

SUMMARY REPORT ON WORKSHOP "SCIENCE FUNDING IN TRANSITION - CHANGING PARADIGMS AND FIRST EXPERIENCES OF IMPLEMENTATION"

Introduction

The workshop "Science Funding in Transition - Changing Paradigms and First Experiences of Implementation" was jointly organised by the German Ministry for Education and Research and the OECD within the framework of the project "Steering and funding of research institutions". It took place on 6-7 May 2002 at the Wissenschaftszentrum Berlin.

Participation was limited to 50 experts in order to facilitate discussions during the workshop. It included members of the ad hoc WG, additional experts from participating countries, but also experts from countries which are not permanently participating in the work of the ad hoc WG (i.e. Ireland).

The workshop was chaired by Steve Shugar, Canada, who is also chairing the ad hoc WG's sub-group on priority setting. Dietmar Braun, University of Lausanne, Switzerland, was the workshop rapporteur.

Workshop objectives

The primary objective of the workshop was to provide a survey of changes in OECD member states' policies governing public funding and steering of research institutions. In detail, the workshop aimed to achieve the following:

- Understand how priority setting in different parts of the science system influences the availability of financial resources for research and training activities, and identify unintended impacts of this activity.
- Examine new mechanisms for funding public sector research (universities and government research institutions) and to identify strengths and weaknesses of these new approaches.
- Describe and identify methods to assess and evaluate research performance in the context of using increasingly priority setting procedures and introducing new funding schemes.

Issues discussed

Balancing academic, political, economic and societal demands is one of the major tasks of increasingly complex priority setting procedures. The workshop therefore discussed questions such as the reasons for priority setting exercises, the players involved in priority setting, the balance which had to be found between increased setting of priorities and institutional autonomy, and the different techniques employed for priority setting.

The allocation of funds is one of the major instruments to enforce priorities, therefore the issues related to funding are very similar to those related to priority setting. Many governments have embarked on reforms of their funding system by trying to reduce the percentage of "funding without strings" for public research

institutions or by introducing more performance-based approaches for institutional funding. Finding the right balance between different demands is a particular challenge in this connection. The workshop therefore discussed whether an appropriate balance between different funding mechanisms can be found and what this balance might be (general programme funding vs. institutional funding, fixed funding vs. variable funding, centralised vs. decentralised funding). It also dealt with the question whether competition always was the best way to ensure the best use of limited resources, and if so, how competitive funding instruments should be designed in order to be efficient.

Since priorities can only be enforced and more performance-based competitive funding instruments can only be introduced if clear output criteria are established, the workshop also discussed new and improved methods of evaluation and controlling. Questions relating to how the effectiveness of different priority setting and funding approaches could best be measured and what assessment criteria should be established were discussed.

Highlights of presentations and discussions

An extensive summary and fair judgement of the workshop's outcome is provided in the rapporteur's report. However, some of the country examples discussed and more general results are highlighted below.

Some interesting examples from different countries showed how governments are reforming their science systems. Experiences with such reforms could serve as input for reforms in other countries.

The Canadian example (Canada Foundation for Innovation) described the attempt to set priorities and enforce them and - at the same time - maintain a balance between different demands on the priority setting process (e.g. top-down vs. bottom-up, centralised vs. decentralised, formal vs. informal) and the complex set of players involved (government, research institutions, industry). The enforcing of priorities in the example described (funding of selected infrastructures) was facilitated by the fact that this was a new programme with new additional funds.

A presentation on the reform of a large part of Germany's public research institutions (the Helmholtz Association) described how in future priorities (strategic and thematic priorities) would be enforced by changing the funding structure for these institutions from institutional funding to a more programme-oriented competitive funding. Contrary to the Canadian example this reform is implemented within the existing framework of funding levels. It therefore met with resistance on the side of the institutions. This reform has just started, and it will be interesting to see whether it can really be successful without injecting additional funds.

An example from the Netherlands described a new funding instrument (funding of virtual institutes) called Leading Technological Institutes which aims at getting industry more involved in basic research and at facilitating transfer of research results to innovation. Within the framework of this system business would take the initiative to establish such virtual institutes and public research institutions would respond to such initiatives. The government's role in this scheme is to match funds earmarked by industry and to facilitate co-operation between the private sector and public institutions. This was yet another example where the setting of priorities is backed up by additional funds.

A presentation from the Australian Research Council described how changes in the funding of public sector research (focus on strategic and thematic priorities) had led to a structural reform of the major funding agency with the aim of supporting and facilitating the intended changes.

