

Planning Research for the Future?

Conference Proceedings, October 2011



Planning Research for the Future?

International Conference

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Conference Proceedings

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Preface



PROF. DR. CARSTEN DREHER
Freie Universität Berlin
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There are many approaches, views and ideas about the planning of research nowadays. The first international conference “Planning Research for the Future?” was hosted in Berlin by the Center for Cluster Development of Freie Universität Berlin and brought together these various views and offered a forum for discussion.

It was preceded by a number of successful colloquia held at Freie Universität Berlin about Foresight in science and research. The subsequent conference highlighted in more detail the possibilities and limitations of acting within the scope of two keynote lectures, three panel discussions and four parallel workshops. In one workshop line the demand and various methods for research planning were reviewed and in a second line the different actors presented their perceptions of the planning process including similarities and differences, requirements and consequences.

Over 150 speakers and participants came together in Berlin-Dahlem with its rich density of research institutions and Freie Universität at its heart to discuss the chances and limitations of research planning for universities, research institutions and organizations.

After the successful inaugural conference, the first of its kind hosted by a German university, we are looking forward to the follow-up activities.

The organizers would like to thank everyone who contributed to the conference and made it a success. We sincerely thank Freie Universität Berlin and Stifterverband für die deutsche Wissenschaft for their valuable support.



Welcome Address



PROF. DR. PETER-ANDRÉ ALT
of Freie Universität Berlin
President

Good evening, ladies and gentlemen, colleagues and guests, it is my pleasure to welcome you to Freie Universität Berlin, on this historical and future-oriented research campus in Dahlem. This is a very special location, with a configuration of academic institutions unusual, perhaps even unique, in Germany. More than 8,000 individuals work in Berlin-Dahlem in knowledge-related fields. This number includes Freie Universität, four Max Planck Institutes, and the German Federal Institute for Materials Research and Testing. It is an international campus that brings together researchers from every region of the world, and it is a young campus, with more than 4,000 graduate students working toward a doctorate. Twenty-five percent of them are from other countries in Europe, Asia, the United States, and Africa. It is an inspiring location and therefore, very well suited to discuss an issue that concerns all of us: “Planning Research for the Future.”

The easiest way out of this issue would be to say that it is in the nature of the future, to not be predictable. But we are not gathered here to hold philosophical discussions on the uncertainty of what lies before us. We are dealing with something else, that is, the extent to which universities and other academic institutions can align their activities to meet future challenges. Without attempting to prejudice the conference discussions, I would like to outline two distinctive positions that cover the field of research planning from extremely contrasting perspectives. Briefly, they can be said to represent pro and con positions. Position one: Research does not follow five-year plans, but rather is driven

intrinsically. According to this position, it is not possible to anticipate future research themes because they emerge through autonomous innovation processes with very limited steering opportunities. In 1919 the eminent sociologist Max Weber gave a speech entitled “Science as a Vocation,” in which he stated that research is ultimately irrational and uncontrollable. More pointedly, because an element of surprise and the unexpected are part of groundbreaking research, such research eludes the regulating grasp of formal planning. If we adhered to this position, we could end the conference immediately and start the social hour. But of course, it is not that easy because the second perspective is still missing. According to this position, research planning does not mean anticipating future-oriented topics, but rather structural preparation that creates conditions conducive to the development of such topics. The fact that chance sometimes leads to success does not make institutional planning unnecessary. On the contrary: in light of constraints in public finance, universities and other research institutions can only continue to achieve excellent results, if they succeed in planning their actions. Their autonomy ultimately depends upon their success in future-oriented self-organization and planning.

In principle, I agree with the first position in its basic assumption that research must remain autonomous and open to surprise. However, as the president of an outstanding university, I also believe that we need planning in order to ensure precisely this autonomy of research. I wish to illustrate this need in the current situation. It

is not only in Germany and Great Britain that one complains much about the underfunding of public universities and the tendency of the government to withdraw from its responsibility to provide the main financial support for the universities. The situation is quite different in each of the separate European countries. While Great Britain relentlessly exposes some of its traditional university disciplines to a down-right Darwinist competition, in Germany the university system is still basically financed by the government, whereby the lack of tuition generates considerable financial constraints. Regardless of such differences, it should be noted: the times when public monies in Europe were lavished on universities belong to the past. How can universities cope with this situation? First of all, they should not complain and otherwise just wait and see what happens. But many universities do just that by letting themselves be guided by thinking that is reminiscent of the Christian principle of Providence. Actions, according to this principle, follow the law of a superior force, whose intentions are inscrutable and whose dynamics cannot even be imagined. The impression that universities often act fatalistically and without selfdetermination can be illustrated with various examples. Most of them operate under the illusion that success in the areas of research, teaching, and management results through a combination of random impulses. They permit themselves the luxury of letting their best minds work next to each other and not with each other. They maintain structures that slow down decision-making processes rather than accelerate them. They utilize their public alimentation without implementing basic systems of a fair performance-based allocation of funds. They ignore the fact that the quality of research depends not only on equipment but also on the spirit and the inspiring effect of an institution. They waste resources and personnel for tasks that are not well coordinated, for projects that are misaligned, and for randomly driven decision making that is seldom organized systematically. Such examples make it difficult for traditionally organized universities to find acceptance for their legitimate demands for better funding. In the meantime, however, it seems to me that the situation has changed somewhat.

The differentiation of European universities has advanced in recent years. In this process higher education in Europe has moved in the direction of developments made in the United States during the past 100 years. In Germany

this process was driven significantly by the government's Excellence Initiative. The universities that were successful in this competition have around 20 – 30 million euros of additional funding at their disposal, which has contributed to at least a temporary improvement in conditions for junior researchers and the development of research at the respective universities. Another crucial aspect, however, is that the Excellence Initiative provided the impetus – in some cases for the first time – for medium-term planning on a strategic basis. If some universities such as my own, Freie Universität Berlin, or others such as Technische Universität München or Karlsruhe Institute of Technology are better prepared than others for this type of competition, it is because of their willingness to establish strategic organizational structures that help them meet the challenges of the future more rationally and efficiently. New possibilities for university autonomy develop through self-directed planning processes. They clearly provide universities – but also non-university advanced research institutions – more self-determination than the usual rhetorical rituals at the wailing wall of public criticism of government. This is where the autonomy of the universities gains a new dimension. It can no longer be taken for granted, but rather must be worked hard to achieve. Its essential ingredient is the ability of the university to detect the challenges of the future as early as possible.

At this point I will take the liberty of using an example of such planning processes at my own university. In recent years Freie Universität has moved ahead with important developments in autonomy and steering. The university has not only established two large research clusters and four graduate schools funded through the German Excellence Initiative, but it has also set up three separate strategic hubs that are responsible for planning future research, the targeted support of young scholars, and internationalization. The university has established five focus areas that serve as platforms for bringing together multidisciplinary research projects and create the conditions for the formation of international and regional research networks. The network model has proven to be well suited to the research region of greater Berlin, as it is a system that promotes cooperation without limiting academic freedom. It is open to expansion, allows fair cooperative working relationships, and creates promising dynamics conducive to future collaboration. Freie Universität will continue to pursue and expand this strategy



as part of its new future development strategy for the Excellence Initiative in 2012, expanding its well-proven international network model while simultaneously placing more emphasis on regional partnerships. The university's guiding principle continues to be strategic control that does not determine the research topics a priori, but creates the structures that make the innovations of tomorrow possible.

Is it possible to plan research for the future? Kant says the following in his essay "Dispute between the Faculties" (1798): members of the general public do not expect that researchers will tell them what they do not understand. Rather, they expect the impossible: sinners expect theology to point the way to salvation, the guilty expect jurisprudence to tell them how to gain acquittal, and those who ravish their own bodies wish medicine to give them the recipe for eternal life. This shows with Kant that any expectation for the application of science creates a paradox because the life-world claim that stands in the back-ground cannot be met. What Kant's assessment does not refute is the possibility for building institutional structures and networks that create conditions conducive to optimal cooperation for all potential partners. This should also be a goal of research planning for the future.

Ladies and gentlemen: We have gathered here today to discuss possibilities for strategic development and management of research for the future. This is an issue that requires more than a few days, so we will only be able to make preliminary surveys of the vast range of possible topics. This meeting was made possible by the Center for Cluster Development of Freie Universität, with important financial and organizational support from the Stifterverband für die deutsche Wissenschaft. I wish to compliment the organizing team for their professional and dedicated planning, and I wish to thank the Stifterverband for their support and contribution to a successful conference! Furthermore, I wish to thank our illustrious guests from around the world for not only attending this event, but also for agreeing to give presentations, and for the interest shown in the subject. Welcome to Freie Universität on the research campus in Berlin-Dahlem. The floor is opened.



Research Planning as Chance for the Science Region Berlin



DR. KNUT NEVERMANN
State Secretary for Science and
Research, Berlin Senate

President Prof. Dr. Alt, Prof. Dr. Dreher, Prof. Dr. Zürn, Ladies and gentlemen, I would like to welcome you to the conference “Planning Research for the Future?”

Some of you may be wondering to what extent research must, should, or can be “planned.” After all, research has to be free to develop dynamically, and – as we all know – we owe some of the most important discoveries in the history of science to serendipity or to unusually creative and unconventional thinking. But even if we take more typical cases as our starting point, scientific insights always depend on other recent work, and the pursuit of new discoveries can be unpredictable. We’re limited in our ability to plan these processes.

On the other hand, however, social and economic issues and goals play a decisive role in initiating research inquiries and fields. Whenever new needs or interests crop up in society, the questions either trigger researchers’ curiosity or new programs are designed to explore these issues. I’m thinking, for example, of the sustainable use of natural resources, the challenges of demographic change (aging societies here, and overpopulation and the lack of resources elsewhere), or the constant evolution of mobility options (e-mobility is the key word here).

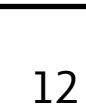
Science and research evolve in the delicate balance between science’s pursuit of knowledge, local and supraregional economic needs, and the tasks of society as a whole, represented by the government.

We are all familiar with the related discussions of basic research versus an application orientation, school funding that focuses on the majority of students versus (or in addition to) support for gifted programs, and the amount of influence politics and society should have on research aims. While these goals may appear to be contradictory, they bring energy to scholarly and scientific work and we need to keep trying to find a balance between them.

Despite the questions I started with on the nature of scientific insights, we can still ask whether research can or must also be plannable. I would prefer to leave this complex question to the experts gathered here – after all, tackling this issue is what brought them here today. Instead I’d like to offer a Solomonic response: what we definitely can and must plan and influence are the institutional structures that make research possible. And of course we policymakers, along with science and industry, need to constantly revisit the question of what the right institutional structures actually are.

Against this backdrop, I’m delighted that the Freie Universität and the Stifterverband für die deutsche Wissenschaft are holding this conference here in Berlin and at the FU.

Berlin is a center of science and learning: a total of four universities, four universities of applied science, three colleges of music, performing arts, and fine arts, two religious colleges, and 26 private institutions of higher education are at home in our city, along with more than 60 research institutions with an international reputation.





That gives us one of Europe's largest and most diverse academic and scientific landscapes. And I am convinced that this also gives us outstanding – perhaps even unique – structural potential and capacity when it comes to research. Strong connections between university and non-university research institutions are possible here. Berlin is a place where disciplinary boundaries can be transcended in unconventional ways and diversity is a source of intellectual inspiration.

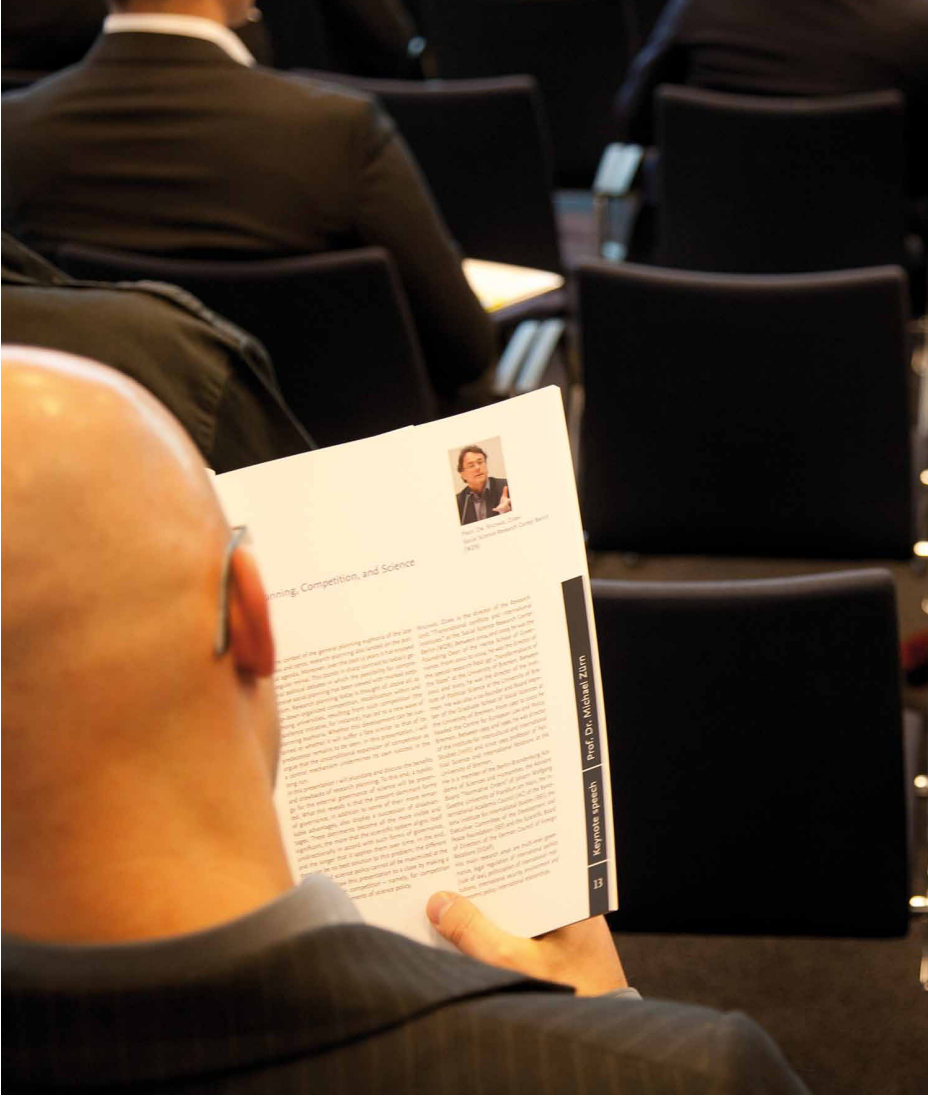
At the same time, cooperation between university and non-university research institutions in particular is becoming more and more important. If Berlin is to remain competitive throughout Europe in research and higher education, it is crucial that we take a strategic approach to research planning. Here, too, I believe that diversity is the best foundation for a strategy of this kind.

In addition, the Freie Universität itself, as a strong research university that also boasts excellent teaching, is an ideal venue for this conference. Under Germany's "Excellence Initiative," it was awarded funding for its long-term

institutional strategy. FU graduate schools and "clusters of excellence" have also been singled out by the "Excellence Initiative." This success demonstrates that the university has set the right course with its strategy, and it also has a very good chance of receiving additional awards in the next round of funding. I would like to take this opportunity to assure you again that the Berlin Senate will support you as you work towards this goal.

We cannot discuss the social, political, and economic development of society without also talking about research, innovation, and scientific advances. What direction is research taking, what should its priorities be, and how can these goals be achieved? It's not just researchers, policymakers, and government departments focused on science who are working hard on the subject of research planning. Rather, interest is growing even among people outside the scientific and academic sector.

The Freie Universität Berlin is an excellent place for intellectually stimulating events, and so I would like to wish you productive conversations and an exciting stay in Berlin, our science capital!



Research Planning in a New Key? A Plea for Reflexive Governance



PROF. DR. MICHAEL ZÜRN / DR. ULRICH SCHREITERER,
Social Science Research Center Berlin (WZB)

I. WW II and Research Planning

Let's go back in history to the fall of 1944. The end of World War II is close. The United States are about to win a gigantic and most important research competition against Hitler's Germany. While in Los Alamos the nuclear bomb is almost ready for start of production, the German effort under the directorship of Werner Heisenberg has faltered. It seems as if state-driven research planning – initiated by Albert Einstein's call to build a nuke in order to curb Nazism – had eventually rescued no less than the future of liberal western civilization.

In that very moment of triumph, Vannevar Bush – Director of the administration's Office of Science and Research Development that had controlled the Manhattan Project, but not a member of the later presidential family – submits a report to the President Franklin D. Roosevelt, in which he strongly advocates free and independent basic research as a major pre-requisite for future progress and success not only in the sciences, but for the U.S. at large. The report's title *Science – The Endless Frontier* is both promising and demanding since indeed it asks government to extend its support for research into peacetime while at the same time drastically reducing its control of the objectives for and performance of research.¹

Two strong assumptions underlie this perspective. First, basic or, for that matter, curiosity-driven science aims at a fundamental understanding, and explanation, of nature irrespective of their possible uses yet not at the solution of given problems. Second, due to trickling-down effects, this kind of "blue sky research" would

become the ultimate pacemaker of innovation, technological progress and social dynamics.

Vannevar Bush's report became the foundational document of U.S. science policy for decades to come. He claimed that both society and science would best be served with a research endeavor unfettered of any outside direction and interference. Science and research should operate as a self-regulating system in which the quest for recognition and reputation would fuel competition and generate achievements. Not only the definition of research goals and the decisions on how to best serve and tackle them should remain in the system's own responsibility, that is with the scientific community or academy, but even more so the assessment of success or failure. The Manhattan Project, Bush argued, had irrefutably proven the power and potential of autonomous science and research that operate independent from political interference and guidance according to their own rules and standards.

This episode shows in the first place that debates about research planning are no recent exercise. It also helps to elucidate what research planning may mean. In a narrow sense, this term points to the identification of priority research goals and topics. In a very broad understanding, it refers to all decisions directly or indirectly affecting content, forms, type and funding of research in universities and non-university research institutes. A third, and probably most common take focuses on the governance of individual researchers and institutions to secure that they are able to successfully address, and tackle, research areas, research puzzles and

research objectives in a way that fits the larger goals of the society.

- On the level of individual research, this “regulative planning” refers to issues like incentive systems and labor relations,
- on that of the universities or research institutions, it deals with organizational structures and features for decision making, resource allocation and accountability,
- and on the level of research policy or national research systems, it has to do with the selection of topics, programs, and agents as well as the provision of funds.

Hence, it seems more appropriate to talk about research governance and different governance paradigms in research planning than just research planning. In the bottom line, research planning always is about how to make the most effective, and efficient, use of limited resources and who is to decide what to do by what means, first and foremost in the sciences and in engineering. In this sense, Vannevar Bush’s strong, and eventually very successful, plea for independent research equals a programmatic statement about the right governance of research planning. It was a timely masterpiece that happened to establish an *independent research paradigm* and to become the ultimate reference point for next to all programmatic statements on the governance of research planning until today.

II. Priests and Shamans

The story of post WW II research planning, however, goes far beyond the paradigm pitched by Vannevar Bush. Today, with the benefit of hindsight we know that exactly in fall 1944, a new conflict between different political systems took off grounds. This time, the so-called communist bloc appeared as an antagonist opponent of the free world. In science, the Cold War of the 1950s and 1960s was carried out on mainly two fields: nuclear energy and space technology. Yet even though the U.S. emphasized independent science in order to underline the superiority of “free science” in a free world, a whole array of „big science projects“ brought tight state planning back into the game. Program-driven big science under the leadership of some ministries, e.g. the Department of Energy (DoE) or newly established „special agencies“ such as the NASA, became the new era’s pinnacle. In the shadow of unregulated or unplanned research under the auspices of the newly established National Science Foundation (NSF), state planned mission-oriented research emerged as a

second, and in terms of resources much stronger, pillar of the post World War II R&D system in the U.S.

In Germany, as of 1955, a similar development took place. The time of big science carried out by federally funded research institutes like the *Kernforschungszentrum* (KfZ) Karlsruhe, the *Kernforschungsanlage* (KFA) Jülich or the *Gesellschaft für Kernenergieverwertung in Schiffbau und Schifffahrt* (GKSS) in Geesthacht had come. These institutes that later merged into the Helmholtz-Gesellschaft stood for the quest of federal government to plan and guide research considered to be of national importance directly, that is not only to allocate funds and garner support, but to decide on preferred topics and to reap research outcomes.

It took three decades until those de-facto developments became somehow programmatic and politically très chic. In the 1970s, advocates of “direct” research planning entered the stage and challenged the independent science paradigm. They were part of a broader movement of participatory claims and rooted in the belief in an almost unlimited capacity to steer society through political interventions, a take which a little later disrespectfully was called *Planungseuphorie* (planning euphoria). Eventually, under the headings of preparing for the upcoming knowledge society and increasing international competition, new political and cultural “framings” for Research & Development (R&D) were put into place that strongly emphasized technology, innovation, and application, conveying a deep mistrust against blue-sky research under the independent science paradigm. The sea change included the rise of the idea of directed research in big organizational units whose spirit the German term *betriebsförmige Forschung* (industrialized research) captured very well. We therefore may call it the *big science paradigm*.

This new paradigm implied a shift of perspective from disciplinary self-regulation through the scientific community to a policy-driven scientific enterprise. It called for continuous monitoring and guidance of research policy, activities, outcomes and performance, for strategic partnerships between public research institutions and the corporate world, and for funding and decision making to be geared to the needs and priorities of what was seen as a National Innovation System (NIS). In its wake, the production (and dissemination) of new knowledge under an uncontested epistemic and social hegemony of academic disciplines got more and more challenged by interdisciplinary,

problem-oriented scientific networks gathered around, and instigated by, real-life problems instead of disciplinary puzzles.

Scientific research came to be seen no longer as some kind of cultural pursuit but rather as a valuable, and indeed seminal, resource for economic growth, social and political welfare. This translated into a shift from *internal* perspectives, or epistemic criteria, for the conduct and planning of research as well as for the validation of research results to an *external* assessment of their relevance and social impact.

The struggle between the two governance perspectives – the big science paradigm and the independent science paradigm – resembles those between priests and shamans.² Priests stand for a conventional bureaucratic top-down organizational approach. They claim leadership and control of capacities, want to avoid failures, strongly resent autonomous bodies, and are out to do away with uncontrolled spheres in spending public money.

Shamans, on the other hand, trust in the power of uncoordinated efforts and the power of self-determination. Leadership may be good everywhere else, yet what is needed in science first and foremost is as much individual leeway and institutional autonomy as possible. Even though such a system will inevitably produce failures, these are but the basis of learning and further discovery that at the end of the day will but help to further strengthen R&D.

By the mid 1980s, the struggle between these two camps bore close resemblance to the one between those who like to complain about market failures and those who like to complain about state failures. In fact, the independent science paradigm had produced quite a number of problems similar to *market failures*.

- Societies which have established organized links between basic research and applied research seem to fare economically better than those cherishing the idea – inherent to the independent science program – that basic research would automatically stir innovation.
- Basic research turned more and more expensive, and even more so often times seemingly irrelevant for value-creating innovation. Thus any responsible spending of public money seems to call for external guidance and control of science and for some stronger problem-orientation of research programs and conduct.
- At the end of the day, no one fully believed in the effectiveness, and even less so

efficiency, of blue-sky research alone. Hence we witnessed the incremental development of what one may call co-existence of curiosity driven basic research governance and big science under a directed mode governance. This has not changed until today: Even the strongest supporters of independent research do not shy away to ask for big publicly funded research programs when it comes to fight against global climate change, epidemic diseases, poverty or environmental pollution.

At the same time, the big science paradigm created problems that were quite similar to those typical for state failure.

- Bureaucratic overregulation hampered innovation and proved to be of significant disadvantage in the accelerating competition for the best minds (“war on talent”) and for research with the most impact.
- The external selection of research priorities had turned out to produce a whole number of significant failures and “white elephants”.
- And after all: Harvard, Oxford and in Germany places like the University of Heidelberg – names which stand for curiosity-driven basic research in the broadest sense – are still considered the world’s best academic institutions that outperform all the new research programs, networks and institutions established and heavily supported under the auspices of the big science paradigm.

III. Four Idealtypes of Research Governance

With the demise of planning euphoria in the 1980s, and with the life sciences eventually taking the scientific lead from physics, the idea of “big science” in whatever form appeared as contaminated, outmodeled, or even discredited for some time to come. In the early 1990s, however, a new move reshuffled the equilibrium between shamans (who, some setbacks notwithstanding, had maintained ideological hegemony) and priests (whose programs and resources had grown much faster than those of the shamans). The new move was about to incorporate science more directly in state-planned research while at the same time indirect, incentive-based steering devices came to replace tight regulations and ex-ante directives in the governance of research planning.

A starting point was the so-called foresight approach that was meant to complement, and enhance state-driven agenda-setting.³ Here, the scientific community got involved in the

identification of research goals, opportunities and deficits through Delphi-studies, expert-surveys and, indirectly, bibliometrical studies. A strategic dialogue between the funding public institutions and the research community was widely used in Japan, but the German BMBF, too, resorted to foresight techniques extensively since the 1990s.

