

Standing out from the crowd

Summary

Dutch public research institutes and public research funders have far-reaching freedom in determining their research policy. The inter-relationships between the autonomous Dutch research institutes are marked by a mix of maintaining a distance at the institutional level, competing for staff, students and resources at the faculty and discipline level, and collaboration. In recent years, the national government has restricted itself to developing preconditions and funding without a great deal of steering.

The policy of autonomous institutions and self-organisation has worked well. The Netherlands has a flourishing scientific climate with an international reputation. The Dutch scientific landscape is a 'mountainous plateau': the plateau is made up of all those researchers in the Netherlands whose performance is above average, measured against international standards; the mountain peaks are made up of world-class researchers who have risen even higher in terms of the quality of their work. These peaks are what embeds Dutch science in leading, global networks; they constitute the capacity to keep pace with the world's best researchers and to absorb groundbreaking knowledge.

Request for advice

This advisory report pertains to the question of whether it is advisable to continue to implement the policy of the past. Can we rely on the conditions-shaping and facilitating policy of the past years to continue to deliver the results required by society in the future? Or, in light of the new circumstances, is it now time to adapt the policy accordingly?

This question is partly motivated by the fact that the international playing field is changing. New players are emerging at both the global and European levels, while at the same time in the Netherlands, public investments in science are decreasing. While emerging countries are focusing more on scientific research, and neighbouring countries like Germany are intensifying their research efforts, public investments in the Netherlands continue to lag behind. The position of Dutch universities on international rankings is under pressure. Outside Europe and the USA, several strong research and innovation hotspots are developing at a fast pace and are attracting a lot of human capital, private funding and research infrastructure.

Science and science policy

Science fulfils two different functions in society. In the first place, scientific research delivers new knowledge, new answers to research questions, referred to in the past by the Advisory Council for Science and Technology Policy (AWT) as "knowledge as a product". Secondly, the performance of scientific research in itself delivers a broad spectrum of skills and capacities, identified by the AWT as "knowledge as a capacity", with a component of this being the capacity to absorb knowledge.

Science policy is the government policy that focuses on scientific research that is performed by public research institutes. The goal is to maximise the social return on scientific research. On the one hand, this is linked to the results of research (knowledge as a product), and on the other hand, to the performance of research as an activity (knowledge as a capacity).

Science policy does three things: it facilitates, it steers generically and it steers thematically. Science policy facilitates knowledge by developing preconditions, by investing in research infrastructure and by making resources available, particularly from the so called 'first flow of funds' (i.e., the lump sum universities receive from the government). The universities spend these resources as they see fit. In addition, science policy steers generically, based on non-substantive variables including: excellence, transdisciplinarity, interuniversity collaboration, cluster forming, profiles, key focus areas (or "focus and mass"), scientific impact, social valorisation,

alignment with European programmes, participation of women and minorities, and the like. A portion of the funds in the 'second flow of funds' (i.e., the funds distributed by the Research Council NWO on the basis of calls for tender) is used for this. Finally, science policy steers thematically, to develop key focus areas. For a great many years, this has taken place through NWO (the Netherlands Organisation for Scientific Research), in so far as it allocates the second flow of funds programmatically, through the channels of the Netherlands Organisation for Health Research and Development (ZonMw), and by investing strategically in large-scale research facilities. In the recent past, Dutch science policy, financing science through the Dutch Fund for Structural Economic Reinforcement (FES), was more strongly focused on specific themes than is now the case. By steering both generically and thematically, the government increases the odds that 'scientific peaks' develop within a certain field.

Conclusions

The AWT concludes that although the Dutch science policy of non-interference has been very successful in the past, it is now necessary to take a step forward in order to improve the quality of the education, research and valorisation. The conditions under which the current science policy was successful have changed dramatically. New knowledge producers are emerging within and outside Europe. Remaining at the forefront of global scientific developments and retaining the capability of absorbing knowledge from elsewhere make having significant scientific peaks in the Netherlands ever more important. This requires additional efforts aimed at fostering peaks that attract global interest.

Strategic choices are needed to this end. This applies even more because the Netherlands has chosen not to keep pace with the levels of investment in scientific research in other countries. The result is that in the near future we will no longer be able to maintain a "broad plateau with mountainous peaks".

A commitment to peaks requires research institutes to sharpen their profiles and specialise further. It requires the government to stimulate scientific excellence, not only using generic, but also thematic instruments. Stimulating thematically means directing funds to specific key areas that are selected on the basis of their scientific, economic or social importance. This can be achieved through making the distribution of the 'first flow of funds' (i.e., the lump sum) more competitive. It can also be achieved by spending the 'second flow of funds' (from NWO) and the funds for research infrastructure more strategically, having researchers competing even more to acquire resources that are allocated programmatically.

Targeting funding to peaks of excellence implies accepting scientific troughs. At a given moment, weak or subcritical disciplines can become so called "blank spots". This is unavoidable. If this poses a problem, some of the negative consequences can be dealt with through international coordination, collaboration and dividing tasks with neighbouring countries.

Recommendations

The aim of science policy is to maximise the scientific, economic and social return on scientific activities. Increasing international competition together with stagnant budgets sometimes necessitate making painful choices. Against this background, the AWT makes the following recommendations to cabinet members responsible for Education, Culture and Science (in summary below – refer to the main text for the full recommendations):

Focus science policy more on top-quality research, on scientific peaks.

Expand the chances of peaks developing and stimulate their growth. Do this by more targeting research funding, both generically (on excellence) and thematically (key focus areas). To this end, make the funding more performance-based.

Based on your area of responsibility, ensure sound choices are being made regarding key focus areas and make sure they are being effectuated.

Respect the dynamics of science, but ensure that the necessary choices are being made. Make sure you receive sound advice, based on a good overview of all relevant information (science foresight). Make the criteria on which choices for key focus areas are assessed clear to universities and research institutes. Conclude agreements on implementation, funding and evaluation.

Ensure that the funding system is stable and clear. Generously support the development of the chosen key focus areas with financial resources.

Make research funding via the first flow of funds more performance-based. For the time being, maintain the current balance between the first and second flows of funds. Assign NWO the priority task of further stimulating the development of key scientific focus areas. Allow the organisation to evolve from being primarily discipline-oriented into being mainly transdisciplinary and theme-oriented.

Intensify collaboration with other countries.

Encourage collaboration in the fields in which Dutch researchers are among the best in the world. Focus strongly on priority areas within Horizon 2020. Coordinate investments in large-scale research facilities with other countries to a much greater extent than in the past. In addition, in order to fulfil the need for scientific expertise and research capacity, stimulate collaboration – especially with neighbouring countries – in those fields in which Dutch research is in danger of losing touch with the best in the world.

Assess the quality of the performances in **disciplines that have a more country-specific basis or content** and for which the performances are therefore less suited to being benchmarked internationally **in a modified way**, but also make the funding from the first flow of funds for these disciplines performance-based.

Invest in widespread and stable public support for science policy.

Configure science policy in such a way that it has the stability and consistency that corresponds to the long time horizon of scientific research itself.