Evaluation has become one of the key issues for funding agencies and research institutions. Presentations on this issue demonstrated that various evaluation criteria and procedures are still being under discussion

and vary very much between countries. While ex ante evaluation procedures seem to be well established, performance and ex post evaluation is still lacking clear criteria. Improvements in this area must still be made.

General findings

All countries have adopted a more strategic thinking in their science policy approach taking account of the systemic context in which such policy is embedded. This is also reflected by the fact that there is a development towards setting strategic priorities taking account of societal needs as well as of merely scientific and thematic approaches.

Most governments have embarked on reforms of their science systems aiming at more flexibility of organisational and funding structures. More competitive funding instruments are introduced by nearly all countries to achieve this aim. Such reforms seem to be most accepted when they come with increased funds. Introducing reforms with existing funding levels meets with more resistance.

There are no generally applicable answers to the questions raised during the workshop. They depend very much on the context questions are asked in, on tradition, general cultural beliefs and political choices. In this connection "best practices" may be difficult to define. What works in one country may not work in another. However, reform approaches in the various countries are very useful to stimulate discussion within and among countries and experiences with such reforms - good or bad - can initiate similar reforms in other countries or lead to avoid similar mistakes.

OECD Conference Report: “Science Funding in Transition – Changing Paradigms and First Experiences of Implementation”, held at the Wissenschaftszentrum für Sozialforschung

Berlin, Germany, 6-7 May 2002

Rapporteur: Dietmar Braun, Université de Lausanne (Switzerland)

The conference, chaired by Steve Shugar from the Natural Sciences and Engineering Research Council in Canada, was part of an OECD project entitled “Steering and funding of research institutions”. It intended to take a closer look at policy issues related to the governance of science systems by analysing and comparing how individual countries approach the different problems raised by a shift to the “knowledge society”.

There were three sessions held at the conference each treating another question: After the key note speech by Professor Braun from the University of Lausanne on the “antinomy of funding policies” the first session dealt with the question why priorities are set at all, who sets them and what techniques are used to select them? Professor van der Meulen of the University of Twente in the Netherlands gave a general overview of the literature in asking how much steering do we need and Mrs. Charette from the Canadian Foundation for Innovation in Canada presented the rationale and organisation of her Foundation in the Canadian context. The second session wanted to know more in particular about the funding mechanisms set up to realise priorities. Is there an appropriate balance between different funding mechanisms and is competition always the best way to ensure the use of limited resources? Several administrators from different countries presented “best practices” of their country in this respect (Mr. Broersen from the Ministry of Economic Affairs in the Netherlands about the Leading Technological Institutes; Mr. Seppälä from the Science and Technology Policy Council in Finland about innovation initiatives; Mrs. Köster from the Helmholtz Association of Research Centres in Germany about the reorganisation of funding of Big Science Institutes; Mrs. Sarah from the Australian Research Council about recent initiatives in funding policies). The third session, finally, treated matters of evaluation and controlling in order to know how one could measure the effectiveness of different priority setting and funding approaches and what kind of assessment criteria could be established? Professor Kuhlmann from the Fraunhofer Institute for Systems and Innovation Research in Germany presented latest developments in strategic evaluation while Mr. Speed from the Office for Science and Technology in the United Kingdom reported on recent changes in priority setting and evaluation.

Three more general remarks can be made in the beginning:

(1) It became clear during the discussions that one should distinguish between more philosophical and more pragmatic and technocratic questions concerning steering, priority-setting and funding. Questions like how much competition do we need, what should be the balance between programme and basic funding or how much interdisciplinary research should we aspire for, depend very much on the context they are asked in and refer to cultural beliefs, policy traditions and party political aspirations. Choices must be made but one should be cautious in giving absolute answers to these questions. The conference focused therefore much more on technical questions, i.e. how can we best inject a higher dose of competition into the research system or how can the efficiency of funding mechanisms be raised? Most contributors were not interested in discussing if the road to more market and competition should be followed but how to do it in the best way so that high quality research and social responsibility research can be combined.

(2) The second remark concerns the status of “best practices”. Though the identification of best practices is the central objective of the OECD, the few examples presented at the conference and the lack of clear criteria for judging what does “best” mean, make it reasonable not to strive for the identification of best practices in such a conference but to identify by discussion common concerns in funding policies (as for example the concern of an acceptable balance between short term and longer term funding) and to give each participant the opportunity to learn from the examples and discussions he or she has heard and to “re-contextualise” instruments and solutions in other countries according to the specificities of his or her own country.