In Germany, however, the decisive step toward a paradigm-shift did not occur until 1993/4, when the Wissenschaftsrat (German Council of Science and Humanities) passed new guidelines to improve strategic planning in the German research system. While some of his other recommendations kept focused on prospection and foresight, they meant addressing the issue of research planning in a new key, that is as context setting. The idea sounds simple, the concept easily doable. By orchestrating the competition between scientific units without pre-selecting areas or topics to be funded with top priority, the academic system and the researchers were meant to keep their independence yet resources would be allocated much more effectively, namely according to performance and outcomes, which would clearly help to raise research quality across the board. While putting interdisciplinary and inter-institutional collaboration on a pedestal, the research fields or programs entering the competition for funds and public recognition remained framed in terms of prospection and foresight, that is embedded in, and somehow or other, geared to strategic outlooks. In the bottom-line, this meant squaring the circle: Science remained autonomous with respect to both identifying most urgent research topics and the best individuals, groups or institutions to process them, and yet the orchestrated competition would provide for a concentration of resources on themes most relevant for the society and economy and on the best research groups. This led to the birth of a new hybrid of research planning governance, the *excellent science paradigm*.

While the controversy between priests and shamans was basically about whether or not research fields and topics could or should be identified externally or internally, the new paradigm of externally orchestrated competition aimed at not to replace, but to curb and at the same time to spur the slow, intransparent and unresponsive competition for reputation the independent science paradigm had praised and drawn upon. That is why the new key appealed to both priests and shamans.

The shamans took it to be a welcome tool to mobilize additional money for research and the research system without forsaking their agenda-setting power. They still decided about the goals and topics, while groups of academic peer reviewers decided about the funding for research proposals and on who would be the best scientists to conduct the research considered important. Hence the new key fitted all principles of academic self-governance, while at the same time it appeared timely and appropriate in that it included strong elements of competition.

The priests could still claim the need to identify most urgent topics for research while it took competition to tell which group would serve those best. They gave up the power to decide whom to fund and put this into the hands of independent evaluation groups. The EU framework programs are an ideal case in point. Similar mechanisms are now used by the Helmholtz-Gesellschaft. This led to another hybrid that may be called the *tender science paradigm*. Taken together, based on two simple questions, we may thus tell apart four different modes of research governance:

- Who defines, and decides upon, research topics and programs?
- Is public research money spend by way of institutional funding or competitively allocated to specific groups according to their measured research performance and quality?

Figure 1:
Four Types of
Research
Governance

	Orchestrated Competition	Reputation as Currency
Research Topics decided upon by Political Bodies or Agencies	EU – FP 7 = <i>Tender Science</i>	Nuclear Research in the Cold War; Race to the Moon <i>Big Science</i>
Research Topics decided upon by Academic Peers	DFG/WR Excellence-Initiative <i>Excellent Science</i>	Max Planck Institutes; Privileged Chairs according to Academic Reputation <i>Independent Science</i>

It is obvious that these different governance paradigms may coexist. To some extent they even depend on each other. Without universities getting institutional funding under the independent science paradigm, there can be no powerful competitors for programs under the excellent science paradigm. At the same time, winners in that race may use the money for new excellent hirings which will further strengthen their competitiveness in the next treatment. Yet while the rationales of these science governance paradigms remain different, and maybe even contradicting one another, they all tend to claim hegemony for themselves.

IV. Did we get it right now?

What we can see here is that the hegemonic governance paradigm in research planning has changed in the last decade: excellent science has made it to that status. The enthusiasm that new programs under this heading, such as the German Excellence Initiative, have met is truly amazing. In the report the German Research Foundation and the Wissenschaftsrat gave to the political body supervising the program in 2009, this reads as follows:

“The Excellence Initiative had great structural and profile-sharpening effects at German universities. It has created supportive research structures and supports interdisciplinary and faculty-crossing networks both within and outside the universities. It has significantly contributed to the internationalization of German universities and non-university research institutes alike. The program has been internationally well received and increases the visibility of German universities for both students and researchers in Germany and abroad. Above all others, younger researchers have benefitted from it. The program also contributes significantly to more equality between woman and man in the university and to make professional and family life more easily compatible” (translation, MZ/US).⁴

Wow! This sounds like an extremely efficient investment of 1.9 Billion Euro – especially when compared to the hundreds of billions used to guarantee loans to rescue failing banks and weak countries. It looks as if finally the squaring of the circle was accomplished. Science helped to send women and men to the moon, so why shouldn't we be able to figure out something like perfect research planning governance? Or, to put it a bit more critically: the praise of the excellence initiative reverberates the language of a hegemonic paradigm full of itself.

In fact, the international recognition the program has earned is truly amazing, and the breath-taking speed at which programs of that kind now mushroom all across Europe and beyond is remarkable indeed. Spain, Norway, Sweden and Australia are just some examples for that trend. Moreover, this type of research planning tends to spread across all levels and sectors of national research systems. Universities and states (Länder) in federal units stage internal competitions to identify stellar research groups to prepare for upcoming global runs for prestige, attention, and achievements in science and technology. As an upshot, almost all additional resources the overburdened, yet underfunded tertiary sector in Germany could mobilize between 1995 and 2008 (28 per cent net growth) were for research projects funded by the German Research Foundation, private foundations, business, ministries or other public agencies. While institutional funding rose by only 6 per cent (including resources spent to organize internal competitions), third party funding jumped by more than fifty percent.⁵ Moreover, non-university research institutions like the Max Planck Society were allowed, and even pushed, to participate in the competitive game, and some of them plan to establish similar steering provisions in order to stir competition among their institutes, to raise their research performance and to pool projects geared to research areas of strategic importance. All this illustrates the power of the new hegemonic excellent science paradigm.

Yet can that really be considered the silver bullet for the governance of research planning? Are society and science truly best served – to use the words of Vannevar Bush again –, when research is organized, and carried out, in competitive rounds of researchers with other academics as referees? To answer this question, one has to look into three sub issues:

- Is there any sound evidence that this strategy is successful and both an effective and efficient tool to organize scientific research?
- Is it an appropriate device for funding research that is needed?
- Is it sustainable, i.e. does it reproduce the conditions upon which it draws to be successful?

Protagonists of the new paradigm cannot but answer these questions affirmatively. However, overstressing excellent research may carry the seeds for this paradigm's eventual collapse by means of unsustainable victories. That is why strings and ties are needed to contain

its hegemony and to hedge against collateral damages: Diversity and pluralism, or so it seems, need be at the core of any research planning governance that wants to be truly effective and successful in the long run at the same time.

Do we have any evidence for comparable success of programs carried out under the excellent science paradigm?

The answer to that is very simple: No, there is no such evidence, at least not yet. Here, it may suffice to refer to the conclusions an interdisciplinary working group of the Berlin-Brandenburg Academy of Sciences and Humanities that had monitored the German Excellence Initiative has reached in 2010. By and large, the group strongly supported the extension of the program because it had, first, mobilized federal money for research at universities run by the German Länder and, second, led to a more than welcome mobilization of energy and a new spirit of optimism at German universities. Yet given the short time period of its operation, it is still impossible to tell whether or not the program has truly helped improve research quality (measured in international standing) or has re-directed research activities to better gear them to the interests of society. There is no reliable empirical evidence at this point to answer these questions.

Against this background, it is, to say the least, irritating to notice that the statement “the excellence initiative is a huge success” is repeated over and over again and so widely accepted without triggering objections or caveats. The frequent mimicry of this program’s features in other countries may serve as a telling case of *isomorphism*.⁶ Whenever an institutional actor considered modern and successful does something, many others will step in to imitate it even if there is no evidence to support the claim or saga, as in our case, that the action or measures referred to did work in the way they were supposed to do or publicly “sold”, as it were. To put it in another way: Fads rather than function drive the wave of research planning governance.

Are these programs efficient when it comes to resource allocation in the research business?

Even if programs geared to the excellent science paradigm could point to successes, this does not necessarily mean that they are also making a most efficient use of resources. It might be doubtful whether the additional 1.9 billion Euros in public money for the first round of the German excellence initiative are a good investment and could not have been

spent more effectively for the support and promotion of R&D. Aren’t there other ways which might have produced better outcomes? Is this program a very efficient tool to stir excellent science and to bolster top-notch research, or does it come at a high cost?

In the absence of reliable data to measure its outcomes, there is no empirical answer to this question. Alternatively, we thus have to resort to some theoretical deliberations. Can there be any doubt that competition is the most efficient mechanism for the best use and allocation of limited resources there is? Not really, at least not as long as we are talking about private goods traded on a market according to the forces of demand and supply. Yet using market instruments in areas that do not readily show features of private goods produces a lot of problems and collateral damages. In such contexts, we have to cope with two problems of efficiency at the same time.

The first one has to do with choosing the right indicators for research quality. The jury is still out on whether those applied in the German excellence program and the decision-making procedures associated with it are suitable or totally inappropriate. It has been suggested to better take to indicators that more strongly reflect academic achievement and scholarly impact such as reputation measures or citations rather than output indicators like successful grant applications or the number of articles published in top journals which have come to be the most widely used yardsticks.⁷

In addition, we have to deal with a more general problem regarding the construction and use of indicators that applies even to the best ones. When goods are not freely traded on a market as subject of demand and supply, no price tag comes up. While markets produce prices at no costs just by the interplay of demand and supply, those applicable in an orchestrated competition such as the excellence initiative need to be artificially created as proxies that refer to indicators for quality which reflect judgments and assessments of peer evaluators. Since the production of these indicators exhausts resources, the manufacturing of “prices” comes at a cost even though we are inclined to assume that it comes for free. This, however, is nothing but a misapprehension that is more than convenient to maintain.

In reality, under the new excellent science paradigm, top ranked researchers spend ever growing amounts and shares of their time to evaluate research proposals and outcomes, research

groups and institutions, to put together ever new groups to collocate promising new research proposals, or to write grant applications. While on average this may add up to 5 to 10 per cent of their total work load in recent years, academics who are in charge of writing large proposals or the PIs of large research groups responsible for putting them to work will have little or no time left for anything else. Of course, most of those academic trailblazers or “enablers” are proud of their success and enjoy seeing their influence and reputation reconfirmed or even growing. But do they themselves gain any time for their research? More often than not, the answer will be a blunt no.

Evaluators and program coordinators do not get extra pay for their work. Rather, it is considered maybe not a duty, but good academic citizenship. So it is true that, literally speaking, their work does not incur extra costs except for some additional travel expenses. But the most busy research coordinators and evaluators are not just any academics or researchers, but should be, and most often indeed are, among the best of the pack. To spend large amounts of their precious time to generate price tags for research projects, proposals or outcomes through deliberated assessments based on indicators, looks like a careless waste of resources and energies, very inefficient or even stupid.

The second reason why competition under the excellent science paradigm does not guarantee for efficiency has to do with the so-called Matthew effect, a term the sociologist Robert K. Merton had coined already back in 1968: “For to all those who have, more will be given, and they will have an abundance; but from those who have nothing, even what they have will be taken away.”⁸ Rewarding those researchers who have already proved to be outstanding and gathered highest academic recognition is the gist of the excellence paradigm. In Germany, universities for a long time operated in a setting which provided for high levels of equality, but tolerated only very low levels of institutional inequality, let alone stratification. It was more or less unimportant *where* graduates had earned their degrees; what mattered, was just the field they had graduated in. Stratificatory differentiation becomes a rational choice option once you want to have two things at the same time: ever more students on the one hand and a strong focus on excellence in research on the other.

Beyond a certain level, however, inequality turns inefficient. As an illustration of what this means, let us take an example from the first round of the

excellence initiative. In the commission that had to make the final decisions, the evaluators liked two groups of proposals from the life sciences a lot: a rather lean one from a group of younger scientist at a less known university in the center of the republic and an already very well known and successful group of researchers from a big university in the South that already had gathered significant competitive funding. In this situation an evaluator from Britain took sides:

“If I were asked to give the money to the group where it would have the highest marginal impact, I would clearly assign it to this wonderful young group of most promising scientists. But I was asked to identify the best, and that clearly is this well known, well endowed group from the big university. So I vote for them, although I doubt the money makes a big difference there.” This decision may or may not have been wrong, but what the decision-making shows is that the most efficient use of resources did not matter for the deliberation, most probably this aspect did not even make it on the screen.

To wrap up: Competitive mechanism for the allocation of research funds that bear no market features inevitably yield inefficiencies. Due to the considerable costs that the finding of prices and long-term repercussions of the Matthew effect do raise, there is no safe bet that orchestrated competition is an efficient mechanism for the allocation of resources.

Does the excellent science paradigm reproduce the conditions upon which it draws?

Since Karl Marx, it is the most elegant formulation of any crisis theory in the social realm to point out that a given societal system may harm or even eat up the institutional bases it needs to become sustainable, i.e. to safeguard successful reproduction. This is the piece of Marxian thinking that even conservative social theorists were ready, and sometimes even eager, to adopt from Marx. In their view, liberal civil society is under a permanent threat of implosion since by itself, it cannot but fail to reproduce the moral values and social norms it rests upon. It looks as if this may also apply to the excellent science paradigm. To put it in more general terms: competitive programs such as the excellence initiative tend to eventually undermine and consume the very conditions they draw upon, that is diversity in both research fields and research approaches and first and foremost equal opportunity.

Let us start with the latter. In order to produce optimal outcomes in the best interest of society, any research competition needs to be fair and

regarded to be a level playing field on which all participants have the same starting conditions. While this ideal can hardly be achieved in the real world, in the punch line it stresses that all potential competitors need to have at least some chance to win. It is not completely implausible to assume that this was the case when the first round of the excellence initiative in Germany took off. To be sure, as Richard Münch has pointed out, bigger and better known universities were most successful.⁹ Looking at which universities are the major recipients of competitive research funds from the German Research Foundations, we find high degrees of stability. In the years from 2005 – 2007, 40 out of 159 that had turned in proposals got 88 per cent of the money. Still, this is no proof for power- and reputation cartels undermining the idea of competition.¹⁰ It is as little surprising that academic institutions with the best reputation were most successful in the competition as it is in sports when the team with the best prior performance wins another run or game.

Yet when we look into the dynamics these competitive games involve, we become aware of a number of problems they entail. Just take the dynamic they do stir *within* universities, that is the accelerated, and self-perpetuating differentiation, or even division, between those professors who carry the burdens of growing student numbers and those responsible for the management of large third party grants and resources. Success or failure with big research proposals can easily turn into a *critical juncture* in that awards are often times expected to continue forever, meaning that universities are inclined to strengthen or bolster successful research fields while cutting resources for all areas with less remunerative outlooks. As success begets success, large scale DFG projects incrementally shift the balance of power between different fields or departments and lead to an ever greater and stable majority of faculty in the more promising fields over all the others.

Moreover, in the wake of the *Matthew effect* this development may easily deprive many professors, especially those at highly successful universities of the time and resources needed to prepare research proposals to enter the competition. Partly due to the shift from institutional funding to project funds, the student-full faculty ratio in Germany has increased to 1:52,8 in 2009 while third party funds per professor had doubled in two decades.¹¹ Assuming that only a third of the faculty are successful fundraisers who can buy themselves off from their teaching load, at the end of the day only two

thirds of the professoriate will take care of teaching and student affairs while the others are busy managing research projects and their third party funds. And this situation is destined to further aggravate more often than the competitive game is played since the 2/3 majority of faculty has fewer and fewer chances to succeed in putting together ambitious research proposals, large groups and top publications needed in order to enter the competition. Eventually, only the top third of universities will be able to do high quality research while two thirds may be excluded from doing so and have no track-record in research that is worth mentioning. In the long run, this undermines the equal opportunity rule as a prerequisite for the effective functioning of competition.

Moreover, competitive science programs like the German excellence initiative undermine the very conditions on which they rest also in another respect in that they may eventually level differences and weaken diversity. The governance mode of orchestrated competition builds on the assumption that researchers are motivated by aspirations to maximize their individual utility and returns. This may be a no-brainer since both the academy and the modern university as an institution do not consist of purely *philosophical minds* who are only driven by strong intrinsic motivations to search for the truth. The truth of the matter is that there are also professors who are – to quote Friedrich Schiller's typology – *bread-fed scholars* who are motivated by little more than just „to meet the requirements to carry out (their) official assignments and can take advantage of it” (translation, MZ).¹²

Clearly, the philosophical mind and the bread-fed scholar are two antagonist ideal-types. In the real world, each and every professor will somehow or other – in different shares – match both of them. Yet the incentive system prevalent under the competitive science paradigm has a clear bias to strengthen the bread-fed, extrinsically motivated type of scholars. We all learn to maximize and game those indicators that count, regardless whether they truly indicate what they are supposed to do.

A first example: The competition for the very first excellence clusters in 2007 took place under a very limited time frame. No one could expect, and even less so manage, to flesh out a new coherent research program for big groups of scientists within just a few weeks. In a way, everyone was fully aware of the fact that the competition was set up as a game whose purpose it was to find out which capturing group could



credibly create the impression that they were intrinsically motivated academics driven and fascinated by an innovative upcoming research opportunity. Ridiculing its pathetic excellence rhetoric, this game panned out very well.

The proposals submitted for the second round above all illustrated how fast and successful individual academics and research institutions do learn. In the meantime, a flourishing consultancy industry for writing research proposals has emerged both within and outside the universities, as it has been the case earlier with respect to EU programs. Yet since that business has come to look much alike everywhere and become highly standardized, proposals tend to look very similar over time. What we see now is little more but some repackaging of components and ingredients that have proved to be successful elsewhere. Differences tend to dissolve, everything tends to look much alike, if not identical.

This trend becomes even more obvious when one looks at the calls to come up with salient organizational features to support excellent research which would allow for the university itself to be considered an excellent institution. In the beginning, the proposals differed widely; among them were intellectually sound, ambitious plans, but also quite a few shallow or bad sketches. In the second treatment of the first round, however, all plans submitted had become very similar, interchangeable with respect to format, design and content. All embraced a strategy for internationalization, bet on establishing centers for advanced study and for supporting junior researchers of faculty etc etc.

This means that the proposals and indicators meant to help the evaluators separate the wheat from the chaff are losing their predictive power and value over time. The longer the competition goes on and the more treatments there are, the more standardized (and predictable) the exercise will become and the more the quality of indicators will deteriorate. It goes without saying that the evaluators do learn as well and may become ever more sophisticated in playing the game and separating good presentation from good content. Nevertheless, the looming demise of variation and difference makes their job ever harder and increases the likelihood of misjudgments.

Moreover, it may help the bread-fed faction of scholars gain the upper hand in universities and make life for the philosophical minds a lot harder. Research organized as large networked projects most often is exactly the kind of research that *can be organized* this way. Hence we may witness some very powerful mainstreaming trajectory in research and science that will definitely weaken all those who do not fit the standardized model very well. As a result, solid but uninspired mainstream research will get leg-up in comparison to risky research.

By undermining equal opportunity to successfully participate in competitive treatments under the excellence science paradigm and by creating an industry for nice but meaningless promotions that favor mainstream research strands and work, orchestrated competition for large scale research projects may turn out not to be sustainable. It could well be that this governance mode finally eats up its own hotbeds.

V. Reflexive Research Planning

Are society and science best served by the new hegemonic governance mode of research planning? On the basis of theories of governance, this seems more than doubtful. Instead, there are many sound reasons to assume that orchestrated competition will generate significant inefficiencies and side-costs that put a heavy burden on the whole system. Most importantly, however, it looks as if this governance mode is not sustainable but will undermine and eventually leverage difference and equal opportunity, the mother and father of any competition.

Bringing this to mind so outspokenly does not imply a plea for any other of the four governance modes of research planning to gain hegemony. Direct research planning and call for tenders to address pre-defined problems or research topics have to cope with problems no less severe than the ones the excellent science paradigm carries – rather to the contrary. And a return to Vannevar Bush's independent science paradigm would be a tough story to sell since the costs of research have already ballooned to unsustainable growth rates while there are many other competing claims for public money.

In the upshot, Vannevar Bush's question – which mode of research governance serves society and science best – requires a reflexive answer. Only the absence of hegemony can work in the long run. What we need is competition, but above all, a *competition between different modes of governance in research planning*. Without such a competition, we will squander and lose the possibility to learn which – after all – still is trial and error facing an open frontier. In this sense, calling for a balanced and plural governance approach that engages competition, but only as an embedded treatment, may not only be the right thing to do, but called research planning in a new key.

The practical implications of this counter-hegemonic turn depend to a large degree on different contextual setups and implications. The call to balance different governance modes against one another is very abstract and needs to be laid out more specifically. In the case of Germany with more than enough orchestrated competition already, however, it is fairly clear what is missing: a fresh dose of independent science governance in order to restore balance that would allow orchestrated competition to play an effective and efficient role in a sound mix of different governance modes.

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- 1 Vannevar Bush, 1945. *Science: The Endless Frontier*, Washington, online available at: <http://www.nsf.gov/od/lpa/nsf50/vbush1945.htm>.
 - 2 See A. Richard Newton, 2001. *Research Planning in an Era of Hyperchange*, presentation at the conference *Electronics for the 21st century: Trends and Challenges*, Rome, June 7 – 8, 2001.
 - 3 See also Carsten Dreher, 2011. *Foresight and Planning in Scientific Research?*, presentation at the conference *Planning Research for the Future?*, Berlin, October 14, 2011.
 - 4 See Deutsche Forschungsgemeinschaft and Wissenschaftlicher Rat, 2008 *Bericht der Gemeinsamen Kommission zur Exzellenzinitiative an die Gemeinsame Wissenschaftskonferenz*, Bonn, p. 5, online available at: http://www.wissenschaftsrat.de/download/Exzellenzinitiative__Analyse/exini_GWK-Bericht-%5B1%5D.pdf.
 - 5 See Wissenschaftsrat, 2011. *Neuere Entwicklungen der Hochschulfinanzierung in Deutschland*, Berlin, online available at: http://www.wissenschaftsrat.de/download/archiv/VS_Bericht_Juli_2011.pdf.
 - 6 Cf. John W. Meyer, John Boli, George Thomas and Francisco Ramirez, 1997. *World Society and the Nation-State*, in: *American Journal of Sociology* 103 (1): 144 – 81.
 - 7 See Michael Zürn, 2010. *Ein Rückblick auf die erste Exzellenzinitiative – Es geht noch besser!*, in: Stephan Leibfried (ed), *Die Exzellenzinitiative. Zwischenbilanz und Perspektiven*, Frankfurt: Campus, 219 – 229.
 - 8 Matthew 25:29, New Revised Standard Version.
 - 9 See Richard Münch, 2007. *Die akademische Elite. Zur sozialen Konstruktion wissenschaftlicher Exzellenz*, Frankfurt a.M.: Suhrkamp and Richard Münch, 2011. *Akademischer Kapitalismus, Über die politische Ökonomie der Hochschulreform*. Frankfurt a.M.: Suhrkamp.
 - 10 Katrin Auspurg, Thomas Hinz and Jürgen Güdler, *Herausbildung einer akademischen Elite? Zum Einfluss von Größe und Reputation von Universitäten auf Forschungsförderung*, in: *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 60 (4): 653 – 685.
 - 11 Silke Gülker, 2011. *Wissenschaftliches und künstlerisches Personal an Hochschulen: Stand und Zukunftsbedarf*, Frankfurt: Gewerkschaft Erziehung und Wissenschaft, p. 25.
 - 12 See Alfred Kieser, 2010. *Unternehmen Wissenschaft?*, in: *Leviathan*, 38 (3): 347 – 367. .
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Foresight and Planning in Scientific Research?



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The question of whether it is possible to plan the process of scientific research has accompanied discourses between universities or research institutions and legislative bodies for some time. It is worth revisiting due to the growing importance of science and research results for contemporary society. Research as a process of investigation by the individual and/or societal actors can happen according to chance – or it can be specifically organized.

This contribution shall analyze the new challenges facing science and research today and attempts to formulate new questions the current science system needs to address. Furthermore, it will look at the method of foresight as a possible tool for navigating the unknown territory of research planning.

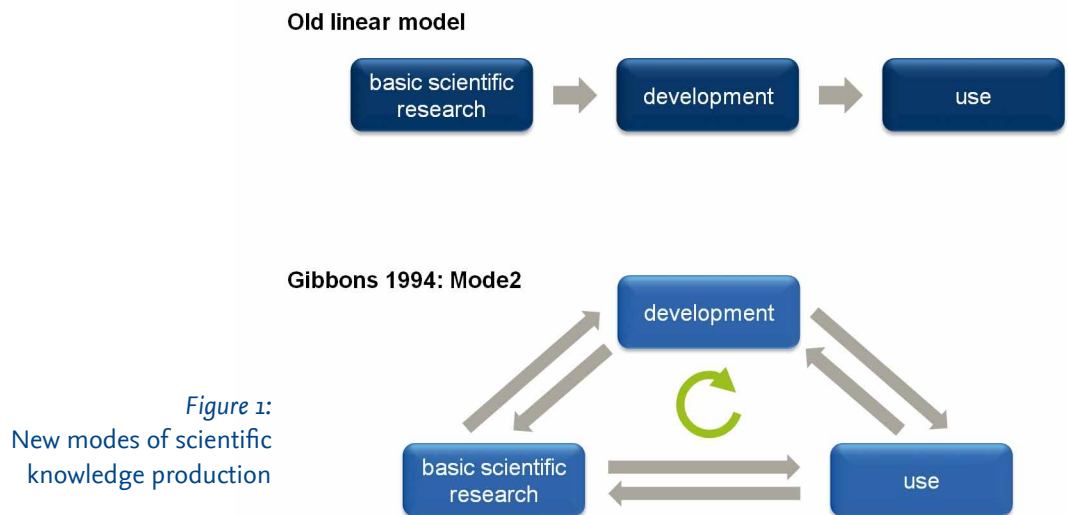
In the current university-based model of research, the individual scientist performs research within a system of local and national peers. Besides that, others can be characterized as researchers with specific tasks who work in mission-oriented research institutes, in applied research or in industry. Knowledge generated by research creates societal surplus in the form of spillovers, for example in education or technology transfer. One main aspect of this model is the free interplay and exchange of topics, data, opinions, methods, tools etc. In his celebrated 1919 speech “Science as a vocation”¹ Max Weber referred to science and academic life as a game of hazard. He argued that in the development of university careers, “chance does not rule alone, but it rules to an unusually high degree”. The “collective formation of will” can perform selection processes only insufficiently,

he stated. Furthermore, the decision over academic fates is also largely a matter of chance because of the double aspect of university careers: the academic must qualify “not only as a scholar but also as a teacher. And the two do not at all coincide.”

