

5 WAYS OF RESEARCH IMPACT

Society continually invests in academic and scientific research, e.g. through the Danish Council for Independent Research. Scientific research constitutes a key driver for the Danish economy and competitiveness, and provides solutions for societal challenges. There is a growing interest in estimating the financial, societal and cultural benefits of research. To the Danish Council for Independent Research it is vital that the funds being distributed to support independent research will have beneficial effects for society as well as the business sector. By funding independent research we support research that contributes to understanding and improving the conditions we live under.

Impact in 5 ways

The knowledge generated by projects that the Danish Council for Independent Research finances can be implemented in society in many ways.

- **1.** Independent research leads to basic scientific breakthroughs and paves the way for new competitive advantages. Thus, it generates results that can be exploited by the **business sector** and which are central to some of our global market leaders within research-based industries.
- **2.** In society, new knowledge gained from research into new technologies, methods or processes can provide the foundation for new collaborations or lead directly to measures that improve the efficiency in the **public sector**.
- **3.** The impact of research is also channelled through our **educational system**, one of the cornerstones of our society. Research-based teaching and education ensures that the latest knowledge is disseminated via the candidates leaving our institutions of higher education and activated in all sectors of society.
- **4.** The channelling of new knowledge into society is supported by providing targeted information to the public, and may in the end influence **legislation and regulation**.
- **5.** Academic and scientific research helps to enlighten us about our own society and has an impact on our **cultural development**. In a globalised world, research provides analyses of the processes of change and brings clarity and relevance to the public debate.

Impact factors based on researchers' publications and other bibliometric indicators constitute important tools for measuring academic quality. **It is equally important to be able to estimate the short-term as well as long-term societal impact of research**, and to measure its effect on specific sections of society - whether it is a particular industry, concrete areas of the educational sector or the effects of research on legislation and regulation.

Danish Council for Independent Research, 2016



How does the Danish Council for Independent Research **ensure that its funds help to finance research with an impact?**

Investing in research is to invest in a future we do not know yet. Academic and scientific research helps to break new ground, providing new answers to known and unknown questions, but also by raising new questions that reach beyond a narrow research field and into new ones. The Danish Council for Independent Research supports a broad spectrum of research activities, as innovative thinking also occurs across the demarcations between various areas of research.

For the Danish Council for Independent Research it is important that Danish research remains on a level with the best international research. For innovation in research to have the strongest possible impact, we must provide a research environment with high standards and the widest possible scope for academic and scientific investigation.

The process from idea to impact often transcends the delimitations of research areas and is influenced by the surrounding world. The Danish Council for Independent Research supports research that is carried out in dialogue with civil society as well as the business sector, locally as well as globally.

It is not necessarily expected of the individual research project, either before or after its completion, that the researcher can account for the long-term societal impact, but the sum of our research efforts in society should have an overall aim of maintaining and developing a sustainable society in broad terms.

*“The impact of research is also channelled through our educational system, **one of the cornerstones of our society**”*

“One third of the research projects are carried out in collaboration with businesses”

Danish Council for Independent Research **invests in researcher-driven ideas and projects**

It is difficult to predict which types of research will meet our future demands. That is why the Danish Council for Independent Research supports the broadest possible range of academic and scientific research, and does so independently of strategic and political priorities. This is vital for developing the knowledge capital in our society.

The Danish Council for Independent Research funds researcher-initiated projects where the researcher may be on a quest for deeper insight or is driven by a need to find solutions to concrete problems in society.

Regardless of where the researchers find their inspiration and motivation, projects financed by the Danish Council for Independent Research all contribute to the common pool of knowledge that helps to improve our society – both in the short and the long term.

DANISH COUNCIL FOR INDEPENDENT RESEARCH INVESTS IN

- Originality and quality, based on the researchers' own ideas
- New initiatives that transcend the traditional boundaries delimitations of research areas, and in subjects with a wide scientific scope
- Research that is on a level with the best international research and which plays an integrated part in the global exchange of ideas and knowledge

Inclusion in the Danish school system

In a project funded by the Danish Council for Independent Research, Professor Charlotte Højholt has studied conflicts in the school environment by mapping the relationships between relevant participants: children, teachers, parents, management and political institutions. This has provided new ways of understanding the mechanisms behind the idea of inclusion, which is one of the key principles in Danish education policy. The new knowledge has subsequently been used to advise politicians on inclusion in the Danish school system.

Growth and jobs in the industry

Through his research Professor Troels Skrydstrup has discovered how the lethal gas carbon monoxide can be transformed into a non-toxic powder that can be used for chemical synthesis in the industry. This has led to the establishment of a small spin-off company, which has had great success providing know-how to the medical industry. At the same time, it has inspired an entirely new research project, which has been awarded funding from the Danish National Research Foundation.

From research to impact

Cleansing of wastewater

Professor Per Halkjær Nielsen has studied biological cleansing of wastewater. By carrying out genetic analyses of microorganisms he has discovered a type of bacteria that is capable of transforming nitrogen in hitherto unseen ways. His research has resulted in collaborations with wastewater treatment works, where this biological cleansing process is applied in practice.

Using big data to safeguard against rapid floods in Danish municipalities

Professor Lars Arge returned from a career in the US, when he was awarded a project grant by the Danish Council for Independent Research to explore the development of algorithms for processing big data efficiently. More specifically, he investigated how a detailed surveying of the terrain in Denmark, by using lasers mounted on planes, can be used to estimate risks of flooding in connection with torrential rain and storm surges. This research led to other projects, including the establishment of a centre with support from the Danish National Research Foundation and a spin-off company which has provided more than half of the Danish municipalities with flood risk assessments based on land surveillance.

Better prognoses for cardiac patients: Establishment of five cardiac centres

Professor Henning Rud Andersen has headed a major study which showed that patients suffering from acute coronary thrombosis had a better prognosis when undergoing balloon angioplasty, than when they received treatment with anti-coagulant medications. The findings were ground-breaking, changing the international treatment regimens for patients with acute coronary thrombosis and leading to the centralisation of acute coronary thrombosis treatment in Denmark at five cardiac centres.

Development of labour market and social policies

Professor and Nobel laureate Dale T. Mortensen has collaborated with Danish researchers in developing economic models that utilise the very detailed data on Danish citizens and companies made available since the beginning of the 1980s through the Danish administrative registries. The research has made it possible to organise Danish labour market and social policies in a way that ensures the best possible interplay between education, labour market affiliations and social benefits.

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Effects of the investments of Danish Council for Independent Research

- 70 % of the researchers find that their research has contributed to new insights which may help to tackle concrete societal challenges
- 51 % of the researchers find that their research activities have contributed directly to tackling concrete societal challenges
- 77 % of the researchers find that their research activities have strengthened their teaching
- 23 % of the researchers indicate that their research findings have been used to advise decision makers
- 44 % of the researchers indicate that their research has involved players to whom the research results have had direct significance
- One third of the research projects are carried out in collaboration with businesses
- 97 % of the researchers note that their research projects have led to entirely new research ideas

Respondents: 641 grant recipients from 2005 to 2011

Source: Effects Analysis 2015 TNS Gallup for Danish Council for Independent Research

DANISH COUNCIL FOR INDEPENDENT RESEARCH

annually finances approximately 400 ground-breaking research projects at a total amount of nearly DKK 1 billion. The Council's funds are offered in free national competition, without any thematic limitations and covering all areas of research, in order to further original researcher-initiated ideas and projects within Danish research.