Keeping science competitive in Germany

Matthias Kleiner
Deutsche Forschungsgemeinschaft, D-53170 Bonn, Germany

Germany’s Excellence Initiative

The state of Germany’s university and research systems has been an increasing topic of debate in recent times. Spurred on by calls to improve the quality of research in Germany, and thus Germany’s standing internationally, in June 2005 politicians ended the political deadlock that had stagnated the science and research communities by approving a €1.9 billion spending package, Germany’s Excellence Initiative.

In January 2004 the then Federal Minister for Education and Research, Edelgard Bulmahn, called for a new start in German science. A competition entitled “Brain up! Germany’s looking for its top universities” was announced. It aimed to identify universities in Germany that were able to successfully compete at an international level and attract the best minds. But after over a month of discussion it became clear that such a competition should not only fund the universities, but also fund individual subject areas or departments. Details of the initiative were drawn up and handed over to two science organizations to implement: the DFG (Deutsche Forschungsgemeinschaft; German Research Foundation), the central self-governing research funding organization in Germany, and the German Science Council.

The Excellence Initiative goes hand in hand with Germany’s commitment to increase its R&D (research and development) investment level to 3% of its GDP (gross domestic product) by 2010, as part of the 2000 Lisbon Agenda, which calls for the European Union to become the most competitive and dynamic knowledge-driven economy by 2010. In approving the Excellence Initiative, Germany embarked on an ambitious trail, impelling its universities to adopt what some may consider to be a new school of thought. Instead of applying the traditional strategy, essentially granting equal funding to all universities, another approach was taken: that of competition. The intention was to change Germany’s university system from a ‘flat field’ to an ‘Alpine structure’, with the pronounced peaks symbolising those universities that stand out in national comparison.

The initiative is science-driven, and science is indeed in a continuous state of competition: competition for the most successful ideas and the best research results. Above all, science is in competition for the best minds. This aspect continues to be one of the most important challenges for today’s international scientific and academic communities. How can national universities and research institutions retain the crème de la crème of researchers? How can past underfunding of universities be compensated for? Researchers and academics need ideal working
conditions, scientific independence and the funding necessary to pursue their projects. And this is exactly where the Excellence Initiative comes into play.

The 5-year €1.9 billion funding mechanism is financed by the federal government (75%) and state governments (25%). The objectives of the initiative are to strengthen science and research in Germany in the long term, improve its international competitiveness and raise the profile of the top performers in academia and research. There are no regional or discipline-related quotas. Although politicians are represented on decision-making bodies, scientists have the majority vote. Funding was awarded in two rounds: the first round was announced in 2005 and winners were selected in 2006. The second round was announced in 2006, with winners selected in 2007.

The DFG and the German Science Council were confronted with many challenges in the initial phases. Although the programme’s timetable was tentatively established a year before, by the time final programme approval was given by the federal and state governments, the turnaround time from government approval to submission of draft proposals was a mere 3 months: an initial challenge that was turned into an opportunity by both the funding organizations and the universities. Another initial stumbling block was the assessment process and the expectation that the majority of DFG reviewers would submit funding proposals themselves and therefore could not take part in the evaluation process. With funding eligibility restricted to universities in Germany, the funding organizations called on approx. 300 international experts to assist in the review process. Again, although this presented initial difficulties, this international outreach, too, was beneficial, as the international perspective turned more attention to recognizing opportunities for female researchers and innovative approaches to promoting the careers of young researchers.

The Excellence Initiative is based on three funding pillars: graduate schools, which receive an average of €1 million annually; clusters of excellence, which receive an average of €6 million annually; and institutional strategies to promote top-level university research, which receive approx. €6–13 million each year, not including funding from the first two lines. Within the initiative, additional overhead funding of 20% was also granted to compensate for the indirect costs associated with research projects. On a side note: this also became relevant for the DFG, as, for the first time, the DFG is now able to grant overhead funding in the majority of its programmes.

**Graduate schools**

Graduate schools, the first funding line, aim to prepare the leaders of tomorrow by providing the highest level of research training. They play a key role not only in developing internationally competitive centres of top-level research and scientific excellence in Germany, but also in increasing their recognition and prestige. They serve as an instrument of quality assurance in promoting young researchers and are based on the principle of training outstanding doctoral students within an excellent research environment. Graduate schools thus offer ideal conditions for doctoral students within a broad scientific area and, as integrative institutions
with international visibility, they encourage students to be active members of their academic and social communities.

Proposals for graduate schools were assessed on the basis of a combination of different factors in a balanced structure-building strategy that ensures the best conditions for doctoral students at the location in question. These factors included: the scientific quality of the investigators and the location involved; plans for selecting, training and supervising doctoral students; promotion of early independence; ability to attract both domestic and international students; measures for integrating doctoral students from abroad; promotion of gender equality; and quality assurance in the research training process. Graduate schools were expected to incorporate an integrative interdisciplinary approach.