The general university-based model just described gives rise to new challenges and new questions requiring an answer. Challenges occur in terms of the nature of science and knowledge production, but also with regard to the globalization of science systems and new forms of governance for the science system.

Concerning knowledge production, increasingly complex processes are replacing the old, linear model. According to the latter, the results of basic scientific research are introduced almost immediately into the development process, which turns them into useable products, processes, ideas etc. There is a clear distinction here between research and application development. New modes of knowledge production, such as Mode 2 described by Michael Gibbons² are based on the mutual influence of the three major aspects basic research, development and use. “Knowledge results from a broader range of considerations”³ and “is always produced under an aspect of continuous negotiation, i.e. it will not be produced unless and until the interests of the various actors are included.” Knowledge production in Mode 2 “is the outcome of a process in which supply and demand factors can be said to operate, but the sources of supply are increasingly diverse, as are the demands for differentiated forms of specialist knowledge.”

The combined science-technology cycle⁴ serves



as an example here to illustrate the growing complexity of knowledge generation and – in the case of natural scientists – its link to technological development.

In summary, the new modes of scientific knowledge production can be characterized by a) transdisciplinarity through method transfer, b) an acceleration of output, interaction and proprietarisation, c) an “industrialization” of scientific research, and d) the existence of new boundaries between “natural” and “artificial”. It can be argued that the new modes of knowledge production have contributed to the increasing success of science and its growing societal and economic importance.

A growing trend that can be observed is the globalization of science systems. Researchers and institutions create individual international networks but, interestingly, global science hubs have emerged as well. According to a study by van Raan⁵ based on a measurement of global publication density in all scientific fields, these hubs can be observed on the West Coast and, more strongly, on the East Coast of the United States of America. Western Europe and Japan can also be considered as hubs, while there are emerging science clusters in South Africa, Latin America, China and Australia. A very recent Royal Society report, however, comes to the conclusion that “the landscape is set to change even more dramatically if current trends continue”. China in particular is expected to surpass the US as the leading producer of research publications before 2020.⁶

A different picture emerges when looking at publication intensity, especially of scientific and technical articles per million people. According to a 2007 study by the World Bank, the top five countries that have produced the most scientific

articles per million people are Switzerland, Finland, Israel, the Netherlands and the United Kingdom.

The Royal Society has not only analyzed the scientific activities between nations but also within them. The trend towards an uneven distribution of publication hubs compared to publication intensity per million people continues on national levels. “In the USA in 2004, more than three-fifths of R&D spending was concentrated in ten states – with California alone accounting for more than one-fifth. In most countries there is a degree of concentration of research activity in particular places. Moscow accounts for 50% of Russian research articles; Tehran, Prague, Budapest and Buenos Aires each top 40% of their national outputs, and London, Beijing, Paris and Sao Paulo are each responsible for over 20%. Among the most prolific publishing cities, Nanjing has leapt 66 places into the top 20 since 1996 to 2000.”⁷ In view of these different tendencies, it will be difficult to predict the further development of international science systems. However, the general trend towards international peer networks is indisputable.

Various countries have created more sophisticated instruments of research funding and support as a reaction to these trends. These include excellence initiatives, for example in Germany, that facilitate the development of new forms of cooperation within the science systems or of other innovative research concepts. In addition, a reduction of the division of labour can be observed in national science systems as well as a strong increase of international cooperations. Considering research plans and programs, the increased readiness for joint programming and planning activities can also be regarded as a reaction to the globalized science trend.

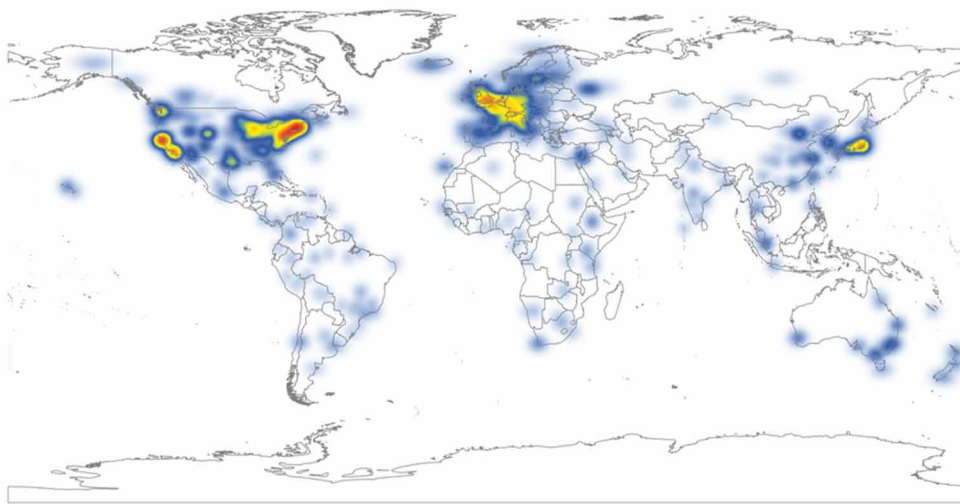


Figure 2:
The globalization of
science systems.
Publication density,
all fields, worldwide

Source: van Raan,
Measuring Science, 2009⁸

In the globalized science system, tremendous investments have been made and catching-up processes initiated outside of OECD countries. Especially in the southern hemisphere, international collaborations on a “south-south” basis have increased. Overall, the new science systems are administered by different governance regimes. The question that immediately springs to mind is: What will happen to the old governance regimes? Will they slowly disappear? Will they be merged with new ideas for the governance of science systems? This remains to be seen.

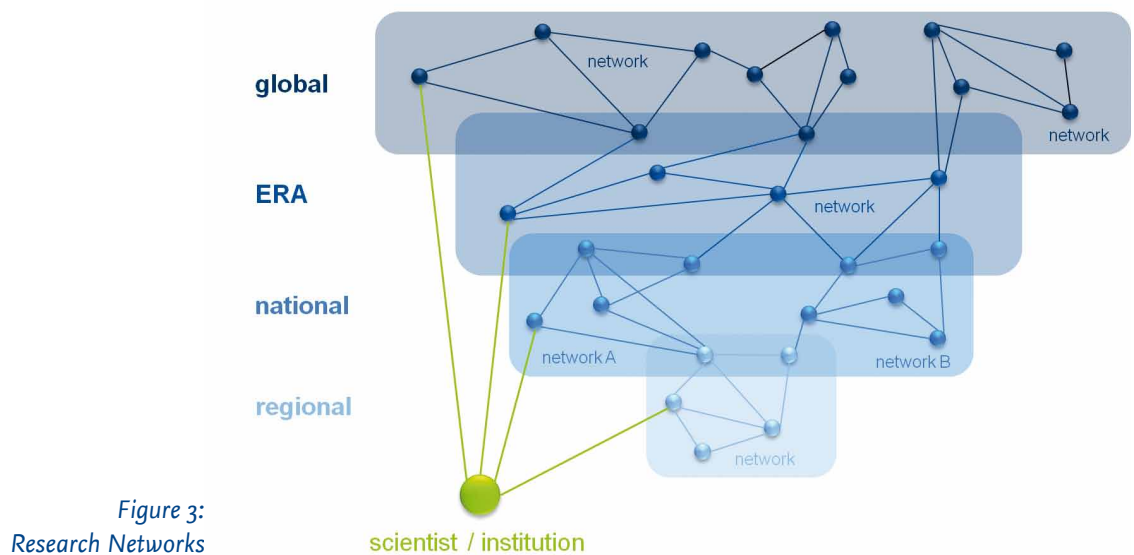
Governance in the European Research Area will be subject to change in the forthcoming years, initiated by the European Commission. The creation of a European Research Area (ERA) was proposed by the European Commission in 2000 and was endorsed by the EU shortly afterwards at the March 2000 Lisbon European Council. The Framework Programmes for Research have an important impact on the research landscape in Europe. Currently, new legislation is envisaged by the European Commission.

The successor of the current Seventh Framework Programme will be called Horizon 2020, starting in 2014. The support of applied and innovation-related research will play a major role whereas support for social sciences and humanities will diminish. A recent communication by the European Commission illustrated a new understanding of the role of universities, which are to serve as producers of human capital and stronger stakeholders in regional development.⁹ Generally, as a report by the German Science Council of 2010 suggests, re-arrangements of the actor on various levels occur as a reaction towards changes in research policy decision-making. “The internationalization of

science policy is another dimension insofar as it creates supranational science-policy actors (especially at European level), on the one hand, and forces national and regional science politics to consider European or international developments in their decision making.”¹⁰ Such re-arrangements affect integration processes at local, regional, national, European, international level and even on a vertical level.

The individual scientist or institution is usually integrated into a sophisticated research network consisting of several layers, ranging from regional and national cooperation, to networks in the European Research Area, to collaboration on a global level.

Within these individual networks of global partners, a good overview of personal strengths and abilities and those of the respective partners is indispensable, particularly in view of the increasing dynamics in the relevant research fields. A certain amount of “strategic intelligence”, meaning the ability to identify and interpret future developments and challenges may also be required. These aspects affect the researchers within their research fields as much as research institutions and organizations as they facilitate the identification of possible courses of action. In order to determine the lead times for monitoring developments, the institutions should have sufficient knowledge of the development times relating to their own abilities and routines. Depending on the complexity of research projects and the degree of involvement of external partners, a planning process has to be ahead several years. Furthermore, the research institutions should include options and different scenarios into their planning activities. Taking a closer look at the methods of foresight and forecasting, which are necessary elements

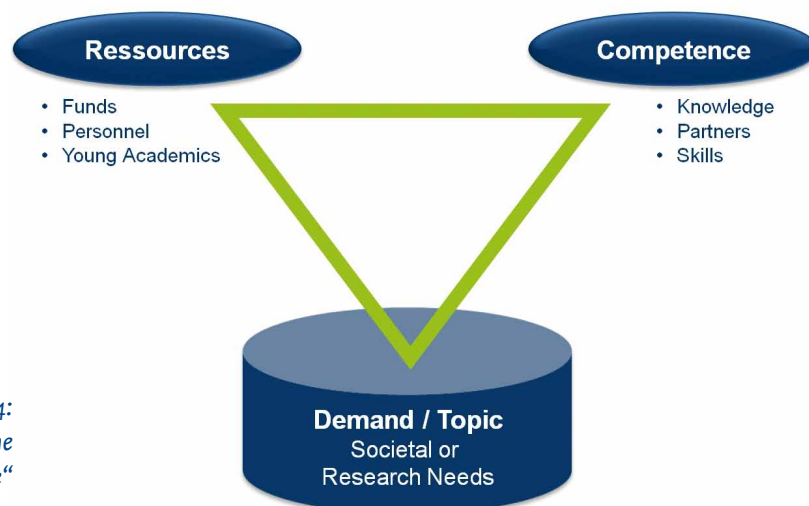


in the above-mentioned planning processes, institutions depending on external cooperation should develop a structured mutual discourse as an effective instrument for exchanging expectations about the future and as a means for discussing and possibly influencing opinions. Future research planning starts with determining the knowledge required for future research in a structured manner, especially in terms of topics, structures, societal challenges and developments. In a second step, scientists, administration representatives and, possibly, external partners discuss these challenges and intensify their discourse. Throughout this process, particular attention should be paid to the input of experts and analyses, but intense communication and discourse activity are particularly important. After a final comparison with the available resources and assessments by the partners, possible measures can be submitted to the decision-making bodies. In contrast to

companies, research institutions publicize their research planning debates after conclusions have been reached.

Leaving the top-down perspective, the challenges for individual institutions and scientists become apparent in this increasingly internationalized context. Often, they have to deal with increased complexity, sometimes accompanied by a certain amount of confusion. They need to re-orientate themselves among a growing share of “programmed” research agendas and have to be accountable to a growing variety of stakeholders. On a more individual level, the time budgets of individual scientists are ever more filled with writing application and evaluation reports.

This is a highly dynamic environment, in which the interrelationship between competence, resources and topic can be best described as a “dynamic triangle”:



There is a new need to manage the complex interrelations in research. Based on the decision to perform basic research or research directed towards societal demand, it is necessary to organize the different competences such as internal knowledge, cooperation with partners but also management skills. The basic constituting element is generally the striving for scientific excellence. Resources, particularly funds, have to be mobilized continuously out of the various science systems. The choice of personnel and support of junior scientists in particular is of great importance for the performance of future research.

For all three elements, the respective actors have to perform similar key tasks. They comprise of a) the identification of resources, competences, topics/demand, b) the joining and aligning of forces, c) choosing suitable resources, competences, and topics/demand and, d) supporting and mobilizing each other. In this dynamic context, foresight and discourse activities can provide orientation and support planning processes. Almost all actors in the science system have already used foresight activities at some stage to aid their own orientation and to design discourses with stakeholders and partners. Among them are research institutions (e.g. the Fraunhofer Gesellschaft), ministries and parliaments (e.g. the German Federal Ministry for Education and Research) and research associations (e.g. the European Science Foundation). Those who understand these interrelations in research have the opportunity to develop clever ways to exploit the existing systems of governance in order to let them feed into the research they really want to do.

Universities face specific challenges because internal processes are inherently much more bottom-up. Internal discourses between scientists, administration and management and external discourses with partners or funding bodies often run parallel to each other. Furthermore, a specific area of conflict emerges between scope on the one hand and foci on the other. Universities are often required to have a big topical scope, also including smaller fields which are less important for research organizations. The requirement to create particular foci at universities developed out of the growing trend towards specialization. A further challenge for universities is the demographic development, as they need to address questions concerning the ageing population and adapt their education offers to its needs in the context of lifelong learning etc. Strategic foresight and discourse activities can help initiate corresponding developments in a structured way.

In summary, it is necessary to emphasize once more the increasing complexity created by the outlined challenges and the resulting need for strategic orientation on all levels. Internal and joint discourses including the scientists on these issues are certainly required. The use of foresight tools to gain more orientation may help, if they feed into the discourse. However, it is necessary, if not crucial to create a balance between scope, which ensures diversity in an institution or field, and foci, which ensures the strategic emphasis on core topics. Foresight may help – if methodologically sound, properly applied, and used for discourse and joint strategy development.

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Workshop I: Identifying Demand

a) Societal Challenges as Research Questions – From Demand to Research Project

DR. KERSTIN CUHLS, Fraunhofer ISI and Universität Heidelberg

PROF. DR. ERIKA FISCHER-LICHTE, Freie Universität Berlin

DR. HEINRICH HÖFER, Federation of German Industry (BDI)

DR. MARIA JEPSEN, European Trade Union Institute Brussels

DR. MARKUS MÜLLER-NEUMANN, BASF SE

Facilitator: PROF. DR. WERNER VÄTH, Freie Universität Berlin

The workshop focused on examining the extent to which societal challenges could and should be considered in science and research. Participants from universities, research institutions and industry discussed how the process could ideally be set up in order to enable a transfer of these societal needs into research.

Foresight

Kerstin Cuhls opened the workshop by presenting the foresight perspective on the possibilities of identifying research demand. To clarify what foresight is about and what it is not about, she stated five characteristics: 1. Foresight is not planning; 2. Foresight is not prediction; 3. It can be a step in planning, but it is more about alternative thinking and looking into the future; 4. It is about bringing stakeholders together, and 5. There is always an alternative. So even though it is unlikely that a research process can be strictly planned, it is possible to look at what will be demanded in the future and to define it to a certain extent. Translating demand into research and application is a complex process with many intermediate steps. But although it is difficult to predict in which direction research will later develop, the starting point should already include a long-term perspective.

Interdisciplinary research

With regard to the topic of the workshop, Cuhls pointed out that societal challenges require interdisciplinary or even transdisciplinary research. This also includes translating the terminology of the different disciplines since it is often very difficult for them to understand each other and even more difficult to reach “common understanding”. People who are able to cross the borders between pure science, research, innovation, and application on the one hand, and between the different disciplines on the other are urgently required. Foresight is one of the attempts to bring these people together.

An example of the necessity of translation and cooperation is the field of e-mobility, which is interdisciplinary per se and involves research in all fields including technology, natural and social sciences as well as the humanities. Everyone involved in this process has their own perspective on the same issues. The question is how best to integrate these different perspectives for collective discussion. A new methodology has yet to be developed that combines all these aspects.

In view of the above, it is certain that researchers who perform interdisciplinary work will follow a different academic career path from the one considered “normal” in the last decades. There will be completely different tracks in the biographies of scientists, researchers and developers. But it is predictable that these kinds of careers will be normal in the future and it may even become necessary to redefine our understanding of an academic career.



left to right: E. Fischer-Lichte, K. Cuhls, M. Müller-Neumann, M. Jepsen, H. Höfer, W. Väth (Facilitator)

Megatrends vs. fashion trends

Markus Müller-Neumann drew attention to the influence of megatrends in social development on defining which research questions are important today. Megatrends are always long-term developments that started in the past and can be traced over years. They are characterized by the fact that they are global, are sometimes driven by both technology and societal demands, that they affect everybody and, last but not least, that they can all be extrapolated into the future. Examples of today's megatrends are demography, energy, housing, mobility, and communication. It is important to distinguish megatrends from mere fashion trends which depend more on zeitgeist phenomena than on long-term developments. And we do not know when the curve of a megatrend "breaks".

The role of industry for science and research

Another topic in Müller-Neumann's talk was the role of industry for science and research. He pointed out that there is multifaceted and highly productive cooperation between industry and academia. Application-oriented basic research is conducted at universities and, especially in Germany, at research institutes like the Max Planck Society, whereas applied research & development and translating R&D results into innovation is a task of industry. R&D cooperations between academia and industry thus serve as a bridge between basic research and innovation. Open innovation is an increasingly common form of cooperation. Both sides have something to give each other, which leads to a win-win situation. The intended EU programs ("Horizon 2020") give priority to the "grand challenges", which are strongly linked to chemistry. The chemical industry is an innovation engine, acting along the whole value chain. Müller-Neumann also pointed out that research and development need time, so it is necessary to start today in order to have new products and innovative solutions tomorrow. For all of this, good scientists are needed, and enthusiasm for innovation-promoting work in the fields of science and technology has to be raised in Germany as well as for technology acceptance.

A new scheme for university financing

In his talk, Heinrich Höfer made the point that while scientists want to do basic research, society wants innovation and new results from the scientists. A financial scheme is therefore required that brings together what is wanted with what is needed. Höfer proposed a university financing model with a 60/40 sharing of costs. This means that 60 % of the budget would come from outside and the universities would have to compete for the rest. The 60% share of financing would come from project funding from public funding institutions (e.g. DFG), and from program funding by ministries and the EU. In contrast, the other 40 % of the university funding should be completely free so that the university is able to decide on this part of the funding on its own. This would give them the autonomy to choose their own structure as well as salaries, organizations, investments etc. on a truly free basis. It would thus be possible to strengthen the mechanisms which are already in place as well as opening up new ways of meeting these needs. With such a funding model, the already existing knowledge society could be complemented by a much-needed knowledge economy.

The role of trade unions

The diversity of the roles of trade unions in the context of research demand and the varying perception in different countries was the topic of Maria Jepsen's talk. For trade unions, research is not part of everyday work, but research certainly concerns everyday life. Since public funding is decreasing, money has to be used efficiently. The trade unions play a role in the important process of determining which actors identify and define the relevant demand and who decides on the relevant projects later on. One of the keywords in this debate is "excellence". But as Jepsen pointed out, the notion of excellence is not well defined. One should be aware of the fact that science per se is not excellent. Jepsen sees time as another major conflict in the process of defining demand. Quick answers are often demanded and academia cannot provide them because scientific answers take time. This is why academics are often accused of being too slow and lagging behind the times.

The perspective of humanities

Erika Fischer-Lichte discussed the problem of research planning from the perspective of the humanities. She questioned the potential of research projects in the humanities to respond directly to certain cultural or social problems. She defined the contribution of the humanities as their capacity to thematize particular problems resulting from new developments and raising public awareness about them. In a multi-cultural society in particular, the creative potential inherent to this multiculturalism must be examined. It is the task of the humanities to bring the different perspectives to bear on such issues. In a globalizing world, these different perspectives have to be made comprehensible and fruitful for societies. It is therefore no longer an exclusively national approach which is demanded from the humanities and social sciences, but a transnational and trans-regional one. This is an appropriate response to problems posed by globalization.

summarized by CCD



DR. KERSTIN CUHLS, Fraunhofer Institute for Systems and Innovation Research (ISI), Karlsruhe

The demand for research to meet the societal challenges of the future is obvious. The first question to be posed is what are the societal challenges of the future? The second question concerns the translation into research: it is not possible to have a clear progression or even cascade from identifying the demand via research to practical usage. The transfer needs different „translation“ steps.

Some of the obvious challenges (some are even megatrends underlined by historical and present data) are rather long-term and develop in such a way that we do not notice the changes. In these cases, it is very difficult to identify the „real problem“ and if it is identified, often a combination of implementation and research is required. Political attitudes and an attitude of „I am not concerned“ hamper early action instead of late reaction. One old example: demographic change, which is a development but not a problem per se. It can evoke different problems with huge impacts. Research is still needed, but more already known measures should be implemented. Universities also need a division of labor and priorities of their own in these cases.

Societal challenges are not easily identified. Changes in science and technology can be (more often) estimated, because they are projected. But society's reaction to, or after technological

changes (imagine mobile phones) or economic changes (to save or spend money?), acceptance issues (acceptance of new patchwork family structures) cannot be predicted. At the moment when new developments occur, scenarios can be drawn to discuss the alternatives, possible and even desirable futures. This is foresight, but not prognosis and therefore still harbors uncertainties.

Some (better: most of the) challenges need interdisciplinary research – and often even basic science. But as researchers tend to „defend“ their own field and often do not speak the same „language“, it is difficult to work together, although everybody assumes that there will be progress when this cooperation is successful. One example: education. There are many research results from brain research, some are just as expected, and there is considerable experience from pedagogics, didactics and even psychology or practical teachers. Both sides could learn a great deal from each other – but that requires a certain readiness to accept the other's language.

My personal opinion: Very basic science is also needed – the demand is not always clear in all cases right from the beginning. Without free thinking, we will lose ground.



DR. HEINRICH HÖFER, Federation of German Industry (BDI)

Social Challenges as Research Issues – from needs to research projects?

Science and social needs are in continuous interaction. Society is always looking for new ways to overcome shortages but science and other players in society like entrepreneurs find the solutions. New discoveries create new needs.

To make this interaction as efficient as possible the knowledge society needs a well-organised knowledge economy in which research does not stand apart from society or the economy but is an integral part of the knowledge economy. Research provides insights, perspectives and proposals for solutions and simultaneously addresses society's issues to help find solutions, as well as providing various options for solutions.

As regards public research at universities and non-university research institutions this interactive process depends mainly on autonomy and competition. Autonomy relates not least of all to the research programmes and the recruitment and remuneration of researchers, as well as the facilities. Competition also relates to the financial resources in particular.

To ensure intensive interaction between science and society, including the business sector, through competition for financial resources, business believes a financing model which could be implemented more effectively is essential. The core behind this is that the so-called basic financing - which the various

public institutions use as they see fit - is allocated according to the success achieved in the competition for research projects in scientific self-management (German Research Foundation) or in competition for state research programme projects or for cooperation projects with business and contracts awarded by business. Linking research funding to payments of students at universities could also be integrated into this. Similar effects could be achieved to a lesser extent if research institutions were to be given complete freedom to operate on the research market regardless of the distribution key for public funding. But good governance requires comprehensive competition as a control-mechanism.

Particularly close integration of society and public research is to be expected from the French fiscal research funding model which grants a tax bonus to all private sector research, doubled for cooperation projects and contracts with public research institutions.

In such a system, research planning is conducted by the political stakeholders in research funding programmes, cooperation partners and contracting entities and - last but not least - the public research institution researchers themselves – partly with a view to attracting potential partners and contracting entities, including those of the state and the business sector.



