a clearer overall picture of the research conducted with Academy funding. The perspectives have been selected to guarantee a sufficient coverage of the various manifestations of impact in society. The objective of the Academy is not to steer research towards a specific target impact; nor will the Academy rank different kinds of impacts in any particular order. Researchers are free to choose how to describe the impact of their research and how to place the different impacts in this framework, and they need only choose those perspectives that are appropriate for their own research.

It can be difficult to identify the effects and impacts of an individual research project. Research is conducted as part of the wider scientific community and society at large, and its outcomes are often the result of the joint effect of several factors and actors. The presentation of the effects and impacts of an individual research project are by default based on the researcher's personal assessment – it is often not possible to present unambiguous evidence of a direct causal link between the research and the impacts cited.

Impacts can be either desirable or undesirable, depending on the angle. An impact pursued in one area may, when viewed from a different perspective, have an undesirable impact (e.g. adverse environmental impacts from economic growth). It is not necessary to consider these kinds of indirect effects separately. In general, the (desirable or undesirable) societal relevance of research effects can only be assessed after some time, in the light of the values and goals prevailing at each moment.



In practice, the impact of research always also depends on the actions of third parties (i.e. other parties than researchers). The significance of these actions may range anywhere from minor to great. References may be included in the text about the conditions for impact to materialise.

The guidelines concerning the five impact perspectives or areas can be read individually. The purpose of the guidelines is to give concrete examples of possible manifestations of impact within each perspective.

### **Public services and societal functions**

Research knowledge or expertise can help improve public services (e.g. education, social services, transport, safety, energy management) or joint practices and principles (e.g. policy, administration, behaviour). Research has the ability to improve established practices (e.g. through new technology) or to promote related understanding and public debate.

The following lists some examples of areas where research – if successful – may have positive effects. The examples are intended to concretise potential impacts as regards public services and society's function and to help identify and/or advance them. The list of examples is not meant to be exhaustive, but descriptive and indicative.

#### **Impacts on policy-making, legislation, agreements or other regulation**

- research knowledge has been put to good use in preparatory or executive processes, including international work
- research has reformed structures and operational models for decision-making or decision preparation, or highlighted needs for reform
- a researcher has been in a position of trust or a member of an expert group, or has trained experts for such assignments

#### **Impacts on training, education or other civilisation**

- research knowledge or know-how has been used to redesign curricula or plans for early education
- research has prompted reforms of educational structures or operational models
- research has promoted international student exchange or export of educational expertise

#### **Impacts on the delivery of other public services (e.g. care services, security, transport, culture)**

- research knowledge has contributed to improving the relevance, efficiency or accessibility of services
- research has supported the creation of new kinds of public services or operational models, or helped to identify needs for change
- researchers have participated in planning or developing services



### **Impacts on preconditions for public debate and participation, impacts on public sector**

- research has widened the scope of public debate or changed its focus by, for instance, introducing new topics
- research has contributed to creating better platforms for public debate and/or participation
- research has made it possible to assess or develop the functions of the public sector

### **World views, culture and human understanding**

Research knowledge or expertise also affects the world outside the scientific community, reinforcing, maintaining or altering our understanding, views or debate about topical issues and their meanings. The effects may target, for instance, the capacities of individuals or communities as regards knowledge, skills or functions, incl. the operating environments and technologies that support such capacities.

The following lists some examples of areas where research – if successful – may have positive effects. The examples are intended to concretise potential impacts as regards world views and culture and human understanding and to help identify and/or advance them. The list of examples is not meant to be exhaustive, but descriptive and indicative.

### **Impacts on abilities as regards knowledge, skills and functional competencies**

- research has increased citizens' understanding of the world or improved the level of civilisation also outside academia
- research has improved citizens' reasoning, self-awareness, ability to absorb information and life-long learning
- research has spawned operational environments or models that support learning, creativity or experimentation

### **Impacts on the usefulness and utility value of technology**

- research has supported the exploitability of existing technology in new areas or among new kinds of user groups
- research has produced advanced technological solutions to satisfy existing needs
- research has contributed to solving issues related to the exploitability, use or consequences of technology

### **Impacts on human communities and collective capabilities**

- research has improved the vitality of local communities, special groups or other social networks, for instance
- research has strengthened national identity, the collective memory and experiences of community or dealt with national difficulties, for instance
- research has supported a favourable societal development in terms of international relations and global trends, for instance



### **Impacts on cultural understanding and intercultural dialogue**

- research has increased understanding of different cultural traits or operational models also outside academia
- research has fostered tolerance and acceptance of diversity and stamped out prejudice or racism
- research has promoted intercultural dialogue, conflict resolution and co-existence

### **Economy and commerce**

Research knowledge or expertise can promote or reinvigorate public or private economic activity. The effects may be seen, for instance, in private companies (new products and services, improved efficiency or competitiveness), branches (profitability, renewal), economic structures (new businesses and branches) or in economic ecosystems and regional development (clusters of knowledge and expertise).