(3) There was a general feeling – and this was worked out by professor van der Meulen – that pretensions in steering should be reduced in a sensible way. The rising complexity of research systems, growing interconnectiveness and indeterminacy have led policy-makers more and more to reduce their ambitions in direct regulation of research and to rather lean on structural and indirect policies to raise capabilities of research organisations and researchers to act and learn in a responsible and accountable way.

Without any doubt, one can state a number of *converging trends* in funding policies today that have in part already be highlighted by the OECD publication of 1991 on priority-setting. Among them we find:

- All countries have embarked on *strategic thinking* in the development of their funding policies. Strategic thinking does not just mean identifying the most efficient goal and means relationships but to develop policies considering the systemic context of research policies. A large number of variables must therefore be taken into account. A fine example for this tendency was given by Stephen Speed by presenting the recently set up joint venture of research councils and the Office of Science and Technology in the United Kingdom.
- The development of *strategic priorities* confirm these tendencies. Strategic priorities are often developed on several levels of the funding system and must be co-ordinated. Questions are still open how to find the right set of priorities, if they should be found by copying other examples or by being innovative and get an advance in development, and how to do it in the best way.
- *Competition* is the catchword everywhere. There is a strong belief in all countries that only by obliging research organisations (including universities) to compete for funds, there will be the rise of efficient and responsible research. The immediate consequence is a severe reduction in institutional funding and an augmentation of programme and project funding in research systems. By allocating funds in a competitive way, co-operative projects across the borders of science and industry can be effectively initiated.
- Governments have started or already realised a *considerable flexibilisation of organisational and funding structures inspired by the new public management philosophy*. This had considerable consequences for funding agencies, not only because they must more and more allocate program-bound funding money but also because of a the shift from input to output orientation: no funding agency can escape today the work of clearly identifying its objectives, demonstrate how these objectives should be achieved and measuring ex post how successful programs have been. This needed a major reorientation in mentalities and organisational behaviour.
- *Evaluation* has therefore become a key business of funding agencies and research institutions. As professor Kuhlmann indicated, there are different ways how to do evaluation in a complex world. Evaluation tends to become – like strategic thinking – more and more sensible for the systemic context and must reorganise its procedures in this way.

Let us quickly reconsider the main conference questions:

(1) Why should we use priorities at all? In his conference paper, Steve Shugar had already developed possible answers to this question. During the conference two answers were discussed: one, there is a clear necessity to develop priorities because resources for research have become scarce and, two, we should use priorities, because they are the “key to success”. There are indications that by establishing priorities, funding agencies can quite effectively direct research trends and even reform research behaviour. Priorities oblige, both the funder and the funded and thus create stable working relationships as well as a stronger commitment of the scientific community in the development of proactive and strategic thinking.

(2) Who should set priorities? Of course, there is no clear-cut answer to this question. It is confirmed during the discussions that the OECD was right in 1991 to contend that priority-setting is a highly interactive process with many actors involved and that it is quite difficult and perhaps impossible to decide who has set priorities. It was mentioned that a clear-cut answer can also not be given because answers might depend on the themes aborded or structures available in a country. One sees, of course, a general tendency of governments to limit their priority-setting activities to the stipulation of the very broad and general lines of research policy. The recent announcement of “global steering” of the German Ministry of Education and Research might serve as an example. The presentation of the Leading Technological Institutes in the Netherlands has served during the conference to confirm the high and complex interaction process in building priorities.

(3) How should we set priorities? Again, there is no definitive answer but a consensus that priorities could and should not be set by Ministries in a top down fashion. The Dutch “polder model” is an example where – quite on the contrary – a large number of actors are participating and where several intermediary organisations are involved in order to aggregate bottom-up propositions and discuss them with the responsible Ministries. There are other ways, notably the Austrian one where recently an Advisory Council to the government has been made responsible for priority-setting and execution of research policies and which works more in a top-down fashion. There are different methods to gather the necessary information for priority-setting, for example Delphi-methods, an interactive deliberation process between all actors involved (from industry to scientists and politicians) like in the Netherlands, or the “systemic analyses” implemented by the Science Council in Germany. Conference participants were not sure to what extent stakeholders from society should be integrated in priority-setting. A general tendency to go into this direction is observable but the institutionalisation of stakeholders differs considerably in countries.