DR. MARIA JEPSEN, European Trade Union Institute, Brussels

Research and innovation are being promoted as the providing the solution to many of the main challenges faced by the world, bringing anticipated benefits, increased competitiveness, prosperity and better jobs. European policy-makers stress the Europe 2020 strategy and their commitment to research and innovation as the future for European development. This view has been widely promoted by various economic as well as societal actors (although increases in actual public research expenditures barely reflect this). However, the acceptance of the economic benefits of research does not go hand in hand with the acceptance of research as being solely beneficial for society in general. A RTD Info article suggests “People are not confident that the ‘sound science’ approach – a scientific assessment of risks and benefits with decisions made solely by the experts – is necessarily a guarantee of the best choice for society”. While European publics are not questioning the scientific information as much as they are actually questioning the institutions generating it (a lost confidence in business, government and the academe), they tend to perceive research to be good when it solves problems and is relevant to people’s lives – when research is useful to society, and not just in an economic sense. Too often though, researchers are perceived to be addressing issues that the public may not necessarily consider as beneficial to society. In the face of this paradox of perceiving science as the solution but doubting in the manner that the funds are being spent; rethinking the interaction between the science community and societal actors becomes a key issue.

Researchers are reacting to public concerns about the direction and potential outcomes of their work (eg, fears about biotechnology, medical research, food safety and nanotechnology) by increasing their efforts to communicate to non-specialists. While this is a necessary practice, such communication has often had limited success, and has, in some cases, even exacerbated public risk perception of research-based developments. Science communicators have been concentrating on finding ways for the public to ‘accept’ the research agenda, without sufficiently fostering a meaningful exchange. Other actors, with non-scientific perspectives, may not have the same priorities and value systems as researchers, so merely communicating better what science is doing might not be sufficient and could even be antagonising. A way forward is to create forums for interaction between the various actors in order to exchange and dialogue on societal relevance of research agendas, allowing for both communities to benefit from being challenged on the research questions they raise.

A key issue that arises within the complex interaction between science and societal actors is “who is the expert?”. While this question can be clearly answered at the extremes, there remains a grey-zone and overlap that should be exploited in a fruitful manner for societal actors as well as scientists. This requires a mutual respect and understanding of the roles and responsibilities of all actors. Creating a research system that can enable this interaction requires stable institutions, engaged and empowered actors.

Trade unions in certain EU member states have a long standing tradition of engaging with the science community with both positive and negative outcomes. It does however remain fragile in many countries.

In the light of scarce public resources and well as the continued political emphasis on science as being able to provide an answer to societal challenges, the importance of establishing and maintaining fruitful dialogue between the scientific community and societal actors will only grow. It might however be the right time to rethink how this interaction is brought about and what the resources to sustain this dialogue might be.



DR. MARKUS MÜLLER-NEUMANN, BASF SE

Megatrends are large and enduring changes which affect our daily lives, and consequently, our needs and demands; they also affect many industries. These megatrends are: Growing and Aging Population, Urbanization, Energy Demand and Climate Protection, as

value chain starts with basic research in academia, followed by industrial R&D, and finally converting the scientific and technical results into successful market products, processes and services. Cooperations between universities and industry, and between suppliers and customers are an essential building block for knowledge generation and transfer.

Successful research combines market impulses with scientific insights into innovative products; i. e. “technology push” and “market pull” complement each other. BASF – the Chemical Company, is a research-based transnational company, serving customers and partners in almost all countries of the world; and innovation is its life blood. BASF has spent approx. 1,49 bn Euro on R&D in 2010, the highest amount for chemical R&D worldwide in a company; and it will further increase this sum in 2011. BASF has more than 9,600 employees in R&D at more than 60 sites worldwide. Innovations are the result of global teamwork within BASF and close partnerships with academia and customers in about 1,900 R&D collaborations worldwide.

Five Growth Clusters (Nanotechnology, White and Plant Biotechnology, Raw Material Change, Energy Management) address the megatrends and develop materials and solutions for global challenges in energy and resources, mobility and communication, health and nutrition, as well as housing and construction.

A strong knowledge and science base is vital for the successful future of Europe. This strong base needs a culture of innovation to generate wealth for Europe. We, the society as a whole, need to be open for innovation and progress. Better public understanding of science, improved technology acceptance, innovation culture and lifelong learning are key issues. All items form integral parts of BASF’s sustainability strategy, i. e. aligning economic success with environmental and social responsibility. This will ensure long-term business success.

Research planning is an integral part of innovation management. It comprises a bottom-up approach on project level as well as top-management guidance. Phases and gates control the projects, with an open idea-finding process in the beginning, followed by a thorough and repeated project assessment (“business case”) and focused project work from laboratory to launch.

The presentation will give examples on BASF’s R&D strategies, structure and processes.

Workshop I: Identifying Demand

b) And who asks us? – Students and Junior Researchers

WILLIAM OMAR CONTRERAS LOPEZ, University of Freiburg

PROF. DR. CHRISTIAN HACKENBERGER, Freie Universität Berlin

DR. CORNELIS MENKE, Die Junge Akademie

Facilitator: DR. DAGMAR SIMON, Social Science Research Center Berlin (WZB)

The workshop focused on the role of junior researchers in research planning processes. Dagmar Simon opened the session with a retrospective look at discussions between “planning optimists” in politics and ministries and “planning skeptics” in social science research back in the late 1970s and early 1980s. Nowadays, social science research takes a more sophisticated look at innovation and creativity by discussing different modes of knowledge production. Here, different kinds of research (basic, applied, thematically defined, open) are considered as well as the cooperation between basic and applied research and practitioners.

In order to focus the discussion on which kind of research is needed to tackle the complexity of current societal problems and the specific perspective of younger researchers, Dagmar Simon asked the following questions:

1. What exactly do we mean by “planned” research? Is there a shift towards more applied and planned research?
2. How do planned research and high insecurity in academic careers fit together? Are the programs for thematically open research funding for younger researchers in Germany satisfactory?
3. What kind of autonomy do younger researchers need and in what kind of institutional setting can this be realized?
4. How can the growing differences between the disciplines (with regard to normative standards, understanding of quality, career path or degree of openness towards the application of research results) be acknowledged?

Career opportunities and the need to develop a distinct profile

Christian Hackenberger began his contribution with a quote from a recent article published by an American science journalist. The article looked at the career path of young scientists in Germany today, compared it with the traditional path within the “habilitation” system and concluded that “the outcome of reforms and initiatives from different institutions is that a young academic’s career path in Germany has evolved into complexity and a confusing array of parallel ways of pursuing an academic career.” Christian Hackenberger supported this point of view and acknowledged that there are a number of different options for younger researchers to apply for open or thematically focused funding programs in Germany (e.g. Emmy Noether, AvH, Volkswagen Stiftung, BMBF). However, he stressed that irrespective of the source of funding, in the very early stages of their career, younger researchers have to develop their own ideas in order to strengthen their scientific profile and to be competitive later on in the national and international scientific community. The freedom to develop an own scientific profile is thus essential for younger researchers. In addition, Christian Hackenberger emphasized that the transition from young academic careers to more established careers is a critical issue. In order to become an independent and highly regarded scientist it is necessary to acquire a larger cooperative research project, e.g. SFB or Cluster of Excellence. This in turn requires the respective (younger) researcher to have a certain standing but also appropriate funding conditions that enable younger researcher to initiate such projects.

Careers and thematic restrictions in medical research

In his opening statement, William Omar Contreras Lopez focused on the specific situation of medical research. Since medical research almost always requires collaboration, larger labs and teams, the careers of younger researchers in most cases start in given structures, i.e. they have to adapt to the thematic priorities and institutional settings provided by the lab at which they do their thesis or postdoc project. When they later specialize, these researchers face two important barriers: First, medical research is often restricted by ethical considerations and corresponding political regulations, in particular regarding stem cell and genomic research. Second, research priorities in medical research have to be committed to the overarching objective of human welfare, i.e. to supporting global health. The question here is who defines the primary direction of medical research? Here, William Omar Contreras Lopez emphasized the critical role of the pharmaceutical industry in setting the agenda for medical research.

Research planning at different levels and potential contradictions

In line with his written statement, Cornelis Menke emphasized two main messages in his opening statement. First, he pointed out that the distinction between planned and non-planned research seems to be artificial since research is in most cases a goal-oriented activity and thus “planned” in a certain sense. The crucial question is rather who is setting the research or scientific agenda. Second, Menke pointed out that the “big” research topics set by institutions, e.g. universities, are likely to be contradictory to the topics young researchers are interested in. Since a degree of research planning is legitimate and necessary at both the institutional and the individual levels, the challenge is to match the topics set by an institution, e.g. a university, and the research interests of the scientists working at the institution. From the perspective of a smaller university, the difficulty might be to attract those researchers with an outstanding reputation and compatible thematic profile who are needed to fulfill the research priorities defined by the university.

The need of individual specialization from different disciplinary perspectives

Taking up Christian Hackenberger’s point about the need for young researchers to develop their own profile at an early stage, William Omar Contreras Lopez pointed out that in the field of medical research, too, there has been a tremendous trend towards specialization during the last decades. Nowadays, researchers can only succeed, e.g. when applying for research funding, if they have a very distinctive specialization. Cornelis Menke added that in the humanities it is necessary to develop a proven track record of interdisciplinary work and collaborations, e.g. in order to be appointed to a chair. However, at the same time there is an increasing trend towards specialization among individual researchers due to the new types of career paths. In the old habilitation system most researchers developed at least two thematic foci, one in the course of their thesis work and another in the course of habilitation. Nowadays, there is fierce competition to get postdoc positions within a short time after finishing a PhD, which means there is hardly time to switch the research focus to a second theme. From a natural science perspective, Hackenberger also stressed that it is not only important for young researchers to develop a visible specialization and profile in order to gain renown within the scientific community but also within their own institution. In particular, it is essential for younger researchers, too, to acquire collaborative research projects in order to secure their position within the institution.

Approaches to developing new research ideas within the different disciplines

With regard to the question of “setting the research agenda” at the individual level, Menke pointed out that in the humanities and also for himself, teaching is an essential way of finding new research topics. Since teaching involves opening up to new issues and reading new articles and books it often leads to the development of new lines of thinking. Lopez stressed that in medical research, new research topics derive directly from everyday clinical work and the actual problems of the patients which are unsolved. From his perspective within science, Hackenberger proclaimed the simple but sound motto of “read and talk”.



left to right: C. Hackenberger, W. O. Contreras Lopez, C. Menke, D. Simon

Involvement of young researchers in setting research agendas on a larger scale

The involvement of young researchers in agenda setting on a larger institutional or political scale was discussed in a more critical way. Menke said that from the perspective of a young researcher, these agenda-setting processes (e.g. in the case of a university strategy) take too long. In other words, the time for which a younger researcher stays at one institution is usually too short to get involved in these planning processes and in particular to benefit from the results. The perspective of younger researchers is therefore often more oriented towards their individual autonomy within the research institution or university than towards the strategy of the institution they work at. Hackenberger also raised the point that the influence of younger researchers is often restricted due to their limited experience and lacking research profile. In order to be accepted by the community, young researchers must have proven that their ideas are feasible. In the natural sciences, new topics are usually initiated on the basis of the ground-breaking work done by established researchers. Therefore, the scope for initiating new topics for young researchers is often limited.

Transition phase from “young” to “established” researcher

In the course of the discussion, the issue was raised that the transition from a well-endowed young investigator grant to an established position as a professor is often problematic. In comparison to the young investigator programs, resources are often more limited for established positions while the competition rises to another level and freshly appointed professors then have to compete with “the big guys”. This transition phase is still a challenge for young investigator programs which is not being adequately addressed. Thus, Hackenberger stressed that these programs should also provide opportunities for their candidates after completion of the program.

summarized by CCD



WILLIAM OMAR CONTRERAS LOPEZ, University of Freiburg

The ideal scenario for a researcher is to conduct original and interesting science, spending his days answering questions that he/she finds intriguing. However, this dream could end by being just that. The future of medicine includes advances in cellular-based therapies, genome-based tailored treatments, and antibody therapies. And from those three branches the researcher has to decide where to get involved.

Once he/she decides, he/she has to find a centre (laboratory), since conducting own, independent research is almost impossible today. Laboratories require a lot of ethical and legal permissions, without mentioning funding concerns and economic facts. After the researcher applies to the chosen laboratory, the people in charge could hear his propositions, but 90% of the time they will involve the new researcher in a project which is already running or has all permissions and its ready to begin. Starting a new project involves a lot of bureaucracy and scepticism as some scientists are not willing to take a risk by letting less experienced investigators rather than proven researchers work on new projects.

It is also important to say that investigation groups have been generating vast amounts of data. For the research into many diseases such as HIV scientists are required to analyse these tonnes of data. Pooling and sharing of data from different sources will really help saving the lives of many.

Health and epidemics are no longer a regional problem. With so many airplanes travelling between continents every day, health needs to be global. And that worsens the scenario from now on because we need to prioritise diseases like malaria, tuberculosis and HIV. (Malaria by it-self kills more than 2 million people per year).

Science needs to focus on these types of diseases, which leaves few chances to investigate low incidence diseases, even if you have a great idea. Another bioethical dilemma is whether the pharmaceutical industry is going to deliver what is needed, considering their profit motivations? There is some cynicism over how the pharmaceutical industry allows supply and demand to dictate the direction of research (for example the neglect of investments into new antibiotics developments in the last couple of years).

Does this reflect a shifting culture around lab work, leading to a business-oriented point of view of “pure” science? Are there going to be more students who leave academia in favour of working for industry, who may not only have truly noble causes?



PROF. DR. CHRISTIAN HACKENBERGER, Freie Universität Berlin,
Institute of Chemistry and Biochemistry

Starting an independent scientific career seems to be seemingly easy for young researchers working in Germany. Junior researchers can choose from numerous support programs offered by diverse institutions together with various consulting services and trainings opportunities in the field of scientific management. Such programs provide various options in terms of the endowment of the position and its embedding in respective institutional structures, ranging from junior professor with or without „tenure track“ via third-party funded junior group leader at a university or a research institute to a traditional habilitation model. Still, it is worthwhile to take a closer look at the situation of junior researchers in the context of research planning. Particularly at the beginning, young researchers are occupied with strengthening their scientific profile and, depending on the personal background, have their own ideas that he or she wants to realize. Happy is the one who has been lucky to receive one of the sought-after and thematically not defined research programs for young scientists such as for example the Emmy Noether Programme of the German Research Foundation (DFG) or the Kovalevskaya Programme offered by the AvH-Stiftung. However, what happens if one is not successful in gaining such a thematically open research funding or what happens afterwards?

There is no doubt that a younger researcher can benefit from thematically defined calls and collaborative research projects. He or she can obtain research funds, provide new scientific impulses and cross-link one's own research topics. This can also lead to new research projects one has not thought about before or which one alone could hardly ever accomplish. Yet, how can junior researchers put forward topics for research? And how is it possible to combine this with the desire shared by most of the young researchers to gain a permanent position giving long-term security both in personal and scientific terms? What happens when the career opportunities are more difficult to realize than anticipated; for example due to „planning“ or focusing on research topics outside the young researchers' primary focus at the faculties or institutes, due to internal university projects or science policy incentives? How much „flexibility“ can be demanded from a young researcher and what is really credible?

All these questions point a delicate balance between „free“ and „planned“ research and emphasize the significance of the set of problems discussed in the course of the conference.



DR. CORNELIS MENKE, Die Junge Akademie

At first sight, it might seem odd to contrast planned with non-planned research: In a certain sense, all research is planned, for research is a goal-directed activity. Though the successes of science, a gain of knowledge and successful applications alike, often depend on serendipities – we find something we were not looking for – it is far from clear that not looking for anything increases the chances of serendipities. So, drawing a distinction between planned and non-planned research is often meant to address the question of who is to decide on the research agenda: the individual researcher, the leader of a research group, funding institutions, the public, etc.

The freedom of young scientists to pursue their own research agenda depends on their institutional autonomy; the degree of autonomy differs widely depending on position held (member of a research group, assistant professor, independent research fellow, etc.) as well as on the resources needed. But equally important, the freedom is restricted by disciplinary aims and trends of research. Having to decide between addressing socially relevant issues and pursuing scientifically/disciplinary relevant research, young (i.e., not tenured) researchers can hardly be expected to prefer the former. (This is not to say, of course, that there is generally a trade-off between social and academic relevance.) A particularly important criterion of scientific problem choice is only to tackle problems that are (supposed to be) soluble; thus, a reasonable way to enable young scientists to work on socially relevant questions is to keep possible conflicts of social and scientific relevance in mind when deciding on the scientific agenda.



DR. DAGMAR SIMON, Social Science Research Center Berlin (WZB)

In the early seventies, a controversy erupted within Science Studies on the subject of “planned research”. By observing research processes in a variety of disciplinary contexts, proponents of the theory of the “finalization in science” argued that at distinct stages of development, scientific epistemological processes were amenable to economic, social and political purposes. In addition these external purposes could function as guidelines for developing scientific theories. Opponents accused this camp as being Stalinist. Concurrently, governmental policymaking in the seventies was in the grips of a planning craze, as ministries strove to exert influence on societal and technological development processes via research programmes and their results.

Nowadays, the term “planned research” is no longer evoked in debates within Science Studies. Instead debates revolve around the questions of whether and in what ways research focuses and types, (such as basic versus applied research), have potentially changed. A strong case was made that a type of inter- and transdisciplinary research bringing together scientists and practitioners and ascribing societal relevance a significant role in generating research projects and programmes would crowd out academic and

disciplinary-oriented research, which is prominent at universities. This type of research assumes a certain prominence with societies facing highly complex challenges, which can no longer be addressed from a single disciplinary perspective. Such an approach does in a certain sense resemble the earlier type of “planned research”. However, in Science Studies a consensus emerged, that different types of scientific work can coexist and enjoy their own individual rights to exist

What can be observed is a differentiation and a diversity of research types as well as of scientific disciplines, defining their own standards of “good” science, their own quality criteria and creating their own career perspectives for young scientists. However this does not answer the question as to whether we need thematically-oriented research (funding) programmes, focused on societal challenges, in the event that scientific communities do not address these challenges by themselves automatically. What needs to be considered in this context in particular is what opportunities are offered to young scientists to participate in setting the research agenda, within the context of options and restrictions imposed by the very disciplines they belong to.



left to right: A. Frank, W. Rohe, W. Krull, S. Sommer, J. Küpper (Facilitator)

Workshop II: Actors' Views and Processes

a) Enabling without Influencing the Agendas? – The Role of Foundations

ANDREA FRANK, Stifterverband für die Deutsche Wissenschaft

DR. WILHELM KRULL, Volkswagen Foundation

DR. WOLFGANG ROHE, Stiftung Mercator

SIMON SOMMER, Jacobs Foundation

Facilitator: PROF. DR. JOACHIM KÜPPER, Freie Universität Berlin

The workshop focused on the role of foundations in funding research. Foundations aim to influence societal development and to strengthen scientific research. A central question in this context is to which extent the funding policy is determined by the foundation's mission and/or external agendas. Additional relevant dimensions in this context are: the freedom of purpose in science and its quest for meaning and influence as well as the sustainability of funded projects and newly established structures.

In his introduction the facilitator, Professor Küpper, stressed that although foundations operate with and spend private money, tax reliefs mean that it is, in fact, also partly public money.

“A variety of animals”

“Foundations are a variety of quite different animals.” With this opening statement Wilhelm Krull, representative of the Volkswagen Foundation stressed the diversity of foundations. They do not only vary in size and budget, but also in their scope and their funding principles – some are operational while others fund external projects. Thus their financial investments into the research system can take many different paths. The *Volkswagen Foundation* is a supporting foundation that divides its up to €100 million p.a. across three main areas: fostering young talent, research into key challenges in science and society, especially in the humanities, and promoting international activities.

“Funding often comes with a price tag”

For his opening, Simon Sommer from the *Jacobs Foundation* chose a quote by Michael E. Porter on the “obligation to create value”, stating that foundations have to spend their money more effectively and efficiently than public institutions. Sommer also pointed out that among the variety of animals there are a lot of smaller foundations which usually have a lower degree of organization and professionalism.

Research organizations and universities have to bear in mind that private funding often comes with a price tag. Therefore any organization that is interested in receiving funding from private donors has to be willing to act in line with the principles of the respective foundation or donor; a university has to decide for which price it is willing to put its symbolic capital on the market.

In the case of the Jacobs Foundation, the Jacobs University is its major investment, but it is by no means the foundation's only activity: it spends about CFH 10 million p.a. on projects supporting child and youth development. After ten years of highly successful operation in teaching and research, the Jacobs University should not be seen only as an “agent of change”, but rather as a successful international campus university. In response to Sommer's statement, Wilhelm Krull stressed that the Jacobs University, different from many other universities of this type, was not, in fact, established by the Jacobs Foundation but was an already existing institution into which the Jacobs Foundation decided to invest. While many universities that were set up by foundations or other private organizations

have not been successful, it seems the Jacobs University is.

Ideally such universities trigger the transformation process of public universities. This ability to impact on public universities is one of the objectives of the Volkswagen Foundation as well as many other actors in the field.

“An institutional strategy is crucial”

The *Stifterverband für die deutsche Wissenschaft*, represented in the workshop by Andrea Frank, differs from other foundations as it is a membership organization which generates its funds mainly out of the donations and membership fees of more than 3,000 companies.

The funding lines, ideas and projects conducted by the Stifterverband are developed in collaboration with universities in a process that can not be influenced by the donating companies.

The Stifterverband focuses on three main areas: Governance in the form of structural innovation on the institutional level, policy advice, and the discourse on relevant and upcoming issues in the field of higher education for which the Stifterverband provides a platform.

For Frank it seems legitimate that a donor is interested in influencing what their money is spent on. As there are a variety of donors with a variety of interests, an organization that is looking for funding should carefully examine if its institutional strategy matches the funding priorities. An institutional strategy is thus not only crucial for acquiring funding but it is also a major element for securing the sustainability of (short-term) projects.

“Foundations are not free actors”

Wolfgang Rohe from the *Stiftung Mercator* provided three theses in his opening statement: Firstly, foundations should not act like benefactors, secondly, public research has become more program-oriented and thirdly, foundations are not free actors in this system. Derived from this he recommended that foundations should have a strategic agenda and should not hide it. Further they should define their goals within a certain scale and make their investments in a certain field. Additionally, Rohe stressed the importance of mutual respect between foundations and universities.

The issue of transparency and quality assurance

A recurring issue concerning the role of foundations in science funding is transparency and how it can be secured.

On behalf of the Stifterverband, Andrea Frank emphasized the role of the committee selecting the projects that are to be funded. The Stifterverband carefully chooses persons with a heterogenic institutional background. The second step in the selection process is a project presentation. This is usually done in a public setting in order to initiate a learning process and exchange of experience at an early stage.

As many foundations have implemented complex governance and selection systems, Joachim Küpper asked whether the foundations are ever evaluated.

In response, Wilhelm Krull underlined that one- or two-day evaluation events as conducted by many organizations are not really worth the

effort. In contrast the Volkswagen Foundation has set up an evaluation pyramid including project and program evaluation by external experts and the review of internal activities by auditors. The results of the first evaluation phases feed into the following setting of priorities. Overall the Volkswagen Foundation has started a broad transformation process and considers transparency as an obligation towards the public.

For Simon Sommer the transparency is very closely linked to the reputation of a foundation's trustees. If they have a good reputation and are trustworthy then the foundation will be perceived in the same way.

The Mercator Foundation began its strategic process in 2008. For internal and external transparency an evaluation by experts will be carried out in 2013. Part of this evaluation will be a survey among the foundation's clients conducted by the Centre for Social Investment at the University of Heidelberg.

Public universities and their ability to change

In response to Wilhelm Krull's earlier comment on his hope that public universities have the ability to change, Carsten Dreher from Freie Universität asked whether this hope has been encouraged or diminished over the past years? For Krull this hope seems reasonable because many of the universities that have been awarded funding in the Excellence Initiative already started their transformation process in the mid-1990s. A good example is the transition towards a structured doctoral education in most German universities. Another interesting development is that the German Excellence Initiative is frequently being copied across Europe.

Unfortunately, most universities are increasingly unable to fulfill their key tasks. One of the main reasons for this is the shortage of public funding, which is why many universities are also spending third-party funding to finance their core business.

The importance of goals

Carsten Dreher brought up the issue of strategic planning and wanted to know what the new agendas of the foundations consist of and what the envisaged goals are?

For Andrea Frank a university's goals should be long-term goals. As universities in many cases only receive small-scale funding they should plan their spending strategically and with a long-term vision. Some universities have already implemented an identification system for funding opportunities that are in line with their long-term strategic goals. For the Stifterverband these universities are good practice. The Volkswagen Foundation is not imposing agendas but strongly prefers to work with agents of change. It usually sets up a long-term strategy as well as an exit strategy, in case the project is not taking the course initially envisaged.

According to Wolfgang Rohe, the universities in the Ruhr area are situated in a system of cooperation and competition. The strategic cooperation is coordinated by a joint center that takes decisions and operates without the involvement of the Mercator Foundation.

summarized by CCD



ANDREA FRANK, Stifterverband für die Deutsche Wissenschaft e.V.

Foundations do follow their own agendas in higher education and research funding. This agenda could be to focus on a specific research field, on specific groups, or on selected institutions. Having an agenda does not necessarily imply that foundations unduly exert influence. At the same time, it is more than legitimate to set priorities – that may or may not cater to public research agendas – when spending private money.