Graduate schools which were selected for funding stand out through their scientific profile in the form of overarching issues and approaches (not specialized topics) and their structured research training processes, which includes an innovative and clearly defined supervision plan, with compulsory tutorials and a differentiated training programme.

Graduate schools are expected to incorporate non-university research institutions in the region, including those from the private sector and the arts, whose participation can enhance scientific training and/or help prepare students for a non-academic career. The aim is to achieve national and international integration and focus in the research training process. A number of the graduate schools include participation from industrial partners, whose contributions range from offering internships, training courses and business plans, to work placements etc. One such example is the Erlangen Graduate School in Advanced Optical Technologies, which collaborates with A.R.C. Laser, IZMP Erlangen, Lucent Technologies, Bell Labs Innovations, HumanOptics, WaveLight, ERLAS, ESYTEC, Promeos and Siemens Medical.

Clusters of excellence and institutional strategies

Clusters of excellence, the second funding line, aim to enable German university locations to establish internationally visible and competitive research and training facilities, thereby enhancing scientific networking and co-operation among the participating institutions. Clusters of excellence should form an important part of a university’s strategic and thematic planning, significantly raise its profile and reflect its considered long-term priorities. They should also create excellent training and career conditions for young researchers and particularly encourage interactions between science and industry. Funding should be used to establish new structures and the required infrastructure, professorships and major instrumentation.

Selection criteria included: previous top-level research results; excellence and thematic coherence of the planned research programme; international visibility; promotion of young researchers at all levels of scientific and academic training and career development (e.g. structured support for doctoral students and early independence for young researchers); status and plans to promote equal opportunities; collaborative strategy between disciplines and between participating...
Clusters aim to combine local resources available in universities and independent research institutions in order to exploit synergistic effects, with the focus on strengthening university research. Co-operation between science and industry also plays a crucial role, not only in terms of transferring research results into practical applications, but also for promoting dialogue and exchange. For instance, 18 of the 25 clusters selected in the second round collaborate with partners in industry or other non-university institutions. One such example is the Cognitive Interaction Technology Cluster, in which participants from the Bielefeld Faculty of Technology collaborate closely with additional faculties (biology, linguistics, physics and psychology) and with Miele, Bertelsmann and Honda. Another example is the Formation of Normative Orders Cluster, which co-operates with non-governmental organizations to fund development work to support a research network geared towards young scientists studying the normative basis of development policy.

The third line of funding (institutional strategies) is contingent on the successful establishment of at least one cluster of excellence and at least one graduate school. The Excellence Initiative provides funding for institutional strategies that are aimed at developing top-level university research in Germany and increasing its competitiveness at an international level. The funding of the institutional strategies covers all measures that allow universities to develop and expand their areas of international excellence in the long term and to establish themselves as leading institutions in international competition. Nine universities have been awarded funding: RWTH Aachen University, Free University of Berlin, University of Freiburg, University of Göttingen, University of Heidelberg, University of Karlsruhe, University of Konstanz, Technical University of Munich and University of Munich.

Selection procedures

The DFG set up a Joint Commission together with the German Science Council. This Commission consisted of an expert commission (whose members were appointed by the DFG senate) and a strategic commission (whose members were appointed by the scientific commission of the German Science Council). The Joint Commission specified the terms of funding for the programme and, based on the assessment of draft proposals by international panels of expert reviewers, decided which initiatives would be invited to submit full proposals in all three funding lines. The Commission also developed the funding recommendations for all three funding lines. Funding decisions were made by a Grants committee, consisting of the members of the Joint Commission and the ministers responsible for research and science in the federal and state governments.

The statistics for the two funding periods attest to the attractiveness of the initiative. After the selection process, a total of more than 600 draft proposals were submitted by 79 universities. Full proposals were invited from 43 universities. A total of 180 full proposals (83 for graduate schools, 79 for clusters of
excellence and 18 for institutional strategies) were received. Finally, funding totalling approx. €1.9 billion was awarded, distributed among 37 universities, for 39 graduate schools, 37 clusters of excellence and nine institutional strategies.

31% of the 39 graduate schools (percentage according to the number of schools) can primarily be assigned to the life sciences; 28% to the humanities and social sciences; 21% to the natural sciences; 15% to engineering and 5% can be classified as general. For the 37 clusters of excellence, the corresponding distribution reads as follows: 33% to the life sciences; 27% to the natural sciences; 24% to engineering and 16% to the humanities and social sciences. Funding for institutional strategies was not allocated to specific disciplines, but was instead awarded to the university as a whole. Although the Excellence Initiative focuses on research, it has also had a significant impact on higher education in Germany. Approx. 5000 positions at all qualification levels, including approx. 400 professorships, have resulted from this funding.

Although still in its infancy, the effects of the Excellence Initiative can be described as far-reaching. Calls to continue the mechanism beyond the 5-year period have already begun to echo in political circles. With its Excellence Initiative, Germany introduced an important stimulant for innovation and we are hopeful that Germany will continue to benefit from its many impacts.