The new strategic thinking, “Mode-2”-funding and an increasing demand for applied-oriented research has had important consequences for the organisation of research councils and funding agencies respectively as well as on the allocation of funding money. The examples given during the conference demonstrate that all governments have attempted to reorganise the research council system though one should make a distinction between more independent funding agencies like the German Science Foundation and the research council systems. Governments have followed three strategies to reform funding agencies and overcome resistance: They have, first, circumvented the existing system by creating new agencies like it happened in Canada (an option critically regarded by some participants because this increases the institutional complexity of the system), they have, second, put financial pressure on existing funding agencies accompanied by a profound evaluation like in Germany, or they have, third, completely rebuilt existing funding agencies like the ARC in Australia in order to integrate social responsibility and strategic thinking (which might be difficult because of the change in organisational culture). All three examples given seem to have led nevertheless to a

satisfactory change in this respect and participants insisted on recommending that governments should continue to overcome the resistance of funding agencies in order to create viable and flexible funding systems.

Participants were quite aware of the difficulties these changes cause for the role of funding agencies in the research system. Traditionally, funding agencies are the intermediaries between two systems and feel the pressure of both. They maintain their balance by not giving in too much to either side. The recent reforms clearly strengthen the interests of societal and economic stakeholders in funding policies, often at the detriment of science interests. This was clearly pronounced by the Australian representative when stating that it becomes almost impossible to get the support of the government for long-term research projects. The healthy antagonism guiding the action of funding agencies may, therefore become destabilised.

We find, nevertheless, support in most of the OECD countries, especially from the side of industry, for maintaining long-term research. This might and already begins to change somewhat the mood of governments in curtailing funding resources for basic and long-term research.

There was some discussion on the thesis that countries needed to inject large amounts of money in order to reform their research council system and to be successful in research. Recent examples are Australia, Finland and Canada. Fresh and abundant money give the opportunity to create new institutions and overcome the gloomy mood of reforms imposed by austerity measures. This inspires funding actors to more actively pursue new funding policies. New money makes it also easier to overcome resistance of existing institutions insofar no redistribution of money is needed. It is nevertheless important that governments accompany their injection of money into the system by a clear vision and strategic goals of funding intentions.

Critical voices stated that change might also be possible without a growth of funding. Less money provokes more uncertainty and makes people work harder. The redistribution of money from responsive mode to program funding is also an effective way of reorientation in funding policies.

Finally, the conference embarked on the subject of how best to organise and fund co-operative relationships between universities and public-funded research institutes on the one hand and industry on the other. The example of the Leading Technological Institutes in the Netherlands served as an example. Several problems were raised in this context. A first problem is the question who should initiate such co-operation networks. If it is the government, the program might induce windfall profits for enterprises riding along the programme though they would have started it alone. Programs should therefore be pre-competitive but it is evident that it is difficult to determine when a research is pre-competitive or already competitive given the shorter cycles between new basic knowledge and application. A second subject are priority rights: in order to get enterprises in, property rights should be given to participant enterprises while public funding implies that knowledge is a public good. There were discussions about who best selects the topics of funding. The Netherlands pursue a strategy of outsourcing a preliminary study of the field and then get relevant enterprises, universities, research institutions and funders around a table to discuss the priorities which should be given. After the final tender an independent commission is deciding on which of the final subjects should be presented to the Minister and then to the Parliament. Monitoring and evaluation are other subjects of interest. There are no best practices yet but it would be worthwhile to ask for further comparative studies in this respect.

Though the spectrum of topics discussed was broad, a number of questions remain to be discussed in the future which are presented below without pretending that one is more important than the other:

- What should be the future role of stakeholders in priority-setting and evaluation?
- To strengthen the learning capacities of funding agencies and research institutions is a major aim to adapt to a complex and ever changing world. How can this be improved? The evaluation procedure presented by professor Kuhlmann was one interesting example to do it. Are there others?
- Interdisciplinary research was not sufficiently aborded in discussions and must be more extensively discussed.
- Funding and research systems are globalising. This aspect of international competition between funding agencies, the role of the European Union and international networks of scientists must be integrated in reflections. While there is a competition for best researchers, increasingly a co-operation between funding agencies is also needed to improve best practices and efficiency.
- There are a lot of discussions on evaluation but the development of performance indicators can be improved.
- Evidently, research and technology policies are shifting together but there is still no reflection how in the future funding agencies and Ministries in these two fields of action can effectively collaborate.