Self-confident research institutions with a clear research strategy are an important success factor for a healthy relationship between universities and foundations – or private investors in general. In the words of Michael Porter, the essence of strategy is “choosing what not to do”. A clear institutional research strategy defines priorities and also identifies fields which will not be explored or expanded. A clear institutional strategy becomes a forceful instrument to resist corrupting incentives by (private and public) funding institutions if it is strongly supported by the management of the university and its researchers.

The funding instrument of endowed chairs which has been promoted by the Stifterverband since the 80s is a good example to illustrate the possible area of conflict between private funding priorities, institutional strategy, freedom of research and sustainable funding mechanism. When setting up an endowed chair, the interests of the three partners differ. Private

investors or foundations want to strengthen teaching and research in specific fields, universities look for additional (long-term) sources of funding, professors want excellent research conditions without influence on their research agenda.

Autonomous universities with clear research priorities are a key to safeguard freedom of research in this potential area of conflict. They are free to accept or reject private funding. If endowed chairs are established in priority research areas it has advantages for both sides. Long-term funding could be provided more easily by the research institution or university. But also funding institutions benefit if the endowed chair is integrated in a strong research environment.

Universities and research institutions are in the position to define rules and principles in dealing with private funding, a code of conduct, in order to establish a reliable framework for researchers and private investors. The University of Frankfurt has worked with a code of conduct for a number of years and reports about positive experiences with the instrument. It helps to manage expectations and increase transparency for all partners involved. The Stifterverband has recently published a code of conduct for university – industry cooperation as well which stresses the freedom of research and the need for transparency to the public.



DR. WILHELM KRULL, Volkswagen Foundation

Foundations – Enabling without influencing the agendas

In a rapidly globalising and interdependent world new challenges and opportunities are arising for Europe. In order to successfully build the future European knowledge-based society it is essential to enhance the quality of the research base, to strengthen the structural dynamics of the respective research and innovation systems, and to support frontier research in carefully selected areas. By combining risk-taking with a high degree of flexibility and a proven track record in quality assurance foundations can inspire, support, and encourage institutions as well as individuals to build or reconfigure their research environment, and to break new ground.

When it comes to identifying future topics for research a certain tension can be observed between the mission or agenda of research funders and the research interests of individual researchers. This is most obvious when it comes to companies sponsoring research at universities.

However, (operative) foundations, too, tend to have a more or less hidden agenda. A research foundation can only succeed if it successfully detects new directions in research early on and tries to enable breakthroughs in emerging areas. At the same time foundations need to be responsive to upcoming and already existing developments, especially within the respective research community.

Epistemologically speaking, radically new answers can usually not be phrased in terms of the initial question. The openness for „fresh thinking“ is not only required by those who produce new ideas, but also by those who are expected to pick them up. The readiness to listen to independent voices inside and outside of one's own network, to encourage risk taking in „off the beaten track“ areas, and to create a climate of mutual learning are prerequisites for successfully creating a „culture of creativity“.



DR. WOLFGANG ROHE, Stiftung Mercator

In Germany, the support provided by foundations to academic research accounts for around 1% of total public-sector academic funding. If foundations wish to have a noticeable impact, it is essential that they define the objectives of their support and formulate an action strategy. They must decide on what belongs to their agenda and what does not. As far as the activities of foundations are concerned, seeking a balance between two agendas – that of the foundation and that of the academic disciplines – is inevitable. To meet the needs of both parties, three rules above all must be adhered to: 1) The foundation's strategy must be transparent. Foundations should be explicit about their goals. 2) The foundation's strategy must be justifiable and justified. 3) Within a justified strategy, the promotion of projects must be aligned with the academic quality of projects as well as with the institutional framework conditions of the supported institution.

Essentially, there are two possible ways in which to formulate a strategy for research funding: on the one hand, science and humanities can be described with respect to its internal rules, its characteristics, its self-control and self-reproduction. From a strategic point of view this leads, for example, to a support of single disciplines, or of young researchers, of international or interdisciplinary collaboration or perhaps science infrastructures. On the other hand, one can also describe science and humanities with respect to its social function, its links and complexities and the impetus it receives from or gives to the outside world. Strategically, this will result, for example, in the promotion

of technology transfer, the improvement of a public understanding of science or of research with the express purpose of achieving societal objectives. In the case of Stiftung Mercator, this would mean preventing dangerous climate change or achieving better integration of people of migrant origin through education.

Academic support that follows the three rules can be pursued with both perspectives and strategies derived from them. Identifying the opportunities and deficiencies of the academic system can give rise to possible activities on the part of foundations, as can social objectives. Foundations, being civil society actors, can bring such social objectives within the horizon of academia without being suspected of harbouring political intentions. Even within the framework of a strategy aimed at preventing dangerous climate change, support given to specific projects can be based on their academic quality. Support can be goal-oriented yet aimed at no predetermined outcome.

Where support is made available to universities, their advancement towards greater self-responsibility and self-control in the recent years is both an opportunity and an obligation for the activities of foundations. The opportunity is the possibility to negotiate directly with universities as project partners, while the obligation is to do this while respecting the goals of the respective partners. If this is achieved, support can serve the foundation's agenda while at the same time achieving the university's development goals. This means renouncing originality as end in itself and focusing on the sustainable value of research funding instead



SIMON SOMMER, Jacobs Foundation

Bringing Research into real world-settings – the outspoken, not hidden Agenda of the Jacobs foundation

The conference organizers have in their original program courageously defined the role of research funding foundations as “ENABLING WITHOUT INFLUENCING THE AGENDAS”. At least, I think, this should have come with a question mark at the end. If we look at the self-descriptions of foundations we will soon understand why there is good reason for this question mark: virtually all research-funding foundations strive to set and to change agendas.

At the Jacobs Foundation, we are a little less audacious and define our mission in the area of research funding as follows:

“We are committed to identifying and supporting high-quality research carried out by world-leading scholars on the development of children and youth. We want to advance this field because we understand that research is crucial not only in order to identify and better understand the challenges and opportunities for children and youth, but also to build solid evidence for intervention, policy, and practice.”

As a relatively small foundation, we found our niche in systematically motivating researchers and practitioners to work together. We are convinced that research plays pivotal roles in the development, evaluation, refinement and dissemination of interventions and programs

for children and youth. Research-based developmental models have to provide the framework for successful interventions and programs as they are developed. These models can then be tested, and ongoing research can lead to a series of refinements of the interventions and programs. Research can also provide essential information about who the programs succeed with and who they do not, and newer types of scientific intervention research can rigorously identify factors which can bridge the research-to-practice gap, maximizing the effectiveness of interventions, programs, and policies when they are disseminated into real-world settings.

Conducting such intervention research, translational research, and mainstreaming research in cross-organizational team requires academics to leave the comfort-zone of their labs and to face real-world problems (which is far more difficult for a lot of them than one would think!). This is not a hidden agenda, it is an outspoken one. As a small Foundation we have the liberty but also the need to be selective.

If there is interest in the audience, I will also be able to discuss the large-scale investment into Jacobs University made in 2006 and relate it to the workshop questions.



left to right: S. Joos, L. Behlau, F. Scapolo, C. Ettl, P. Heil, A. Johnston (Facilitator)

Workshop II:

Actors' Views and Processes

b) Research Planning and Institutional Rationales – Actors in the Research System.

DR. LOTHAR BEHLAU, Fraunhofer-Gesellschaft
DR. CHRISTOPH Ettl, Max Planck Society
DR. PETER HEIL, Leibniz Association
PROF. DR. STEFAN JOOS, Helmholtz Association
DR. FABIANA SCAPOLO, European Commission – Joint Research Centre
Facilitator: PROF. DR. ANDREW JOHNSTON, Freie Universität Berlin

Research strategy of the Fraunhofer-Gesellschaft

Lothar Behlau opened his statement by asking in general terms which layer should be responsible for finding a proper and suitable research strategy. It depends on the respective institution, but a clear mission is required. From his point of view, this is non-negotiable.

A mission generally comprises two parts. In the first part, the institution should address a set of fundamental questions in order to define its mission: Who has a stake in the institution and its work? Who will benefit from it? What impact should the institution have? What can be agreed upon with the funding or supervisory body? (What is meant here is the definition of appropriate goals with the respective funding bodies.) The second part of the process would start once the mission is agreed upon. Then the institution can delegate the strategy-finding process to institutions or even to individual researchers. In the case of the Fraunhofer-Gesellschaft, which comprises 60 institutes working in relative autonomy, the framework is usually laid out by the Fraunhofer head office in the form of quality controls. The head office does not define the content of the institutes' work, but it introduces them to an essential creativity process. What we have observed is that the best possible and most appropriate solutions were the result of a shift from a technology orientation to a problem orientation, including an interdisciplinary approach to research.

The Fraunhofer approach represents a customer-driven approach, in which case the customer takes over the role of the outside influence.

It could be argued that Fraunhofer performs applied research from a market perspective. Its strong links to industry ensure that research outcomes meet the demands of industry.

Lothar Behlau ended his statement with a case study from his experience at the Fraunhofer-Gesellschaft. The Fraunhofer head office has created communication platforms and think tanks to find solutions. In a second step, they decided on the most competent person, group or institute to solve the defined problems. All these strategic processes are independent from governmental influence

Research strategy of the Max Planck Society

Christoph Ettl introduced the mission of the Max Planck Society to the audience – “Knowledge must precede application” (Max Planck). The Max Planck Society performs basic research at the frontiers of knowledge. Its institutional structure is formed by giving researchers the most freedom possible to perform their research. According to the Harnack principle, researchers are the most important investment for the Max Planck Society, which represents a personalized approach to research strategy. They have a great degree of freedom and independence within their departments. At the Max Planck Society, success is rarely measured over short periods of time. The adoption of such a far-sighted approach is the only way to meet the challenge of exploring the unknown, which is always essential if important breakthroughs are to be made. Crucial scientific landmarks are often achieved by embarking on unknown paths.

A strategic process can be initiated when a director of an institute leaves or retires. It is a process of shaping what will be implemented next and is managed by commissions of the respective sections within the Max Planck Society. The Federal Ministry of Education and Research (BMBF) does not exercise any formal or practical influence. Moreover, the work of the Max Planck Society is driven purely by scientific curiosity, and it has been successful at keeping its independence from governmental and political influence thus far.

The success of strategy development within the Max Planck Society is supported by an effective system of scientific advisory boards that evaluate the institutes and give them valuable advice. There is a high level of interaction between board members and the institutes. This thorough exchange of ideas has a clear, positive effect on the strategic planning efforts of the institutes.

Christoph Ettl pointed out that overall the Max Planck Society has created space for creativity and is the home of independent researchers. Its strategy is based on the commitment of its scientific members to think beyond their own departments and in the interest of the Society as a whole.

Research strategy of the Helmholtz Association

Stefan Joos introduced the strategic processes that allow the definition of future research activities within the Helmholtz Association. He pointed out that the Helmholtz Association is a mission-driven organization that addresses complex scientific questions and aims to find solutions to the major challenges facing our society. It performs user-inspired basic research and its member institutions manage complex research infrastructures.

Within the Helmholtz Portfolio Process, international specialists and Helmholtz scientists analyze each individual research field (Energy, Health, Key Technologies, Structure of Matter, Earth and Environment and Aeronautics, Space and Transport) to determine whether “we are doing the right things and if we do things right”. The portfolio process can be characterized by its flexibility, since it is not under the influence of the BMBF. It is mainly driven by researchers in a bottom-up manner.

Another key strategic process is closely associated with the process of how the Helmholtz Centers apply for financial resources every five years – Program Oriented Funding (POF). The

POF process starts with research policy requirements with reference to the basic structures of the research fields provided by the BMBF, along with the evaluation criteria. Based on this, the different research centers set up research programs, which are subsequently evaluated by international reviewers according to their scientific quality and strategic relevance. Important criteria of strategic relevance include Helmholtz adequacy, collaboration with relevant partners at other research institutions and talent management. Based on this evaluation, which puts programs in competition with one another, contributing Helmholtz Centers can receive funding for another five-year period. The BMBF exerts its influence through research policy requirements. Yet there is also scope to flexibly design research programs for researchers. This means that the scientific potential for the Helmholtz Centers is not restricted by policy requirements, but an underlying creative process is in evidence.

One critical element for the Helmholtz Association is the networking strategy, which receives its financial endowment in large part from the presidential fund. The establishment of networks across the Helmholtz Association is supported in different ways, such as with the Virtual Institutes or through cooperation with universities. The budget can only be used for five years, so it represents a playground for intense collaboration. At the end of that period, researchers are encouraged to develop other models for their network. They can also establish institutional structures. Different models for collaboration between universities and Helmholtz groups based on institutional funding have recently been established, e.g. the Karlsruhe Institute of Technology (KIT) and the National Centers of Health Research.

Research strategy of the Leibniz Association

Peter Heil began his statement with a fundamental question: Why do we deal with program-building? He then pointed out that there are two basic underlying tensions that affect the strategy and program development process: the tension between science/scholars and society and the tension between the program and individual scientists.

The first tension refers to the responsibility that science has to society and the cultural profit that science offers. It boils down to the expectations of society, which funds the research and asks for a benefit, and the expectations of research perceiving free, on a first glance indeed not

“useful” developments of ideas as the basis for new insights. What can be done freely? In a bottom-up and top-down process, stakeholders provide hints about what researchers should do and deal with.

Peter Heil suggested three possible answers to solve the tension between society and research. In the first, science provides highly competitive processes for finding the best researchers and society acknowledges that the researchers being selected should have the means to develop freely. In the second, science accepts that society has a high demand for new scientific solutions and it reacts by developing appropriate large-scale programs. The third solution combines the first and second. Leibniz institutes follow this third approach by trying to find an adequate balance between the free development of research and fulfilling their responsibility to society.

The second tension refers to a tension within science. On one hand, there is a need for structured and strategic program planning, especially in experimental disciplines. On the other, the humanities in particular face a different situation generally characterized by more independence. This means that the structured strategic approach cannot be applied equally throughout the research system but needs to be adapted within the various fields.

Research strategy of the European Commission – Joint Research Centre

Fabiana Scapolo opened her statement by looking at the historical development of the Joint Research Centre (JRC), which was originally established under the Euratom Treaty as a research center. It subsequently had to adapt to policy shifts and the changing needs of society. Its research activities cover various topics, including energy and transport, information society and food security. The JRC strategy is developed as a stimulated bottom-up process within the organization, and it has implications for public and European policies. The JRC responds to upcoming challenges and is a trusted provider of knowledge and advice to policymakers. It provides technological support for the conception and development of European Commission (EC) policies. It is independent and facilitates consensus-building among its stakeholders. The JRC is involved in all stages of the EC policy cycle. The standard governance process is a multi-annual work program that spans the length of the FRP.

The JRC carries out specific direct research

activities within the seventh Framework Program for Research (FP7). Furthermore, it participates in FRP in accordance with and driven by its mission.

The JRC’s customers have a clear profile: the General Directorates (DG) of the EC. The JRC responds to their requirements. It provides services for its customers on the basis of governance of the JRC work program. JRC requirements are defined by thematic advisory groups consisting of high-level representatives from industry and science. In 2009 the JRC undertook a strategy exercise for the period after the implementation of the next FRP called “Horizon 2020” and developed a 10-year strategy. Strategic developments at the moment involve strengthening capacities in economics to be able to bolster its focus on that area. Policy analysis is an equally strong focus, as is cross-secular investigation and impact assessment.

Looking at the JRC’s work from another perspective, the JRC is moving toward the analysis of economic questions and policy questions as part of a drive to make the European Commission independent from outside advice. One possible interpretation could be that the European Union is interested in producing its own academic/intellectual “test tubes” so it can become more independent from outside discussions.

Collaboration with universities and the creation of new institutes/institutions

On the topic of collaboration between universities and non-university institutions Peter Heil explained that the Leibniz Association regularly engages with universities. Most Leibniz institutes developed out of university institutes and now have strong ties to those universities. Another point he made involved the question of how the German science system will develop after the Excellence Initiative ends in 2017, since there is a complicated funding system at the federal level. He assumed that the pillars of the German science system are moving closer together, but was curious about what will happen after 2017. He hypothesized that the central government might give money to universities at an institutional funding level, which would create a new vertical structure between federal and non-federal funding. This would certainly change the German science landscape.

Lothar Behlau, however, was not in favor of institutes developing out of universities, because universities have their own missions and need to market their own special position and aims (USP). Dependencies (i.e. new institutes) would

have to develop an identity of their own, but could continue to be associated with the university for a certain undefined period of time. A means of cooperation needs to be found in every case.

In the Fraunhofer-Gesellschaft, cooperation is not goal in itself. Mutual appointments are made where Fraunhofer sees advantages. It is general practice in the Fraunhofer-Gesellschaft to encourage the development of missions for research institutions based on the central question of what the world would miss if the institute did not exist. From that they develop a mission statement and then a strategy. Christoph Ettl added that the Max Planck Society has joint appointments with universities. Furthermore, the Max Planck Society runs more than 60 International Max Planck Research Schools (IMPRS) in close cooperation with universities and other research institutions, some of which are outside Germany. Their most intensive cooperation with universities takes place at the PhD-student level, because the Max Planck Society does not have the right to award doctorates (“Promotionsrecht”).

Stefan Joos pointed out that a central point in the federal government’s Pact for Research and Innovation is to create enduring partnerships by intensifying interaction between universities and non-university institutions. The Helmholtz Association has other means of interacting with universities. For example, the Helmholtz Institutes are responsible for interaction on campuses. One Helmholtz Institute can have up to eight university partners.

Fabiana Scapolo added that in her experience scientists evolve through cooperation. As a result, the JRC also collaborates with multiple external partners and universities.

Mergers between universities and non-university institutions – Is the Karlsruhe Institute of Technology a model for the future?

The discussion then turned to the most intense mode of cooperation between universities and non-university institutions: the merger. The first two institutions in Germany to unite in this way were Universität Karlsruhe (TH) and the

Helmholtz Research Center Karlsruhe. In 2009 they merged to create a new institution called the Karlsruhe Institute of Technology (KIT).

Stefan Joos, the only representative of the Helmholtz Association with direct insight into this merge process, encouraged an evaluation of the new structures, which often can become very complicated. In the case of KIT, the distinction between the Helmholtz part and the university part is sometimes difficult to make. He thinks that some of the questions raised by the merger are still unsolved. In the future, lots of eyes will be on KIT to see how this institution develops.

Lothar Behlau was hesitant about this development. Tailor-made missions are a better way to go, in his opinion. With KIT, two big partners came together without a clear mission. The implication of this merger for the German science system is the question of how to manage the research landscape if all its stakeholders cooperate. Integrating two institutions in one legal body with one general management may not be the solution for every merger. Similar to KIT, the Jülich-Aachen Research Alliance is another new model of close collaboration in Germany. It will be interesting to see how these institutions develop, he added.

In Peter Heil’s view, everybody wants to cooperate. But who is willing and able to finance what? What are the restrictions? KIT, he controversially stated, is basically a university funded by the federal government. The future role of the federal government should be questioned with regard to creating opportunities to fund universities. Then there would be a chance to implement a new horizontal level of funding, which would be a new development in the German system and could precipitate stronger cooperation between university-based research and non-university-based research.

In addition, there is a tendency among institutions to develop goals that are similar and lead in the same direction. There is also a tendency to create similar structures. This development of moving in a similar direction might not be intentional, Lothar Behlau added. Every organization reacts to technological developments in a different way; this is the idea



behind market maturity. The European Commission tackles this question differently from the Max Planck Society. There should be an understanding among science institutions that acting differently is necessary. Similarly, the great variety of institutions means that measures and cooperation models also need to be diverse. The science community should incorporate steps into overall systems and mirror these with other actions to frame bigger questions.

Internationalization

Both the Fraunhofer-Gesellschaft and the Max Planck Society operate institutes abroad. Christoph Ettl said that in Europe there are three Max Planck Institutes that are traditionally based abroad: two in Italy and one in the Netherlands. The new Max Planck Institute in Florida and the recently established partner institutes in Shanghai and Buenos Aires, which are operated as cooperation projects with local scientific organizations, should also be mentioned in this context. After 1989 the Max Planck Society established more than ten institutes in the Eastern part of Germany. They became a success story and have contributed to the cultural wealth of their regions. He observed that clusters have a positive impact on regions with similar activities.

Lothar Behlau stressed another, more critical aspect of international collaborations when he said they need to have an impact

on German and European industry. The Fraunhofer-Gesellschaft has found a way to ensure this happens. The five Fraunhofer Centers in the US are required to regularly prove that their collaborations are having a direct and real impact on Germany and German industry.

Promotion of graduates and junior scientists

The question of graduate support and promotion was discussed by focusing on the aspects of graduate schools and joint appointments of junior scientists. For the Helmholtz Association, joint appointments are necessary and common practice. There are efficient talent management programs and different opportunities for junior scientists to get ahead. There can even be graduate schools within Virtual Institutes.

Generally, there is a different intensity of cooperation for non-university institutions and universities depending on the model used for joint appointments (Karlsruhe model, Berlin model, Zurich model). The Fraunhofer-Gesellschaft has 3,000 PhD students working in its various institutes, and it regularly makes joint appointments.

The Max Planck Society has also had positive experience with joint appointments, but occasionally they have difficulties. Although several directorships of Max Planck institutes form joint appointments and the position is generally associated

with a great degree of prestige for the respective university, the positions themselves are difficult to fill due to a relatively heavy teaching workload and because continuity regarding the research discipline cannot be guaranteed when an institute needs to be restructured. Collaboration with universities at the graduate level is very fruitful, not least because of the over 60 International Max Planck Research Schools (IMPRS) mentioned earlier, which operate in close cooperation with universities.

Graduate promotion is also endorsed by the JRC, which offers PhD and postdoc programs. Visiting scientists and national experts come to the JRC for short periods of time to share their expertise.

From “Land of Plenty” to heavy cuts in public funding

The final question of the workshop was discussed in hypothetical terms since it concerned a controversial future scenario – a heavy cut in public expenditure. Looking at Germany from outside, it could be said that it currently resembles a “land of plenty” (Schlaraffenland) because it seems like the perfect science system. Yet, if one envisages a worst-case scenario, saying if the euro crisis affected Germany to a much greater extent and it had to make a 50% cut in research funding investments, how would that affect research strategy/strategies?

In his answer Peter Heil recalled the current situation of public funding for research and education in Germany, in which the federal states (Länder) have the financial authority for

universities, not the federal government. According to that scenario, it would be a difficult situation for the federal government because of the conflicts between the federal states. The government could start funding universities. A process of identifying what appear to be the best universities would ensue. They would probably end up choosing 16 universities since there are 16 federal states. These universities would become federal universities (Bundesuniversitäten). Some universities might have to close down, and some non-university institutions might have to close too. But he warned that conflicts could develop within the Max Planck Society because of budget responsibility and authority and in the State-Länder conference concerning the financing of the Leibniz Association.

Lothar Behlau, the advocate for clear and precise missions, continued that a process in three steps would be necessary. The first step would be to change the mission. The second step would require an increase in competition, and the third and final step would consist of cuts in work contracts.

Christoph Ettl said that heavy cuts in funding would not cause the Max Planck Society to change its mission, but they would definitely force it to reduce the number of Max Planck institutes.

The general reaction toward this worst-case scenario was in accordance with Darwin’s theory of evolution and the idea of the “survival of the fittest” – the best universities will survive.

summarized by CCD



DR. LOTHAR BEHLAU, Fraunhofer-Gesellschaft

How self-governed are the planning processes in the institutes of different scientific societies?

Speaking for the Fraunhofer-Gesellschaft the processes of R&D planning and the possibilities of the successive performing of research are quite autonomous and self-governed. There are two major influences on the strategy finding process: the public R&D programmes which Fraunhofer has to follow and the short and medium term demand of industry. Both are drivers for Fraunhofer's orientation. Fraunhofer is as well able to create new R&D topics („markets for the day after tomorrow“) and to finance them with their own institutional funding (technology push), even this amount is limited.

How strong is the influence of the BMBF and its foresight processes?

Fraunhofer cannot wait for these processes and their results because they are often lacking in time and are somehow only reflecting actual debates of the scientific communities. Fraunhofer has to develop more sensitive instruments and internal processes in order to detect very early new signals and new markets. The foresight processes of the BMBF are mainly

confirming the strategic topics of the research organizations. The output of the BMBF processes are well aggregated on a very broad level but are not useful to influence the strategy of the institution apart from the fact that the future public project funding will be following these results (see answer above).

How successful is the development of strategies? What is the input on the operational/institutional level?

The definition of medium term R&D topics (if this is meant with „strategy“) for an R&D institution is necessary in order to:

- analyze one's own potential in relation to the state of the art and to competitors
- to make a resource planning and a professional road map planning
- to communicate internally on the aim of the institute
- to cooperate with other partners to build critical masses

Fraunhofer has implemented strategies on the institute's and the corporate level, both refer to each other. The institutes use standardized processes to develop their strategy.