The following lists some examples of areas where research – if successful – may have positive effects. The examples are intended to concretise potential impacts as regards economy, business and industry and to help identify the phenomena and/or advance the impacts. The list of examples is not meant to be exhaustive, but descriptive and indicative.

#### **Improved business efficiency or competitiveness**

- research knowledge has contributed to the development of useful products or services
- research has helped to improve companies' strategies, processes, standards, management or activities
- companies' research, development and innovation activities have increased as a result of research cooperation
- research has attracted emerging business activities through technology licensing, for instance
- Finland's position as a world leader in the field concerned has strengthened

#### **Improved employment opportunities or expert work**

- research-based knowledge has helped to create new jobs and employment opportunities
- research has increased the value added produced by expert work and generated greater demand for highly educated experts in business and academia
- researchers have acted as experts, mentors and trainers in business companies
- research has raised the expertise level in the field concerned

#### **Improved efficiency, equity or sustainability of public finances**

- research has been utilised in planning public finances or economic policy
- research has made it possible to identify or deal with market disruptions, externalities, problems in income distribution, etc.
- research knowledge has contributed to improving resource efficiency, equity or sustainability



### **Improved economic environment or structures**

- research knowledge has encouraged businesses to reinvent themselves
- research has boosted industry in the sector
- research has contributed to spawning a new branch or ecosystem or to improving the international competitiveness of a significant existing branch

### **Health and wellbeing**

Research-based knowledge or expertise may contribute to promoting human and animal health and wellbeing, to preventing or reducing social malaise or social problems, or to alleviating the risks associated with these issues. The effects may concern, for example, healthcare practices, methods, equipment, recommendations and so on.

The following lists some examples of areas where research – if successful – may have positive effects. The examples are intended to concretise potential impacts as regards health and welfare and to help identify and/or advance them. The list of examples is not meant to be exhaustive, but descriptive and indicative.

#### **Impacts on physical health, morbidity or mortality**

- research has helped to develop or introduce a new medical drug, a nutritional or physical exercise recommendation, a treatment or therapy, a diagnostic method or medical technology with beneficial health effects
- improved patient care outcomes through the research-based procedures described above and improved healthcare practices and clinical or healthcare guidelines

#### **Impacts on mental health, social wellbeing or quality of life**

- research knowledge or know-how has been put to good use in identifying risk factors associated with mental health problems or in improving the quality of life of individuals and communities
- research knowledge has helped to improve the rehabilitation of people with mental health problems
- in some areas, research knowledge has led to improved social wellbeing and reduced inequalities in society

#### **Improved healthcare provision and public health services**

- health service providers or the authorities regulating service provision have put research knowledge to good use
- new medical drugs, devices, improved diagnostic methods or new procedures and practices developed and introduced on the basis of research have reduced the costs of care

#### **Management and prevention of health risks**

- research knowledge has made it possible to improve the prevention or earlier detection of diseases



- research has increased public awareness of health risks or benefits (e.g. physical exercise, nutrition, smoking)
- research knowledge and its application has contributed to improving nutrition, food safety or environmental health
- research has helped to identify or manage new types of health-related risks (e.g. nanoparticles)

### **The environment and natural resources**

Research knowledge, expertise or new technologies can help to improve the state of the environment or the sustainable use of natural resources, mitigate environmental problems or adapt human activity to the carrying capacity of the environment. The effects may be manifested in, for instance, the climate, water bodies, forests and agricultural environments and the built environment as well as in the organisms and communities of organisms living in these environments – including humans.

The following lists some examples of areas where research – if successful – may have positive effects. The examples are intended to concretise potential impacts as regards the environment and natural resources and to help identify and/or advance them. The list of examples is not meant to be exhaustive, but descriptive and indicative.

#### **Impacts on the state of the environment, environmental load and monitoring**

- research knowledge has helped to improve methods for the decontamination, restoration, monitoring or care of the environment
- research has helped to define the sources, emissions, spread or threshold values of substances harmful to the environment
- research has contributed to improving the identification, management or reduction of environmental risks

#### **Impacts on natural resource use, environmental protection, biodiversity and ecosystem function**

- research knowledge has been put to good use in promoting sustainable use of renewable natural resources and/or in reducing consumption of nonrenewable natural resources
- research knowledge has helped to preserve and/or increase biodiversity or to improve the survival of organisms or communities of organisms (incl. forests and agricultural environments, the built environment and welfare of production animals)
- research has made it possible to develop and sustainably use or maintain tangible and intangible natural assets (i.e. ecosystem services, such as natural products, forests and mires as carbon sinks, and recreational use of forests)

#### **Impacts on the built environment and infrastructure**

- research knowledge has helped to improve the quality, health and amenity of facilities in the living environment
- research knowledge has been put to good use in land-use designation, in infrastructure development or in building sustainable community structures

**Impacts on adaptation to the environment and environmental changes**

- research has contributed to the development of joint practices in order to take environmental issues better into account, for instance, in reconciling societal and environmental goals
- research knowledge or know-how has been put to good use in anticipating local and/or global environmental changes, in adapting to climate change or in other studies on the future of the environment