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Can the Climate Act be carried through by a "green NASA"?

With the adoption of the Climate Act, Denmark got its first research and innovation mission. The reduction of CO_2 emission in 2030 and 2050 is a concrete objective, and funding has initially been prioritised for four specific missions that are intended to support the Climate Act. This means that both public and private funding for research and innovation are now increasingly being earmarked for the green transition. A number of central players are, however, questioning whether the present research and innovation system is at all designed to guide Denmark towards the goal of the Climate Act. Through conversations with the key players in the green transition, DFiR has identified systemic challenges and opportunities in the green research missions. The discussion of how we should reach the research mission goals will form the basis of DFiR's annual conference on 25 November 2021.

A paradigm shift

Research and innovation is broadly recognised today as a key condition for our welfare society. The research-intensive part of industry plays an ever-increasing role in Denmark, and not least during the corona crisis we have seen the importance of having a strong base of ready knowledge. Since the noughties, a political intention behind the public investment in research and innovation has been to contribute to the general welfare in society through the paradigm "from knowledge to growth". Public research and innovation funding is partially shaped for that purpose. However, the man-made climate changes have made it imperative to contribute in a focused way through research and innovation by responding to and halting the changes. The balance between independent and strategic research has been in focus throughout the years, but now funds are increasingly earmarked for the green transition. The research and innovation funding system is thus currently undergoing major changes, and DFiR is therefore contemplating whether the general growth paradigm is disappearing as the basic narrative behind society's investments in research and innovation.

Green missions

Research and innovation missions is a new concept that has found its way into Danish politics in recent years. Mission-driven research and innovation is characterised by, as a starting point, having a (to varying degrees) well defined goal. The best-known example is probably the American research effort in the early 1960s when John F. Kennedy introduced the very tangible research and innovation mission: "We are going to put a man on the Moon".
Compared to traditional, strategic research, where funds are distributed to research and innovation within an overall subject, the mission-driven research is usually controlled top-down to a higher degree, as projects are coordinated and prioritised on the basis of a comprehensive consideration of how they each contribute to the accomplishment of the common mission in society.

The mission-driven research and innovation earned a prominent place in the Danish limelight after the adoption of the Climate Act with 2030 and 2050 objectives for CO_2 emission. Since then, seven themes and four specific missions have been formulated as part of the Danish government's green research and innovation strategy. Funds have thus been allocated on the Danish Finance Act for *capture and storage of CO2, green fuels, climate-friendly agricultural and food production,* and *recycling and reduction of plastic waste*. DFiR has spoken with the key players within green research and innovation who question whether the Danish research and innovation system is designed with adequate instruments for mission-driven research, and whether the new missions should lead to changes in the way in which we plan and organise research and innovation in Denmark. DFiR has decided to examine this more in detail, and during the coming year, DFiR will present a number of analyses and recommendations through reports and at the annual DFiR Conference.

New ways of financing research and innovation

The discussion of whether the present funding system fits the mission philosophy was central in the interviews that DFiR carried out with key players in green research and innovation. Private as well as public funders in the Danish research and innovation system are largely characterised by being *input requisitioners*. Based on broad calls in open competition, applicants are called to apply for basic research projects, development projects and what lies in between. Considerable resources are spent on the selection of the best projects, and the Danish funding system has generally played a significant role for our top position in the international world of research, as previously described by DFiR in the report **World Class Knowledge**.

Will a green NASA be able to prevent the widespread risk of "greenwashing" that may arise when research funds are increasingly concentrated within the green area?

A consequence of the input guided funding strategy is less focus in the funding system on the results of the research project and thus less control of the *output*. Of course, there are great variations between the various funding bodies, but as a general rule, it is expected that good research results will be able to "stand alone" when the projects are completes. Either as a result of dorect collaboration with enterprises following a pull from market forces, as a result of a push where research leads to innovation, or through publications in the scientific literature. The introduction of the green missions furthermore calls for an exploration of how research and innovation should translate into specific societal solutions. Has a need arisen for a funding system focusing more on *output*?

A "Green NASA"?

Through their conversations with DFiR, players from public and private funding bodies, industry, public authorities, and the university and innovation sectors have identified challenges and opportunities associated with endeavours to reach the Climate Act objectives. There is a need for yet unknown technological breakthroughs, but also for an efficient, focused application of existing knowledge and research infrastructure. It has been suggested in these conversations that Denmark, inspired by the man-on-the-Moon mission, should have a green NASA, which can ensure a coordinated and prioritised research and innovation effort. Further it has been discussed whether a green NASA will be able to prevent the widespread risk of "greenwashing" that may arise when research funds are increasingly concentrated in the green area. It was also discussed how to avoid a "crowded midfield" as grant recipients and funders position themselves in relation to the fact that an increasing share of the funds for research and innovation are concentrated in the green area.

The green transition comes with complex challenges that are very different from those of the Moon landing. It is an exercise involving a multitude of diverse players and sectors, and many of the desired solutions will be based on interdisciplinarity. That calls for systemic changes. If we are to score goal with the 2030 and 2050 objectives through specific missions, the players in the green transition point out the need for a clearer distribution of roles in terms of management, coordination and prioritisation of the portfolio of green research projects that will be or have been launched. Here the idea of a "green NASA" is of course intriguing. A large central organisation with many resources, great professional insight and implementation responsibility. Just as it is important to have control and coordination of the possible uses of the research results in connection with the green mission, is it also important to maintain a diverse and disruptive approach to the *input side*.

DFiR's Conference Climate Ends and Means on 25 November 2021

It is a balance we will learn more about at the DFiR Conference of the year when the following questions are debated by key players: Can a green NASA ensure a good balance between ends and means and the many players working for and with both? Is Innovation Fund Denmark's road map instrument a solution, or is there a need for new institutions or instruments? Which systemic changes are realistic within the narrow time frame of the Climate Act, and how can you include the private funders in the equation? Read more about the conference **here**.

Further information

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