DR. CHRISTOPH Ettl, Max Planck Society

The fundamental principle of the Max Planck Society is to allow outstandingly creative scientists, who think in interdisciplinary terms, scope for independent scientific development. This Harnack principle takes its name from the first President of the Kaiser Wilhelm Society, which was the Max Planck Society's predecessor organization. It represents a traditional policy of appointing the brightest minds as Scientific Members of the Max Planck Society, and building whole departments around these exceptional individuals when they become departmental directors. Yet the Harnack principle is concerned with more than just the central role of these researchers. It can also be seen as a complex of guiding principles for the overall organization of research, with the aim of making new scientific perspectives effective in the long term. The necessary freedom to achieve this aim is afforded by the Society's exceptional organizational structure. The Scientific Member alone decides on his or her research objectives and methods. Such conditions, combined with rigorous selection of candidates for appointment, have made the Max Planck Society one of the most attractive destinations in Germany for leading international scientists. Once appointed, the heads of department or Max Planck Research Groups do not follow a curriculum or research programme determined by the organization or by market requirements. Instead, they rely on their own intuition, which allows them as researchers to transform and advance the cause of science. Appointments, made in accordance with the

Harnack principle, involve the provision of funding based on a profound leap of faith. Therefore, the Max Planck Society's finance model for Scientific Members is often referred to as being based on a high-trust principle. This contrasts with the low trust principle, whereby funding is allocated purely on a project or programme basis. At a Max Planck institute, when a scientist is appointed as director, he or she is provided with resources until his or her retirement as a Scientific Member.

An important factor in the success of the Max Planck Society is the commitment of Scientific Members to think beyond their own departments in the interest of the Society as a whole. This commitment is exemplified by the regular meetings of the three Sections (Biology and Medicine; Chemistry, Physics and Technology; and the Humanities). The Sections include all Scientific Members and representatives of the other scientific staff members for each of the scientific fields. At these meetings, the Sections discuss the future scientific development of the Max Planck Society and establish the basis for key decisions.

A natural starting point for the reorientation of institutes arises when Scientific Members retire. At such times, suitable new topics are integrated into the portfolio of the institutes through the careful development of existing topics, and ways of launching new areas are established. The approach adopted varies depending on the situation.

If only one director leaves, an institute is requested to identify an outstanding researcher who best matches the institute's overall profile and who can offer the greatest potential for innovation. As part of this process, the institute consults with the Perspectives Commission of the relevant Section. An appointment committee, comprising high-ranking internal and external individuals established by the Section, examines the proposal and independently looks for suitable candidates. Following evaluation by a large number of renowned international experts, the final scientific assessment is carried out by the Section members. A core element of the Max Planck Society's culture is to expand the organization's common scientific basis by recruiting highly creative minds, and to improve the society's overall performance continuously through the appointment of outstanding colleagues.

If several Scientific Members leave an institute, or if it is deemed appropriate by the President or the Sections for other reasons, consultation on the subsequent procedure takes place at a higher level. A Core Committee or Presidential Committee consults on development options, suitable fields and possible candidates. An

extensive range of instruments, such as search symposia and the drawing up of competing strategic proposals is available for this task. The Max Planck Society also attaches great importance to external expertise in these processes.

Although research fields are sometimes first identified during the appointment procedure, this does not conflict with the concept of appointments based on the Harnack principle; the main focus always remains the person to be appointed. If the best possible person cannot be attracted in a particular field, a new research topic is selected. Excellence is not compromised. The Max Planck Society sometimes identifies outstanding researchers before establishing the Max Planck institute that would provide the most beneficial working opportunities for them. When a suitable candidate is identified, the decision to appoint him or her is made by the Senate of the Max Planck Society. This body is made up of outstanding figures from the fields of science, industry and politics, and further social groups. As with other important decisions, such as the founding of new institutes, the Max Planck Society also avails itself of independent assessments by external experts in this instance.



DR. PETER HEIL, Leibniz Association

How self-governed are the planning processes of the individual institutes within the various scientific societies?

The management of a Leibniz institution is responsible for the development of an overall plan for the individual institute. The plan must be able to maintain a strong position before the Science Council and the Board in terms of content and structure. In addition, it is also assessed within the framework of an external evaluation (cf. [www.leibniz-gemeinschaft.de / evaluation / senate statements](http://www.leibniz-gemeinschaft.de/evaluation/senate-statements)). Regular evaluation by the Leibniz Senate serves the Federation and Federal States in determining whether joint funding should be continued or terminated.

How influential is the Federal Ministry of Education and Research (BMBF) and its foresight processes?

Leibniz institutions ordinarily receive fifty per cent of institutional funding from the Federation and fifty per cent from the Federal States. Major decisions concerning the budget amount are made by the Joint Science Conference. The country of domicile and the Federation are represented on the Board of a Leibniz institution.

Due to this structure, the provisions of a single state actor which are implemented through funding decisions play less of a role in the institute's development than they would in those institutions which are primarily funded by one actor (for example the BMBF).

How successful is the development of strategies? What is the input on the operational/institutional level?

The evaluations by the Leibniz Senate show that a distinct profiling and strategic orientation clearly lead to better academic and scientific performances. Strategic development is not "l'art pour l'art".

Institutional forms of organization and structure are necessary to foster the development of a strategy that will impact performance. One is constantly reminded that adapting structures to meet new objectives is a very arduous but rewarding task.



PROF. DR. STEFAN JOOS, Helmholtz Association

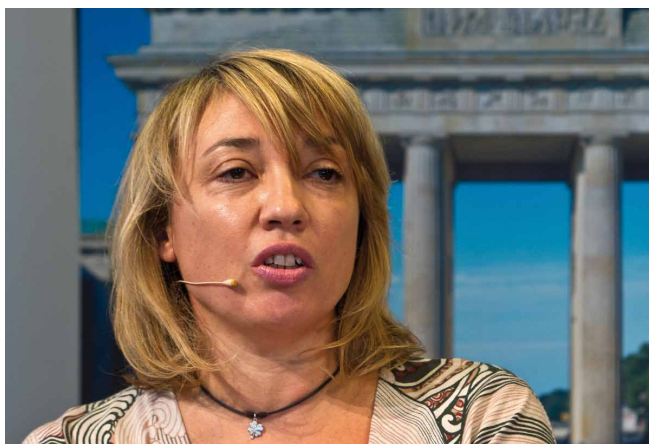
Research Planning and Institutional Logics – The Helmholtz Perspective

The Helmholtz Association represents the largest non-university research institution in Germany financed by the Federal Government and the Federal States (90%/10%). Overall, 18 Helmholtz centers are collaborating in six research areas, i.e. Earth and Environment, Structure of Matter, Energy, Aeronautics, Air and Space, Key Technologies and Health. Scientific work is focusing on major scientific challenges by applying long-term oriented research as well as operation and development of complex infrastructure and large-scale facilities.

Major strategic processes at Helmholtz include (i) those in the context of program-oriented funding; (ii) the Helmholtz portfolio process; and (iii) the roadmap process of research infrastructures and large research facilities. Based on the results of these strategies, which are continuously discussed between the Helmholtz Association, external specialists and the corresponding federal ministries, new research programs are established every five years. These

programs undergo a strong and competitive international peer review focusing not only on various parameters of scientific quality but, additionally, on strategic relevance. The research strategy over the five year period is not rigid but can be adapted according to scientific developments. Flexibility is also gained by the Impuls- and Networking Fund of the President of the Helmholtz Association, allowing the initiation of strategically important projects, which might be considered for institutional funding at a later stage. This funding tool is frequently used to support cooperations with external partners, in particular universities, and to promote education or the recruitment of young researchers from particular disciplines.

The balance of strategic autonomy and influence of ministries in the context of Helmholtz research planning as well as *pros and cons* of the strategic processes described will be discussed in more detail during the workshop.



DR. FABIANA SCAPOLO, European Commission – Joint Research Centre

The Joint Research Centre (JRC) as one of the Directorates General (DG) of the European Commission (EC) provides customer-driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies. Its seven research institutes are distributed across five sites in Europe (Belgium, Germany, Italy, the Netherlands, and Spain) with its headquarters located in Brussels.

The mission of the Joint Research Centre is to provide customer driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies.

As a service of the European Commission, the Joint Research Centre functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

The JRC has about 2750 permanent and temporary staff. It is active in the policy areas of energy, transport, environment, climate change, competitiveness, safety of food and consumer products, security, crisis management, and nuclear safety and security. The principle customers of the JRC are the policy-making Directorates

General of the European Commission. The JRC also provides scientific-technical support to other EU institutions such as the European Parliament. The JRC cooperates with relevant EU agencies through exchanging data and information, providing informatics tools and risk assessment models. It provides support to the Member States in areas where it has a special competence (e.g. environmental and civil crisis management, anticipation, nuclear forensics and damage assessment). In the frame of the EU's enlargement, the JRC also assists accession and candidate countries in the take-up of the body of EU law (so-called *acquis communautaire*).

The main customer DGs of the JRC are the DGs for Energy and Transport, Enterprise and Industry, Environment, Climate Change, Agriculture and Rural Development, Health and Consumer Policy, and Research and Innovation.

The JRC bases its strategy on the need to meet the Grand Challenges facing the EU and world set by the Lisbon Treaty and the Europe 2020 Strategy, and specifically to support the strengthening of the European Research Area (ERA). The ERA provides the JRC with its strategic research policy context as we address the challenges and priorities of Europe 2020.

In order to be more pro-active, the JRC is developing its capacity to anticipate future policy-relevant areas potentially requiring action. The JRC has started building a corporate capacity to provide HORIZON SCANNING AND FORESIGHT INTELLIGENCE. This includes:

- Scanning of the scientific landscape and alerting the JRC community, networks and customers to significant developments of policy relevance.
- Providing in depth studies using foresight methods and analyses in selected areas with the support of expert networks from Member States and the international scientific community.
- Providing support to policy DGs and other EU institutions when joint interests call for systematic investigations of new or critical areas of work.

This capacity will support the further development of the JRC, consequent work programmes and, where relevant, provide input to other Commission services. It will enable the identification and monitoring of emerging scientific, technological or policy areas that the JRC and policy DGs may want to address in the years ahead. The horizon scan and foresight activity will use JRC competences, experts from other Commission services, and experts from outside organisations.



left to right: P. Alt, R. Münch, B. Sporn, J. Oddershede, D. Scally (Facilitator)

Panel Discussion:

Are Universities Allowed and Capable of Planning their Research?

PROF. DR. PETER-ANDRÉ ALT, Freie Universität Berlin

PROF. DR. RICHARD MÜNCH, Universität Bamberg

PROF. DR. JENS ODDERSHEDE, Syddansk Universitet

PROF. DR. BARBARA SPORN, Wirtschaftsuniversität Wien

Facilitator: DEREK SCALLY, Irish Times

This discussion focused on the issue of whether universities are allowed to plan their own research and whether they are capable of doing it. It started with a number of introductory questions such as to what extent universities should focus and plan their own research and whether they should be allowed to do this more autonomously, or is that a luxury society can no longer afford? Is there an ideal framework for identifying research areas? Can greater planning, coordination and collaboration increase research success rates?

The importance of foresight for strategic planning

In his opening statement Peter-André Alt stressed that planning research based on the instruments provided by foresight studies is very helpful for formulating an overall university strategy. It is essential for a modern university, since decision-making processes are embedded in two major frameworks: competition and strategic thinking. Options for strategic thinking are needed, and it is crucial to know what will be on the research agenda. Foresight facilitates opportunities for cooperation. However, it should not influence the disciplines themselves but should facilitate bridging the gaps between them. It is not possible to define specific topics in each field but it is necessary to have a framework for a good decision-making process. Therefore, foresight should focus on a metadisciplinary and transdisciplinary perspective. Designing good academic environments needs to be supported by recruitment strategies that depend on the knowledge of the future

research fields. Executive boards should provide incentives and fund processes to organise cooperation and facilitate communication. Universities have to develop strategic options, set priorities and define future goals in joint processes with the whole faculty. This is why Freie Universität Berlin established Focus Areas that enable researchers to work together beyond the constraints of disciplinary boundaries. We need knowledge of future developments if we are going to shape the Focus Areas and create a good balance between top-down and bottom-up processes. For all these strategic issues, it is important to embed the strategic approach in future activities to have a strategy that is informed by foresight studies.

Conditions for research

Richard Münch stressed that he wants to present a researcher's perspective, not an administrator's perspective. His reference point is not an individual university but science as a global system and the advancement of scientific knowledge. From the sociology of science studies we know that knowledge does not progress as an outcome of strategic planning; it just happens and we do not know it in advance. If we want to promote and maintain the conditions for breakthroughs, we need to create conditions to promote autonomous research. It is important to strengthen the idea that knowledge is a public good, not a private good, and one that is independent of external influences. The scientific community is a central body that acknowledges scientific achievement. We need a plurality of institutions, theories and methods.

Universities need strong departments to counterbalance the growing strength of university managements. Universities have always been in charge of balancing the sacred core of basic research and the needs of education, professional service and applied research. However, what can be experienced now is a shift in the balance toward external demands on universities.

Studies show it is important to have small research groups in the breakthrough fields and locate them in a diverse environment that provides them with a variety of stimuli. These creative units should receive stable funding and be autonomous in their decisions, and should be under little external control by the university management. Strategic planning is part of the turn to an entrepreneurial university and it is changing this institutional precondition for the flourishing of science.

Challenges for universities in research planning

Barbara Sporn said that universities are being pushed to carry out strategic planning due to growing competition, increased mobility and a scarcity of resources. In view of the scarcity of resources and increasing competition, universities have to find a way to respond to these challenges. A number of important issues should be mentioned in this context, including accountability and differentiation. Funders (state and private donors) are increasingly holding universities accountable as providers of knowledge and graduates. As for differentiation, profiling needs to be mentioned. It is important to be distinguishable from fellow competitors and fellow institutions. Profiling is also crucial for market accreditation procedures that require an area of excellence. It is also worth mentioning the impact of trends like new public management, entrepreneurial university, new governance structures and empowerment at the top level of the institution, all of which preclude autonomy and are connected to the issue of dependence on multiple levels of funding. Universities have to respond to this new environment. When carrying out strategic planning, it is possible to combine both rigour and relevance. Universities can combine *emergent strategies* (giving a profile, showing the area of excellence) and *planned strategies* (areas that

need to be addressed particularly by public institutions). Such an approach provides a number of benefits: it is helpful for resource allocation; it creates a profile in a competitive market, and last but not least, it helps raise funds.

Funding, evaluation and the danger of isomorphic trends

Jens Oddershede argued that instead of saying we are planning research for the future, we should say that the future is about planning and dictating research. When considering research planning at universities, there are many aspects that could be discussed, but he wanted to focus on the issue of funding. He began by highlighting the importance of multiple funding sources. Competitive funds are very important, but maintaining control over internal funds could become up more difficult. Therefore an important question for research planning is the correct balance between basic funds and competitive funds.

Richard Münch agreed that the crucial question is the balance between basic and competitive funds. Since basic research is not immediately usable, society has to wonder what to do with a growing number of scientists. Measurability and accountability are being introduced to decrease complexity. Research planning is subject to isomorphic tendencies (imitational behaviour), and it is often a reactive process leading rather to normalisation than instead of innovation.

Barbara Sporn agreed that there is more convergence leading to the dominance of one institutional model and there is a strong danger of isomorphic trends, i.e. that in the long run all universities are going to look the same. Universities have to be careful not to be streamlined and mainstreamed and should be courageous enough as institutions to focus on fields that are not trendy. However, she doubts that there is a crisis in research or a lack of basic research and creativity in the science system. Universities are facing multiple challenges and there is huge dynamics on an institutional level. There are new institutions and new areas of high-potential research that get a lot of interest, including from funding agencies. Support should go to the best, and not just to the fittest and the fastest.

Jens Oddershede drew attention to the impact of evaluation processes and rankings, which in the long term could lead to the preclusion of divergence. Different disciplines are all being evaluated according to the hard science model. Universities serve multidimensional purposes, but the impact of ranking agencies and evaluations has resulted in a trend towards a one-dimensional university. This is a dangerous scenario. Peter-André Alt agreed that we should not accept the influence of the rankings. The additional aspect of planning is connected to competition and the necessity of applying for external funds. So the issue of measuring quality and adequate indicators during the competition process is important too. There needs to be more openness to unconventional methods and more funding lines to support unexpected ideas. Greater flexibility is needed as far as funding perspectives are concerned. Current competition processes are over-bureaucratic and they overburden universities.

Peter-André Alt questioned the idea that external involvement and the need for accountability necessarily mean interference into the research process, since we cannot automatically equate planning with intervening. Independence of research is an unquestionable, untouchable value; however, anticipatory intelligence allowing us to act and not to react can also be beneficial for researchers. Research needs space for action and anticipatory thinking because we need to know what is going to drive us in the future.

Recent European developments

As a reaction to the EU Communication “Supporting growth and jobs – an agenda for the modernisation of Europe’s higher education systems” (COM(2011) 567 final), Peter-André Alt said that resistance should be the response to the document because it imposes a managerial dimension on universities’ daily agendas. The Communication can almost be viewed as an attack on universities. It tries to heavily influence university structures with respect to both research and teaching, and it should not be forgotten that one element of the success story of European universities is the close link between teaching and research. According to Richard

Münch, the Communication is a good example of the impact of the internationalisation of governance in the sphere of education and science. The agents of change are the experts (mostly economists), who view knowledge production and how societies work from a narrow economic perspective.

Institutional diversity and cooperation

Speaking from a German perspective, Peter-André Alt stressed the role of institutional diversity, which he said is an asset. Furthermore, the German Excellence Initiative has provided a strong motivation for the universities to create attractive environments and collaborate with other institutions. It has helped find institutional solutions for better cooperation. Richard Münch emphasised the importance of cooperation between universities and non-university institutes.

Planning and recruitment procedures

During the discussion with the audience, Arthur Bienenstock of Stanford University noted that the difference between the US and Europe is that one makes it the faculty’s collective responsibility to educate its graduate students whereas the other makes it the individual faculty member’s responsibility. When deciding on appointments, the faculty – given that no one can predict the future – decides to go for the very best person they can get. Peter-André Alt stressed that steering processes with the departments called target agreements including recruitment strategies (collective responsibility) and a linkage between the midterm perspective and the recruitment process. Richard Münch emphasised the importance of planning at the faculty level and the strategic role that can be assigned to recruiting new professors. This is an important aspect of strategic planning that is still foreign to the German system. Peter-André Alt explained that appointment schemes are mandatory in Germany. Nevertheless, universities are able to react in certain fields, and they have been able to redefine appointment schemes in recent years.

summarized by CCD



PROF. DR. PETER-ANDRÉ ALT, Freie Universität Berlin

The best way to anticipate the future is to design and to shape it – this motto should be mandatory both for politics and research. Considering the situation in academic research, the principle seems not to be as commonly accepted as it should be. When it comes to research, most institutions tend to neglect the potential which can be realized by planning future activities. To avoid a typical misconception: this is not a question of how to identify future methods and innovations. Nor should it be debatable to renew the ideology of five-year-plans for research. However, it is possible to identify urgent topics, the potential for cooperation, and the funding perspectives. These are three fields of major interest available for foresight activities, aiming to cope with future challenges.

1st: Foresight activities should depart from the question of social requirements for present research. Unless we manage our recent challenges, we are not able to discuss future needs. The most unique way toward anticipating research tasks of tomorrow is to understand what we have to do now. No one is able to overview the future without grasping his or her own present.

2nd: Drafting future fields of research demands a deep knowledge of cooperation potentials. This must imply a scrutiny of innovative types of cooperation, an identification of new ways of bridging different disciplines, and the establishment of hubs and knots for joint methods. To find a mutual basis bringing together the respective fields is a distinct goal for foresight analysis – and a cornerstone of its success.

3rd: These premises reveal that planning research for the future must be an institutional activity, stimulated by the universities' (or extramural institutions') executive board, carried out by experts who are well informed on current developments. Both tools for a research strategy and measures to match people of different disciplines are elements of an overarching perspective which should be sketched by the executive unit. This does not mean that planning research is a top down agenda – all initiatives for future activities have to be launched by the researchers themselves. But the first step has to be taken by the executive unit in order to establish stimulating environments for future activities.

4th: Foresight activities should focus on identifying funding perspectives. They have to improve the standards for future research by tracing resources for material support. Indicators for success are, for this reason, how strategic development enables the university to allocate means for new projects. Finally, this is a pragmatic but important reason for a university to develop an agenda for the future – the university must act (and not react), aiming for better material perspectives for the future.



PROF. DR. RICHARD MÜNCH, Universität Bamberg

The Death of Creativity: Science in the Stranglehold of Strategic Planning

The new entrepreneurial university disempowers the scientific and academic communities and the disciplinary associations as trustees of the progress in knowledge in the inner core of science and in its outside relationship to society. The collective search for knowledge as a collective good and the collective process of education and knowledge transfer to society in the hands of the scientific and academic communities and the individual disciplinary associations is replaced with the privatized utilization of the progress in knowledge, of education and of knowledge transfer by entrepreneurial universities in the competition for market shares and monopoly rents. This fundamental institutional change threatens inner academic freedom and subjects education and knowledge transfer to external purposes.

The loss of autonomy of research, teaching and learning resulting from the penetration of the economy into the academic field, has crucial consequences for the evolution of knowledge and the academic educational process. The transfer from control via honor, recognition and intrinsic motivation to success figures, profit and extrinsic motivation changes the process of generating knowledge and educating students from being an end in itself to becoming a means for the end of meeting numbers and generating yields. Hence, the potential embedded in the knowledge generating and education process as such is reduced to what can be utilized in economic terms. What is valuable knowledge and valuable education is no longer

determined by the trusteeship of the academic community in cooperation with the disciplinary and professional associations on the one hand, and politics, economy, civil society and public on the other hand. What is crucial now is exclusively the demand from the students who are no longer considered members of the academic community but customers of the entrepreneurial university, but also the demand coming directly from the economy, politics, civil society and the public.

It appears logical that this shift in the definitional power referring to the value of knowledge and education from the side of researchers, teachers and students as an academic community, to the side of external demanders for knowledge and education triggers a restriction of the knowledge generating and education process to what can be utilized in line with the interests introduced from the outside. This means nothing less than the end of academic freedom and the instrumentalization of education and science for external purposes.

In this way, the knowledge and educational process is going to lose its inner dynamics, its creative potential, its ability for continued renewal, its openness for what is new and unknown. Both – the search for knowledge and education – are no longer fueled by themselves with open results, but are driven by outside interests that are always rooted in the ruling knowledge and thought. The potential for the renewal of knowledge is shrinking.



PROF. DR. JENS ODDERSHEDE, Syddansk Universitet

As a university president my main contribution to research lies not in the production of individual research results or research reports. Rather, it is my responsibility to provide the framework for the faculties for doing research and thus to work with research funding partner, public as well as private, to ensure that the funding is as abundant as possible and also enters the university in a way that supports our strategy and the way that in agreement with the manner research must function at a university in the 21st century.

I am president of a comprehensive university with colleges of science, engineering, arts/humanity, social science/business and health science. Thus, it is also necessary to ensure that the research planning at the University of Southern Denmark allows for the diversity there must be across such a broad field of endeavour.

- Given those constraint I am of the opinion that research funding for a comprehensive university must include
- Basic funding that support the research based education that is a hallmark of any research university
- Basic funding that allows for bottom-up research planning initiated by the university itself and in agreement with its strategy
- Both basic funding and competitive grant funding, the latter from both private and public funds
- Some competitive grants that are purely bottom up, that is, initiated by the individual researcher and others that are strategic, that is, where the funding agent has decided the *topic* of the research – but not the *outcome* of the research.

There are many balances to be struck in the weights of these ingredients in the funding of a given university. What is the balance between basic research funding and competitive funding? How large a fraction may strategic research be of the total research output if we still wish maintain our objectivity and independence? How does it vary across the very different fields of research at a comprehensive university?

These and related questions will be addressed in my contribution – taking the outset in the situation we have in Denmark.



PROF. DR. BARBARA SPORN, Wirtschaftsuniversität Wien

The University as Enterprise

Universities in the German-speaking area have seen many, often fundamental changes. Budget cuts, organization reform and student protest are some of the more prominent examples. Overall, a trend towards more accountability, management, and planning can be observed. Universities are described as enterprises which need to plan their resources, innovate their services and understand their internal as well as external stakeholder expectations.

At the same time, competition and market pressure have increased for the best talent and the scarce resources. Institutions with a strong reputation in research and a clear profile are often more successful in this environment. They are pushed to analyze their core areas of competence and need to invest in certain fields. Funding agencies at the national and international level require universities to develop these fields of expertise.

Research Planning

Freedom of research and teaching has been a high value in higher education for a long time. Science has to be free from political, economic or social pressures in order to move a field forward. Many innovations are based on this basic research. Universities need to guarantee a structure which allows the development of talent independent of any market trends or funding requirements. New fields have to be able to evolve.

Apart from an “open space for research” most universities define research objectives. They want to develop, reward, and promote young researchers, or they want to offer an attractive infrastructure for senior researchers and their projects. In this sense, a certain commitment to planning a research environment is necessary.

In Need of a Profile?

The landscape for research funding has changed. Universities need to set up mechanisms to develop areas of expertise and to create groups which form clusters of research. They will then form a specific profile for students and faculty to recognize the character of an institution. Often funding agencies – under the heading “strengthening strengths” - want to be sure that their money is spent for strong competent teams.

It is not easy to plan research. Universities need to make choices about which areas to build. It requires leadership and a certain amount of top-down process with bottom-up participation in order to be successful. Ideally, universities combine faculty expertise with societal needs as a basis to develop a profile. Society at large looks for institutions of higher education which can provide rigor and relevance in their research.



left to right: S. Hermans, M. Decker, S. Kuhlmann, E. Beyer, D. Scally (Facilitator)

Plenum I:

Strategic Intelligence in Science and Research Policy and Structural Implications for the Research System

ENGELBERT BEYER, Federal Ministry of Education and Research

PROF. DR. MICHAEL DECKER, Karlsruhe Institute of Technology

STEFAN HERMANS, European Commission

PROF. DR. STEFAN KUHLMANN, University of Twente

Facilitator: DEREK SCALLY, Irish Times

The session focused on the role of strategic intelligence in science and research policy and in particular the structural implications for the research system. Against the backdrop of the dramatic changes that have occurred in the research world during the past two decades, the aim of the discussion was to reflect on how this influenced the motivations of the superordinate actors at the national level and European level.

Major trends in innovation policy approaches from a German perspective

In his opening statement, Engelbert Beyer pointed out three major developments that are currently of particular interest for the Federal Ministry of Education and Research (BMBF). The first is a growing trend toward coordinative policy approaches, such as the German High-Tech Strategy, which aims to coordinate all R&D agencies at the federal level. At the same time, policy measures focus on priority areas where it is possible to create high added value. The second is a change in innovation policies toward a “mission-oriented approach”. Ten to fifteen years ago, innovation policies mainly followed what might be called a “technology-push approach”, which focused on investments in new scientific and technological developments. Today’s policies are oriented towards larger social or economic goals and seek implementation schemes to reach those overarching goals. Third, strategic planning is now embedded in a multi-actor system, which means the overall goals of R&D are set not only by federal agencies but also by corporate research strategies, independent research organizations like the Fraunhofer-Gesellschaft, universities and other actors.

The concept of strategic planning from the perspective of innovation policy research

Stefan Kuhlmann’s opening statement highlighted the fact that the concept of strategic intelligence was put forward by innovation policy researchers some time ago. In recent years he watched with great interest as many of these ideas were adopted and implemented by innovation policy. The basic idea behind the concept of strategic intelligence is that innovation policy acts within a multi-actor system comprising various levels (research, policy, economy, organizations, national, European). Strategic intelligence was designed as a research approach to better understand the interrelations and interactions within this system based on empirical evidence using e.g. evaluations, foresight, technology assessment or benchmarking exercises. The approach has gained ground during the past two decades, and, in the view of Stefan Kuhlmann, it may have even taken hold of too much. He therefore warned against an overly mechanistic and naïve use of strategic intelligence tools in research planning and policy. Rather, he said there is a need to apply this approach in a cautious and reflective way. Policy researchers and policymakers constantly have to ask themselves whether the assumptions used when applying this approach are still valid, since the world of science and innovation policy is changing very quickly. There are new demands coming from society as well as from the staggering internationalization of science systems and research activities. New players in the system, such as those from Asia, the development of international collaboration networks, and the

high international mobility of scientists all pose new challenges that science and innovation policies have to respond to.

Strategic planning implemented – the perspective of the Helmholtz Association

Michael Decker's opening statement focused on the specific perspective of the Helmholtz Association and presented some thoughts on its program planning approach. All Helmholtz Centers are asked to develop five-year research programs that define a framework for the basic funding they receive. Although five years seems like too long a time to predict what their future research needs will be, the program planning approach does provide a reasonable amount of flexibility. Changes can always be made to the research program if good arguments are presented against the priorities that were originally set. Thus the Helmholtz approach to program planning can be viewed as one good example of a strategic tool applied in a flexible and thoughtful manner.

The European Commission's agenda for Europe's higher education system

Stefaan Hermans' opening remarks raised awareness for the Communication from the Commission entitled "Supporting growth and jobs – an agenda for the modernization of Europe's higher education systems", published in September 2011. His intention was to place the reform agenda drafted by the Commission Communication within the wider political and policy context of the European Union. As the main point of reference, he highlighted the Europe 2020 strategy, which provides the framework for future EU policies by setting overarching goals of smart, sustainable, more inclusive growth. The science and research system is an important vehicle to reach these goals. The central idea from the EU 2020 strategy is therefore one of an "innovation union" that addresses the structural weaknesses in the European innovation system. One of the main weaknesses identified in this context is the failure to transform knowledge into innovation, economic growth and employment. In this regard, the role of universities seems to be of crucial importance and should be strengthened. This is why the Commission Communication has placed a strong emphasis on how higher education can be connected to research and innovation and why it has drafted a package of measures that address the future quantitative and qualitative level of education and research. Based on the opening statements from the

panel members, the discussion focused on three items. The first was the role of politics in creating favorable research environments versus setting research objectives. The second concerned the role of (international) rankings for the strategic orientation of research organizations, and the third involved the relationship between policy approaches at the national (German) level and EU level.

The role of politics in research planning

As Derek Scally pointed out, the Commission Communication raised concerns – especially in the German debate – that the Commission does not place enough emphasis on research. This led to the question of which role the Commission wants to take in strategic research planning. Stefaan Hermans said that the Communication was primarily a way for the Commission to exercise its right and obligation to initiate a debate about future policy objectives and approaches. The objective of the paper was thus to ensure that larger goals of R&D policy are formulated, articulated and debated and to put the universities in the center of this debate. The responsibility of the researchers to set specific research priorities obviously remains untouched by this debate.

Stefan Kuhlmann acknowledged this general intention of the Commission Communication and expressed full agreement with the importance of higher education and research. Yet he called also attention to some contradictions not addressed appropriately by the Commission Communication. First, he asserted that the Commission Communication appears to treat research like an economic commodity. Research and innovation can of course have a significant economic impact, but investments in research cannot be made as if research was a commodity. Second, he emphasized that there are contradictory demands that affect universities in particular. On one hand, large organizations are needed to provide higher education to some 40 percent of young people. On the other, creative research needs flexibility and protected space within these large organizations. In the eyes of Stefan Kuhlmann, the Commission Communication falls short in dealing with these contradictions and more detailed organizational challenges.

Engelbert Beyer added that although it is essential to increase R&D budgets to improve the innovation system, the outcome of policy interventions is difficult to measure. Due to the complex interrelations in the multi-actor system of research and innovation the impact of

policy measures is often not easily to evaluate. Policy therefore has to focus on two areas. The first requires the creation of favorable framework conditions for universities and research institutions, while the second requires them to stimulate and strengthen “smart specialization”. In the increasingly international innovation system, specialization is the foundation of (national) success.

Michael Decker agreed that even innovation researchers are not able to predict which kind of research is most likely to lead to innovation. He concluded that policies should not have too narrow a thematic focus. Research shows that most breakthrough innovations have emerged from long-term developments that could only be reconstructed in hindsight.

The role of rankings for the strategic orientation of research organizations

Another issue raised by the Commission Communication and discussed by the panel was the concern expressed by numerous researchers that research policy is increasingly applying management language and tools to the research system. In particular, the increasing importance of rankings and approaches to tabulate success is viewed with serious skepticism on the part of researchers and education stakeholders.

Stefaan Hermans defended the approach of the Commission to improve the evidence base for policymaking by developing better analysis and evaluation tools. In his opinion, rankings are now a matter of fact and are widely recognized by universities, professors, students, policymakers and other stakeholders. The Commission therefore aims to improve ranking tools rather than neglect the impact that rankings already have on the research system. A feasibility study showed that there is scope to develop a multi-dimensional ranking which takes into account the specific character and strength of the European university system and research system.

Referring to a recent journal article (A. Rip in “Asian Research Policy” Vol. 2, 1, 2011), Stefan Kuhlmann opposed this position by citing the illusion that an “excellence bubble” will develop within the next ten to twenty years. According to this idea, the “global race for reputation” will lead to a situation where rankings are used to such a degree that they develop into “excellence derivatives”. Like financial derivatives, the abstract ranking results will have nearly no relation to the real situation and the real performance

of the universities and research institutions. As the story goes, the “excellence bubble” will burst because strong US universities in particular will quit the rankings in favor of providing liberty and protected spaces to enable creative research. Engelbert Beyer offered a German perspective, saying that rankings might create a negative bias due to the dual structure of the German research system, with its universities in one camp and non-university research institutions in the other. For the German system, it would therefore be better to have rankings that focus on clusters of excellence rather than on single institutions.

Adding to this, Michael Decker said that he would appreciate a greater diversity of rankings that address the varying interests of those being ranked (students, professors, universities). This could also prevent the normative impact of “one-size-fits-all” rankings and the resulting adaptation strategies adopted by universities and research institutions that could lead to less diversity in the research system.

Relation between national and EU policy approaches

The critical discussion on the Commission Communication raised the question of whether the EU approach produced tensions with the national policy approaches or whether there is a larger consensus on the future direction of research and innovation policy at the different levels. Engelbert Beyer stated that from his point of view a policy shift is occurring at the national level and the European level towards a stronger focus on demand and societal needs. This “mission-oriented approach” is the starting point for the development of policy programs such as those in the framework of the German High-Tech Strategy and in the context of the EU 2020 strategy. The European Commission is therefore an important partner of the German Ministry of Education and Research within the multi-actor system.

Stefan Kuhlmann underscored this position by drawing attention to the new European treaty, which states that future research and innovation policy will be the responsibility of both the national governments and the EU Commission. However, the question of how coordination between both levels will actually be implemented is still unanswered, and the process has only just begun.

summarized by CCD



PROF. DR. MICHAEL DECKER, Karlsruhe Institute of Technology (KIT)

Which kind of influence do structural decisions about the scientific system have on the contents of institutional research?

There is a wide spectrum of structural decisions about the science system which go – not surprisingly – hand in hand with a spectrum of influences. If you think about the shift from a research institute from Helmholtz Association to Fraunhofer Gesellschaft, as we were able to observe in Sankt Augustin some years ago, the influence becomes obvious in totally different evaluation criteria coming along with the different missions of the umbrella organisations. The same, but the other way round happened to the Fraunhofer Institute for Atmospheric Environmental Research (IFU) following a recommendation of the German science council.

What kind of influence do evaluation processes have on the contents of institutional research?

Knowing the Helmholtz world from inside, the main advantage of the programme oriented approach is the common development of the 5 year cross-cutting programmes common to the member institutions of Helmholtz. In our programme there was a not always easy but finally successful communication process resulting in a collaborative programme between the research centre Jülich, DLR and KIT. The evaluation is an additional aspect in this “bottom-up steering process”, the programme is developed not only according to internal preferences but needs to find external acknowledgement as well. The evaluation process itself is competitive in terms of budget, but results, as far as I see it, in minor shifts of resources, only.

What kind of skills which the actors do not have can be contributed for example by the BMBF?

The BMBF is in charge of the political guidelines for the national research agenda. There might be societal needs for which R&D and new technologies can contribute to problem solving. The research political requirements addressed to HGF are an example. Technology Assessments and Foresights can help to identify these requirements.

What are the consequences of the current planning processes for creativity, structure and success of the scientific institutions?

Coming back to the HGF-programmes, the creative phase with reference to the structure is in the programme development phase. Once the programme is running there are possibilities to change the research agenda for relevant reasons. However, this needs arguing. Nevertheless the basic funding allows for these – sometimes necessary – quick adjustments to the research agenda. This possibility in itself can be a success factor for the institution. More-over, additional funding schemes such as HGF-alliances are available, which increase flexibility with substantial cross-funding by the research programmes.



PROF. DR. STEFAN KUHLMANN, University of Twente

The main message of my statement: Keep research policy and planning cautious and “reflexive” and use Strategic Intelligence accordingly! One can define strategic intelligence as a set of – often distributed – sources of information and explorative as well as analytical (theoretical, heuristic, methodological) tools employed to produce useful insight in the actual or potential costs and effects of public or private policy and management.

In Germany, as in many other countries, the governance of higher education and research organisations has changed a lot during the last two decades. We see measurement and evaluation procedures on all levels, increasingly the funding of creative activities of academics (in

research and education) is based on proven performance and “excellence”. Clearly, this has increased the transparency allocation mechanisms and enhanced competitiveness. At the same time though, in many places organisational slack, a major resource for serendipity and creativity, has almost disappeared: “Excellence” has become a buzz word in academia; reputation races are organised; top researchers are traded like football stars; all sorts of “excellence derivatives” emerge. Alternatively, reflexive research planning and strategic intelligence would know: Key resources for vivid and creative science in society are conditions that allow for experimentation, variation, plurality, even redundancy.



left to right: S. Ramakrishna, X. Cao, E. de Mesquita Neto, R. Mu, A. Bienenstock, N. Balakrishnan, D. Scally (Facilitator)

Plenum II: Leaving the Nutshell? International and European Dimensions in Strategic Intelligence for Research

PROF. DR. NARAYANASWAMY BALAKRISHNAN, Indian Institute of Science

PROF. DR. ARTHUR BIENENSTOCK, Stanford University

DR. XIAONAN CAO, The World Bank

PROF. EUCLIDES DE MESQUITA NETO, Unicamp, Brazil

PROF. DR. RONGPING MU, Chinese Academy of Sciences

PROF. DR. SEERAM RAMAKRISHNA, University of Singapore

Facilitator: DEREK SCALLY, Irish Times

International research strategy – the Indian perspective

Narayanaswamy Balakrishnan from India said that Indian research and development focuses on public, social and strategic good to reach to a larger percentage of society. This is because nearly 74% of R&D funding comes from the government. In Europe, the US and other developed economies, R&D is also focused on the private good and is driven by market competitiveness. India has 17 government agencies that coordinate research and development. They include the Department of Science and Technology (DST), the Department of Biotechnology (DBT) and the Department of Information Technology (DIT), which focus predominantly on investigator-centric fundamental S&T and account for about 70% of research support. The departments of Space, Defense and Atomic Energy focus on mission-oriented R&D while also promoting fundamental research. A total of 1% of Indian GDP is invested in science and technology development at the moment. R&D investment is expected to increase to 2% in the next five years.

Science management in India rests on highly accomplished scientists, who are fellows of all the major academies in India and some of them are also fellows of academies in the Third World, the UK and the US. There are scientific advisory councils and an innovation council, which advise the ministries.

Private participation is pursued on two fronts. The first involves international S&T collaboration. The strategic initiatives in science and technology through international S&T based

on the principle of reciprocity and parity are vigorously pursued. The process of selecting collaborative projects and mechanisms relies on joint calls, joint peer review and joint monitoring. One of the recent initiatives resulted in the creation of a Joint Center for Clean Energy R&D with the United States with funding of \$100 million coming from both government and industry in India and the US.

India understands that implementation can only be successful if private sector involvement in R&D is as significant as in developed countries. The focus of science and technology elsewhere in the world is on maximizing benefits. India, however, has always focused on optimizing resources and has repeatedly demonstrated that its goal for research is to reach as many people as possible. It is worthwhile to note that 63% of children's vaccines are produced in India. This is not due to labor arbitrage but to the low cost of expertise and widespread idealism among young people. Hence our model of private sector involvement through international S&T collaboration is likely to combine the experience of the two cultures and result in affordable, equitable and economically attractive innovation.

The interfaces between academic research, government, society and the private sector in India are weak. Vertical silos exist but there is a lack of integration. To overcome this weakness, the landscape was modeled as a transition from knowledge to know-how, from know-how to show-how, from show-how to do-how, and from do-how to use-how. In this landscape, know-how to show-how was found to be somewhat

weaker. A new concept based on a relationship model instead of a transaction model is being proposed. A joint venture between the private sector and the public sector will be created to fund research for the public and social good in the areas of agriculture, water, energy, environment and affordable health care.

The government of India is also sensitive to global concerns such as energy, water, terrorism and climate change. It has started a \$40 billion solar energy mission to demonstrate the country's sensitivity to global climate change. The INSPIRE program (Innovation of Science Pursuit for Inspire Research) is actively pursuing new scientific talent in India through the Department of Science & Technology. Their basic goal has been to show young people how exciting and creative science can be and to get more people interested in science at an early age.

A general trend Mr. Balakrishnan has observed, which he perceives as a clear indication of the success of the measures taken by the government and private investment, is the 12% increase in scientific publications, and improved results in rankings and citations.

International research strategy – the US perspective

Arthur Bienenstock opened his statement by looking at Stanford and the luxury it has of being able to pursue its own goals and values. Its basic philosophy is that students (both undergraduate and graduate) are its most important asset as is its ability to attract the best faculty to effectively educate those students. This creates a highly innovative environment. Stanford is surrounded by a prosperous environment, Silicon Valley, which also creates mutual benefits for students and faculty. Given its financial situation, Stanford does not receive direct government funding. The government funding it does receive comes entirely through research proposals.

The US government has a multi-faceted system for funding research. Funding comes from a variety of sources and programs, such as the NSF, the National Institutes of Health, and federal agencies. The US clearly acknowledges the importance of fundamental research. On the other hand, directed from thematic research is the necessity to help agencies to achieve societal goals. Fundamental research and applied research are thus in balance.

A variety of attitudes exist. Some take extreme risks and are merely guided by peer review, whereas other, more conservative approaches

are usually based entirely on the system of peer review. The wide variety of sources ensures that an idea usually finds funding.

In the US, support for big science is generally endorsed, but so is support for paradigms (cf. Zürn). Freedom of research at universities is a general rule, and universities are free to pursue their own goals and excellence as they perceive it.

International research strategy – the perspective of a global financial institution

Although Xiaonan Cao stressed that his view does not officially represent the World Bank, he shared a general picture of research in developing countries and showed what the World Bank has been supporting.

He said many developing countries have been inspired by research models from Europe and the US. However, the fact is that many developing countries also develop their own agendas and face the challenge of planning their research programs.

There is a trade-off between creating new knowledge by investing in cutting-edge technologies and investing in adapting existing technologies to improve the lives of people in developing countries. In Europe, this trade-off is mainly between fundamental research for new knowledge and research transfer to create jobs and revenue. There is a huge difference, he said. When it comes to investment, many governments also face the choice between “cherry-picking” a few ideas to invest in and setting up competitive grant schemes to find the best innovations.

A general question he asked in this context was, how can a traditional research model be adapted to meet new development needs? How can research be made more inclusive so that consumers/beneficiaries are involved in the process (which he considers necessary if research is to find practical solutions)? The World Bank supports indigenous research that can provide practical solutions by means of funding and helping establish connections among relevant institutions.

Forging partnerships at the national, regional and international level is an effective way to bridge the gap in research capacity between more advanced countries and developing countries. There are many examples. The Africa-US Higher Education Initiative strengthens the capacity of African higher education institutions through partnerships between African and US higher education institutions over a sustained period. And the network of 11 Japanese



X. Cao, E. de Mesquita Neto

universities has a strong partnership program with a network of 19 engineering schools in Southeast Asia, just to name two examples.

A critical ingredient for developing countries is capacity development on an institutional and individual basis. Europe has a role to play as a source of inspiration, as a provider of knowledge and good practice and as a partner. Reaching out will become more important. Mr. Cao emphasized that we need to embrace the new global situation where developing countries are increasingly becoming important players in many areas, including research.

International research strategy – the Brazilian perspective

Euclides Mesquita Neto began by outlining the Brazil scenario. There has been a large increase in the number of PhD degrees granted and an increase in graduate programs. One out of every two graduate students receives scholarships. 80% of PhDs work in an academic environment.

Brazil's federal structures comprise three agencies and 26 state foundations. It is a complementary system, and there is a degree of competition between state and federal funding. The state of São Paulo is home to 52% of Brazilian science. There are three state universities, which are public and free, 19 non-university research institutes and one research foundation.

São Paulo Research Foundation, FAPESP, was established in 1962 with the mission of fostering research in all fields. It receives 1% of taxes from the state of São Paulo. It has an annual budget of \$600 million. It receives about 18,000

proposals and grants 10,000 scholarships per year. It cannot spend more than 5% of its budget on administration.

The foundation has a strong legitimacy in the scientific community but works autonomously. 85% is invested in exploratory academic research and the remaining 15% is invested in the applied sciences. Its general goal is to create a framework to facilitate research in which people move from researching as individuals to work within groups and clusters. Longer funding periods of 5 to 11 years have also been created for larger projects. Identifying topics and themes for funding is a bottom-up process in which researchers play an important role. Key programs with relevance to Brazilian society are currently being developed in areas such as bioenergy, climate change, human violence, and biodiversity.

With reference to the keynote by Michael Zürn, Mr. Mesquita Neto stated that the role of foundations in the research funding process is that of a shaman and a priest, but not in equal measure.

International research strategy – the Chinese perspective

At the beginning of his statement, Rongping Mu reminded us that China has the largest population in the world and is the second largest in terms of publications and R&D expenditure. At the moment, 25% of public investments and around 75% of industry investments go into R&D. In the last 10 years, industry funding of R&D has increased substantially. There also has been a shift towards more private

research funding since the government issued a plan for innovation in the mid-1990s stating that China would become an innovation-based country by 2020. They even shelved policy documents in order to ease implementation of the innovation-focused policies.

The central aspects of the Chinese research strategy are:

1. Strategic and comprehensive thinking in a system of five-year plans: Currently, China is in its twelfth five-year plan for economic and social development. They include plans for specific areas that are vision-oriented and based on comprehensive thinking and which take into account many factors, such as science & technology, national capacity building for innovation, and strategically emerging industries. There is a direct relationship between industry and the science plans as well.
2. Changing priorities for science & technology: The Chinese government's focus shifted from economic development to a greater emphasis on social change. This change was necessary due to the Chinese global situation.
3. Adjusting and revising planning mechanisms: This includes regularly monitoring progress every year and evaluating whether further changes need to be made.

International research strategy – the Singaporean perspective

Seeram Ramakrishna stated that, at the global level, Singapore is comparable to major stakeholders with regard to research and higher education. Public investment in higher education is 26%, and there is high innovation potential in everything people do.

In general, there is a strong desire to bring in the best minds. Singapore is a multicultural hub that heavily relies on global partnerships and international talent.

How to cope with complexity in a global strategic environment for research?

After giving a general outline of the research systems and strategies in the panelists' countries, the discussion first focused on the complex global situation in research strategy, where one eye needs to be on complexity and the other needs to be on research matters.

Arthur Bienenstock answered for Stanford, saying that it retains its international links through people and international outposts. Some of the graduate students remain at the university. The

rest leave but maintain close ties to Stanford. From an internal point of view, there is a strong focus on strengthening faculty engaged in the most important research areas.

Bienenstock addressed the question of whether the hybrid model of US research funding (from public and private sources) has been given enough recognition by referring to Germany, where research funding also comes from various sources. In the US, a large portion of basic research happens at universities, which generally have a universal focus. It is believed that teaching enhances research and vice versa.

The role of diplomacy in research strategy in India

In India, one could notice an international attention shift in the fields of research and higher education from Europe to the US. Can countries like India move forward by building relations with diplomacy?

Balakrishnan first looked at the relationship between India and the US, where the US played the dominant role for a long time. Now the picture is much more varied because there can be protests against anti-US policies as well. However, it should be noted that the US has invested \$4 billion to educate Indians.

Generally, these relations are not one-way tracks because profits, products and people go both ways. India has also benefited immensely from its relationship with the EU, but currently more people go to the US. The opportunities seem to be better there.

Looking at the question of research funding in India, Balakrishnan stressed that it is controlled by scientists. Using science & technology to create transfers to society was working well in India. He compared India's current situation to a hammer looking for a nail and a nail looking for a hammer. A scientist with a good idea who is looking for funding will receive funding. Rankings are a luxurious problem in India, he added.

The Chinese model, the perceived shift towards applied research and the role of innovation

When asked about the consequences of this shift away from basic research in China, Mu said that it meant the share of funding for basic research would decline and that funding for applied research would increase in the future. He said this was an intentional decision, and that industry expenditure for applied research would also increase.



R. Mu, A. Bienenstock

China will also see an increase in university mergers resulting in one mechanism that combines high level research and high level education. The Chinese intend to make use of the educational mission and the research mission of higher education institutions. However, the merger of universities with non-university research institutions is considered inefficient due to the different missions and different features of the prospective partners. The role of academies will become more important in China too because they can award degrees. The Chinese Academy of Sciences currently has 60,000 graduate students. They are considered to be even more effective than universities. Mu added that big science in China is happening at the academies and the universities.

Innovation seems to play a very important role in China. It has been said that strategic planning is okay but serving the labor market can drive away innovation. Mu contradicted this view from the Chinese perspective by saying that capacity building covers everything from science to infrastructure to social innovation. China's national science and technology programs are crucial for innovation, he added. It is important to focus on shorter, market-oriented developments but we should not forget to build a long-term view either. Companies develop quickly, and expenditure and government and industry investment in R&D increases rapidly. China's regional government plans have an important role alongside its central government plans.

Differentiation of research topics in Brazil

Prof. Mesquita Neto was asked whether there is concern in Brazil about a “fight” over doing research in the same areas (such as environment or climate) that the rest of the world is active in. Is there only a limited amount of research that can be done in a specific area? He responded by saying that academic research is also done with the important mission of training people. Researchers in Brazil are encouraged to find areas and research topics that could help Brazil solve its current challenges by doing work like researching bioenergy or exploring pre-salt oil deposits. There is a clear need to increase the amount of research to be done in the industrial environment. More needs to be done to strengthen collaboration between universities and companies. The country has established a good environment for basic and academic research. One of the biggest challenges right now is to move from purely academic basic research to more application-oriented, reality-driven research topics that lead to new products and processes.

Trade-offs and brain circulation in emerging countries

Xiaonan Cao put this aspect into a real context by taking small, poor island countries as an example. In many of these countries, research for the fight against tropical diseases is a major topic. Although this is highly relevant to the quality of life in those countries, it is not a goal for big pharmaceutical companies in the West. He said that as a global community we should consider poor, small island countries when talking about research.

The discussion subsequently moved to the concept of brain circulation, which refers to a new class of fast-moving, highly skilled people who circulate around the globe. Mr. Cao reaffirmed the concept of brain circulation, saying that in the beginning of globalization 15 years ago skilled personnel only moved in one direction. Now the situation has changed and these highly educated and skilled people are also attracted to their home countries because conditions have improved there. Looking at developed countries, which are now in a difficult situation in terms of public funding and the general job market, the conclusion one could draw is to increase investment in emerging countries' higher education and research. Statistics in India and China indicate that many people who have been trained in the US, Canada or Europe are now returning home where they can find better opportunities for continuing their research. The Chinese government sends 13,000 fully paid scholars and students abroad every year. About 97% of them go back to do research and teach at Chinese universities after completing their studies abroad. China has also opened its higher education institutions to the world by increasing numbers of foreign faculty. Mr. Cao concluded that greater flexibility and openness and an improved domestic environment make countries more competitive at attracting research talent. Europe and the US should pay more attention to this area despite the economic crisis. He hopes that we won't lose sight of the future.

Ramakrishna contributed the Singaporean point of view, which has a tiny population with a comparatively high amount of research funding. However, talent and ideas are continually required. What would help Singapore tremendously is to sustain its talent and maintain international collaborations based on that talent. This would ensure that Singapore does not lose out on important links to other parts of the world. Singapore introduces new approaches to research. Researchers are attracted to Singapore and they bring their personal networks as an added bonus. Singapore welcomes diversity of thinking by maintaining its own approach.

The globalized system

Ramakrishna then looked at the situation in nation states across the world, which support scientific research on the same topics globally. Will scientists be able to come to a new understanding of global issues?

This train of thought was resumed but the perspective moved away from nation states to

research funding in a globalized system. Do we need global research funding to foster brain circulation? Prof. Ramakrishna was in favor of this idea and outlined the establishment of a global science foundation where joint basic research could be performed. He called for a simple principle concerning the global funding of fundamental research.

When asked whether it would be the job of the World Bank to create such a fund, Dr. Cao outlined the roles of the World Bank. They include acting as a knowledge broker between developing countries and developed countries, acting as a coordinator and conveyor on issues such as climate change, and acting as a science and technology developer (the World Bank established an action plan for African countries consisting of a global science corps where volunteer researchers work in developing nations to help develop capacity).

Prof. Balakrishnan saw the important role of international research funding for the control of quality and research development. For example, India spends \$1 billion annually to fund research in other countries (such as the rebuilding of Afghanistan). A policy of similar spending with partner countries can develop immense benefits for both countries. From his experiences in India, he stressed that multidisciplinary problems cannot be solved if there are borders between countries.

Arthur Bienenstock added his point of view concerning the creation of opportunities, saying that top down never works. People should be given maximum opportunities to interact and collaborate, then exciting things can happen. Funds need to be made available for that. A question from the audience turned the attention of the panelists to an alleged conflict between different levels (i.e. the European and national level). Should the EU continue with a European strategy or should it draft national-level policies?

The responses from the panelists referred to the situations in various countries. Mr. Mu said that in China there is a similar structure of national level and regional level programs. In his view, though, the differences between EU countries are greater. Still, there are some common areas across the regions, such as future technologies. He stressed that the EU should be more vision-oriented, but should also continue focusing on problem solving.

Prof. Mesquita Neto agreed that the EU faces multiple challenges currently, but pointed out that amazing things have happened in Europe,

such as the Bologna Process and the European Higher Education Area strategy. Research strategy is more difficult due to the involvement of industry, but for the development of a European research strategy the EU should find a way to articulate industrial, national and European interests.

Arthur Bienenstock, however, stressed the necessity of the overall perspective by saying that before thinking about organization the EU should define its real goals and then figure out the means.

Dr. Cao highlighted the importance of strengthening partnerships between countries because they are beneficial for all sides. He does not believe in an overall general strategy because the diversity of countries will make it difficult to develop a common policy for basic research and applied research. Rather, strategists should consider basic questions such as the following: What can be done to strengthen the competitiveness of this group of countries? What are their strengths? What are the global benchmarks? Then the decision can be made to spend more on a particular area or invest in the transfer of findings for the benefit of other countries.

Another question from the audience also referred to global strategy development by considering the question of scale. Investing in research to cure malaria was provocatively compared to investing in research for hair care products. How can strategy be designed to help with global issues?

Dr. Cao agreed that there needs to be a common recognition of the problems we face before researchers can determine how to address them. Then partnerships and funding for the support of new initiatives can be established. He returned to his previous point about brain circulation and asked the question of how to ensure that talented and skilled people stay in developing areas. This requires a lot of work in home countries to create an attractive environment in areas like tax policy and immigration

policy. A climate of competitiveness can further improve the home environment. Dr. Cao added that Europe has role to play in all these areas, and he appealed for broader thinking beyond the boundaries of the EU to consider the position of countries inside and outside the EU.

A final question from the audience addressed the possibility of a global science foundation. Those responsible should make sure that the bodies they create have a sufficient degree of open-mindedness. Looking at developing countries, there is lots of knowledge available but it is not very dominant. The challenge is deciding what can be considered scientific research. If there is a willingness to open up models of science, there is a lot that can be gained.

Dr. Cao continued along those lines and went even further by asking how to bring indigenous knowledge into scientific research, how to transform lab knowledge into real solutions to help millions of people, how to create mechanisms for the respect of intellectual property (IP) in developing countries (since IP can be transferred to the private and public sector at the same time) and finally, how to destroy the metaphorical fences around the work of researchers to make sure lots of people can benefit from it. Prof. Ramakrishna added that one could even think about giving the ownership of IP to individuals.

The panelists agreed that there is no room for complacency. We are dealing with a new environment where Europe seems to be lagging behind in its strategic research development and where some reports suggest that Asia will surpass the US in 2012 in some areas of research funding. Europe has to make itself heard if it wants to play a role in research, since there are many different and exciting international developments to compete against. The meeting concluded with a quote from the speech *Science as a Vocation*, which Max Weber gave in 1918: Set to work and meet the demands of the day in human relations as well as in the vocations.

summarized by CCD



PROF. DR. NARAYANASWAMY BALAKRISHNAN, Indian Institute of Science, Bangalore

Planning Research in Science and Technology for the Future – An Indian Perspective

Whereas research, development and innovation in developed economy are driven by private sector investments with a share of about 1.2 to 1.3 % of GDP focusing on market competitiveness and private good, the Indian innovation landscape is predominantly driven by public funding with a 74% share of the total investment leading to focus on public, social and strategic good to reach a wider section of the society.

The research and developments in India are coordinated through seventeen departments. Several mechanisms exist for coordinating plans between the ministries while maintaining their independence in terms of achievements and accountability. The Department of Science and Technology (DST), the Department of Biotechnology (DBT) and the Department of Information Technology (DIT) receive almost 70% of the extramural investigator centric and basic research. The mission oriented Departments such as the Department of Defence, the Department of Atomic Energy and the Department of Space support research through intramural research predominantly. The DST and the DBT are run on the lines of the National Science Foundation and the National Institute of Health in the United States. The DST and DBT also follow the same rigour of NSF and NIH in terms of peer review and monitoring of the projects. More recently the DBT has also been successful in supporting translational research besides supporting fundamental R&D. Both DST and DBT have shown an annual growth of 20-30% per year in the last five years. Further,

the ministries also come up with national initiatives which address the nation's aspirations to be a world leader in some of the emerging areas. In these areas both capacity and capability building with a long range focus have been the major drive. A few such examples include the initiatives in nano science, cognitive science, security, combustion research, supercomputing, stem cell research, systems and synthetic biology, open source drug discovery, earth systems science and energy.

The management of science in India rests in the hands of renowned and accomplished scientists who receive intellectual inputs from various advisory councils such as the Scientific Advisory Council to the Prime Minister, the Scientific Advisory Committee to the Cabinet and the National Innovation Council using a collegium approach.

There is a wide recognition in the country that the next wealth generating engine of growth will be based on knowledge derived from S&T innovation. India has declared 2010 to 2020 as the Decade of Innovation. Our 12th Five Year Plan (2012-2017) aims an increase of R&D gross expenditure of GDP by 55% to 1.55% of the GDP. The planning process is also looking at providing policy stimulants for doubling the engagement of private sector in R&D.

The private participation is pursued from two fronts. The first is through International S & T Collaboration. The strategic initiatives in science and technology through international S&T based on the principle of reciprocity and parity

is vigorously pursued. The process of selecting the collaborative projects and mechanisms hinges on joint calls, joint peer review and joint monitoring. One of the recent initiatives is the creation of the Joint Centre for Clean Energy R&D with the United State. Under this Centre a 100 M\$ fund has been set up. (25 M\$ each from the Department of Energy (US) and the Department of Science and Technology (India) and 25 M\$ each from the American and the Indian industries).

India realizes that the absorption can only be successful if the private sector involvement into R&D is significant as in the developed countries. The focus of science and technology elsewhere in the world is towards maximization of the benefit. Indians all along have been focusing their work towards optimization of resources and have demonstrated repeatedly that their research purpose is to reach as many people as possible. It is worthwhile to note that 63% of the children's vaccine is produced by India and this is not due to labor arbitrage but due to the low expertise cost and residual idealism among the youth. Hence our model of involvement of private sector through international S&T collaboration is likely to combine the experience of the two cultures to result in affordable, equitable and economically attractive innovation.

The Prime Minister's Council on Trade and Industry constituted a subcommittee which came up with a concept paper on Private-Public-Participation (PPP) in R&D for clean energy. The interfaces between academic research, government, society and private sector in India are weak. The vertical silos do exist and the integration is lacking. In order to overcome this weakness the landscape was modeled as a transition from knowledge to know-how, from know-how to show-how, from show-how to do-how and, from do-how to use-how. In this landscape know-how to show-how was found to be somewhat weaker. A new concept based on a relationship model instead of the transaction model is being proposed. A joint venture between the private sector and the public sector

will be created to fund research for public and social good in the areas of agriculture, water, energy, environment and affordable health care. The Government of India is also sensitive to global concerns such as energy, water, terrorism and climate change. A 40 Billion \$ solar energy mission has been started to demonstrate the sensitivity of the country to global climate change, and to come up with viable solutions to balance between developmental aspirations of India and the differentiated responsibility of India to control emission and mitigate climate change.

While the country has been planning on a massive expansion in R&D, the system needs adequate preparations to generate the required absorption capacity. In the last few years, the education system in India has been put on an expanding phase. The youth enrolling into education is ramping up. The gross budgetary support for education in India is 19.8% taking into account of the quadrupling of the number of youth enrollment into education over the past 15 years. During the Eleventh Five Year Plan (2007-2012), the budget for tertiary education increased by 9.1 times and the annual growth of investments in tertiary education has sometimes been more than the budget of some of the science departments.

In order to enrich the R&D capacity of India, an innovative programme called Innovation in Science Pursuit for Inspired Research (INSPIRE) has been mounted for attracting talents for study of science and careers with research. It is a billion dollar initiative and it has already attracted 0.6 Million youth in the age group of 10-32 years to the science sector.

There is an evidence of positive effects of Indian investments into R&D sector, as seen from a 12% annual growth of scientific publications, a 11% increase in citations, greater than 20% increase in patents, and the improvements in the relative ranking in terms of the number of publications in the world from 15 to 9 during the last five years.



PROF. DR. ARTHUR BIENENSTOCK, Stanford University (OSA)

A fundamental dilemma is evident when nations consider planning research for the future. There is broad recognition that research can contribute very significantly to meeting societal goals. With planning, this process can be accelerated, yielding great benefits.

On the other hand, there is also broad recognition that no government bodies, no matter how wise and knowledgeable, can predict the important discoveries of a healthy scientific community. These unanticipated discoveries may have enormous positive, but unplanned, impacts on society. The laser is one example.

Recognizing this dilemma, the United States pursues what I'll call a hybrid approach in which many different government agencies fund research. Some of these, like the National Science Foundation (NSF) and the National Institutes of Health (NIH), primarily support unplanned, scientist-initiated, basic research. Other agencies support research as part of a broader societal mission. These include the Departments of Commerce, Defense, Energy, Health and Human Services, and Justice as well as the National Aeronautics and Space Agency. Within these agencies, there is considerable planning of research in order to achieve their missions. In addition, however, there is usually significant funding of mission-related, scientist-initiated, basic research.

When special opportunities or needs arise, these various agencies work together in their planning. Such interagency coordination is often led by the White House Office of Science and Technology Policy, working with the Office of Management and Budget. Examples of such multiagency programs are the U.S. Information Technology and Nanotechnology Initiatives.

The funding of basic research by many different agencies with different missions has an important effect that is not broadly recognized outside the U.S. The peer review processes employed by NSF and NIH may deter funding of high risk-high payoff research. Often, however, an agency recognizes that a high risk program, if successful, could benefit its mission markedly and funds the program. The Department of Defense's Advanced Research Projects Agency, for example, has funded many important advances in this manner, such as the ARPA-net, voice-to-text and computer translation programs, superalloys and carbon-based composites.

President Obama has supported this hybrid approach strongly, as evidenced by examples from his proposed fiscal year 2012 budget. He urges a 13% increase in the National Science Foundation appropriation, which would take it to \$7.767 billion. At the same time, as described by OSTP, he emphasizes support of „...research into and development of clean energy sources, including \$550 million for DOE's Advanced Research Projects Agency-Energy (ARPA-E) and sufficient support to double the number of Energy Innovation Hubs from three to six to further catalyze synergies between industry and academia.“



PROF. DR. EUCLIDES DE MESQUITA NETO, State University of Campinas (Unicamp)

Research funding at The São Paulo Research Foundation – FAPESP

FAPESP is a public foundation, funded by the taxpayer in the State of São Paulo, with the mission to support research projects in higher education and research institutions, in all fields of knowledge. The constitution of the State establishes that 1% of all state taxes belong to the foundation and the government transfers these funds monthly. The stability of the funding and the autonomy of the foundation allow for an efficient management of the resources that has had a sizable impact: while São Paulo has 22% of the Brazilian population and 30% of the scientists with a doctorate in the country, the state responds for 52% of the country's scientific articles published in international journals.

The foundation works in close contact with the scientific community: all proposals are peer reviewed with the help of area panels composed of active researchers. Many times scientists in São Paulo bring proposals for programs to the Foundation, and these are carefully analyzed and, if deemed strong in academic terms, are shaped by the foundation into research programs that might congregate a set of research projects. Since the mandate of the foundation is to foster research and the scientific and technological development in the State, ideas for programs that match world class research with contributions that will impact social problems are welcome. The foundation supports large research programs in Biodiversity and in Information Technology. In 2008 the foundation announced broad research initiatives on Bioenergy and on Global Climate Change.

FAPESP maintains cooperation agreements with national and foreign research funding agencies, higher education and research institutions, and business enterprises. The international cooperation covers a wide range of countries and the number of international joint projects rose sharply after 2005, when a strategy for intensifying international cooperation was started.

FAPESP invested R\$ 780 million (approximately US\$ 500 million) in research projects in 2010. One third of this value goes into fellowships for graduate and undergraduate students. About 55% goes into exploratory academic research, mostly fundamental in nature. The remaining 10% is invested into application oriented research, in many cases performed in Small Businesses or in joint research performed by academia and industry. The percentage invested in applied research has been growing in recent years, consistently with the foundation's mandate to foster the scientific and technological development in the State of São Paulo.



PROF. DR. SEERAM RAMAKRISHNA, University of Singapore

What are the main differences?

Singapore is home to five million people inhabiting a small island of 700 sq km (similar in size to Berlin) with a GDP of \$250 billion. More than a quarter of Singapore's economy is powered by high tech manufacturing sector. Singapore is investing close to fifteen billion dollars on R&D during 2011-15. Environment & water technologies, biomedical sciences translational & clinical research, and interactive & digital media are pursued as strategic growth areas. Singapore is on its way to reaching the goal of gross expenditure on R&D (GERD) to 3.5% of GDP by 2015. Based on GERD percentage, Singapore is among the exclusive club of research intensive nations. However the absolute amount is small compared to the R&D expenditures by bigger nations such as USA, Japan, and Germany.

History of scientific research suggests that talented researchers are most creative when not directed and free to follow their passion (bottom-up approach). However, the significant amount of public funds involved in supporting research attracts active management by policy makers and public (top-down approach). Is there a merit to the view that larger nations have the natural bandwidth to pursue both bottom-up and top-down approaches whereas the smaller nations are constrained to lean towards top-down approach?

Can Europe keep path with the developmental dynamics of other parts of the world?

Increasing penetration of education and communication & information technologies supported by economic growth is changing the perspectives and competitiveness of higher proportion of humanity around the world. Europe is doing its best yet Europeans are uniquely placed to do even more to be an integral part of developmental dynamics of Asia and the world.

Which direction do scientific systems of other nations take?

There is growing evidence that economic and competitive factors are increasingly shaping the funding landscape of scientific research. Yet there must also be opportunities for talented researchers (preferably collaborating with peers in other nations) to pursue scientific research purely on intellectual basis. New knowledge out of such efforts will help to sustain and improve the quality of lives in all nations in unforeseen ways and means.

How can we strengthen the cooperation of several countries?

The research enterprise is far more wide spread globally than ever before in the history of human kind. The annual total global spending on research is over one trillion dollars. About fifteen per cent (about \$150 billion) of it is appropriated by various governments for pre-competitive research in public sector. In many countries the public sector research is increasingly conducted at universities and various institutions of higher learning. Enablers of transformative research are now globally dispersed. It is timely to set up a GLOBAL RESEARCH FOUNDATION, GRF to support researchers to work in teams internationally on pre-competitive transformative research. It is recommended that a collective pool of 10 billion dollars or higher is set aside annually (each nation to set a % point of their GDP) to support GRF. It is desirable for talented researchers to collaborate beyond their current boundaries set by their host institutions and national funding agencies. Moreover, the collaborations and deeper understanding among intellectuals promote stronger positive ties amongst nations, as most often these researchers are respected opinion leaders in respective nations. There is scope for believing that discovery of new knowledge is a win-win platform for everyone in the long run.

Reference: *The Changing Face of Innovation*, Seeram Ramakrishna World Scientific Pub Co, 2011
(<http://www.worldscibooks.com/business/7558.html>)



CVs of the Contributors

PROF. DR. PETER-ANDRÉ ALT

Freie Universität Berlin, President

Peter-André Alt was born in 1960 in Berlin. After passing his Abitur, he originally wanted to become a medical doctor, but then during the first week of classes, he changed disciplines and began to study German and Political Science. He completed his studies with a doctorate at the age of 24. In 1995 he was appointed professor of modern German Literature at Ruhr-Universität Bochum, at that time the youngest tenured professor in this subject in Germany. In 2002, he accepted an appointment as professor at Universität Würzburg, and in 2005, he returned to Freie Universität Berlin as the successor of his academic teacher Hans-Jürgen Schings. Alt represents a methodologically rigorous form of literary studies based on the historical dimension of texts. In numerous monographs he has examined the connection between literature and the history of knowledge, the

relationship of philosophical models of thought and poetic fiction, and also the tense relationships between drama and political power. His large-scale biographies of Friedrich Schiller and Franz Kafka as well as his studies of the literary cultural history of dreams and the aesthetics of evil have been translated into several languages and recognized as important standard works also beyond the field of German studies. Alt has held numerous offices in the course of his career, most recently at Freie Universität as Dean of the Department of Philosophy and Humanities from 2007 to 2009, as a member of Freie Universität's Academic Senate from 2007 to 2010, as Head of the Friedrich Schlegel Graduate School of Literary Studies, and as Director of the Dahlem Research School since 2009. On May 12, 2010, Alt was elected the seventh President of Freie Universität.

PROF. DR. NARAYANASWAMY BALAKRISHNAN

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Since 1981, Narayanaswamy Balakrishnan has been with the Indian Institute of Science where he holds the position of professor since 1991 and as Associate Director since 2006.

Narayanaswamy Balakrishnan studied electronics & Communication at the Madras University (B E (Hons)). In 1979, he received his PhD from the Indian Institute of Science (Title of the thesis: Constrained Optimization of Antenna Arrays).

His main research areas are: Numerical Electromagnetics, High Performance Computing, Information Security, Wireless networks, Bioinformatics, Digital Library and Language Technologies.

Narayanaswamy Balakrishnan is a member of the Third World Academy of Sciences; the Indian National Science Academy; the Indian Academy of Sciences; the Indian National

Academy of Engineering; the National Academy of Sciences, Allahabad at and the Institution of Electronic and Telecommunication Engineers.

Narayanaswamy Balakrishnan received numerous honours and awards, among others: Academy Excellence Award, Defence Research and Development Organization (2009); CDAC-ACS Foundation Lecture Award (2008); JC Bose National Fellowship (2007); Homi J. Bhabha Award for Applied Sciences Hari Om Ashram Trust Awards, University Grants Commission (2004); Padmashree by the President of India (2002); Ph.D. (Honoris Causa), Punjab Technical University (2003); Alumni Award for Excellence in Engineering Research by the Indian Institute of Science (2001); Millennium Medal of the Indian National Science Congress (2000); Excellence in Aerospace Education Award of the Aeronautical Society of India (1998).

DR. LOTHAR BEHLAU

Fraunhofer-Gesellschaft, Department Strategy and Programs

Lothar Behlau is Head of the Department „Strategy and Programs“ at Fraunhofer Headquarters in Munich. He studied Bioengineering at the University of Applied Sciences in Hamburg (1979 – 1982; degree: Dipl. Ing.) and Chemical Engineering at the Technical University of Hamburg-Harburg (1982 – 1985; degree: Dipl. Ing.). From 1985 to 1990, he was a researcher at the Fraunhofer Institute for Food Engineering and

Packaging and completed his doctoral thesis at the Technical University of Munich (degree: Dr. Ing.).

Lothar Behlau's main research areas are R&D strategy planning; technology foresight; R&D cooperation; R&D trends; evaluation of projects, programmes and institutes; performance indicators for research institutions; sustainability.

ENGELBERT BEYER

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Engelbert Beyer studied Economics at the University of Münster (Westfälische Wilhelms-Universität Münster). Since 1989, Engelbert Beyer has been working with the Ministry of Education and Research (BMBF), where he holds the position of the Head of Directorate 11 “Innovation Strategies” since 2009. Since 2006, he has

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PROF. DR. ARTHUR BIENENSTOCK

Stanford Program on Regions of Innovation and Entrepreneurship (SPRIE),
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Arthur Bienenstock received his M.S. degree from the Polytechnic Institute of Brooklyn, and his PhD from Harvard University (1962). He was awarded honorary doctorate degrees from Lund University and from Polytechnic University of Brooklyn.

Arthur Bienenstock, the Past-President of the American Physical Society, is Special Assistant to the President for Federal Research Policy at Stanford University, where he also is Director of the Wallenberg Research Link and a professor at the Stanford Synchrotron Radiation Laboratory and in the Departments of Applied Physics and Materials Science & Engineering. At Stanford University he also held the position of Vice Provost and Dean of Research and Graduate Policy (09/2003-11/2006) and of the Director of the Geballe Laboratory for Advanced Materials (09/2002-09/2003). From 1997 to 2001 he was Associate Director for Science of the White House Office and Science and Technology Policy (OSTP). Between 1977 and 1997 he headed

the Stanford Synchrotron Radiation Laboratory at the Stanford Linear Accelerator Center.

His main research areas are in the area of solid-state physics, amorphous materials and synchrotron radiation as well as in the area of science policy and university governance.

In 2008, Arthur Bienenstock was President of the American Physical Society; he is fellow of the American Physical Society, the American Association for the Advancement of Science, the Institute of Physics and of the California Council on Science and Technology. He was awarded the Cuthbertson Award from Stanford University (2009), the Distinguished Service Award from the Department of Energy, Stanford University (1998), Distinguished Alumnus Award of the Polytechnic Institute of New York Alumni Association (1977) and he was the first recipient of the Pittsburgh Diffraction Society's Sidhu Award for his work in x-ray diffraction and crystallography (1968).

DR. XIAONAN CAO

The World Bank

Dr. Cao is the Lead Knowledge and Learning Officer for the Europe and Central Asia Region at the World Bank. During his tenure at the World Bank, he has worked on education, knowledge economy, and capacity development projects in Africa, Asia, Europe, Latin America, and the Middle East, including higher education projects in Russia, China, Afghanistan, etc. He co-authored human resource development chapters for the knowledge economy reports on South Korea and China and delivered the first knowledge economy capacity-building program to the Baltic States in the late 1990s. At the corporate level, Dr. Cao co-established the winning program of the Education Knowledge Management System for the Education Sector and has been involved in various aspects of current internal reforms at the World Bank. In 2000, he left the World Bank and became a Global Knowledge and Learning Manager at Cap Gemini Ernst & Young – a global management and IT consulting firm with more than 50,000 employees world-wide. While there, he co-developed and executed global knowledge and learning systems to support consultant performance.

Dr. Cao began his career as an officer at the Ministry of Education in China and later became the Deputy Division-Chief of Higher Education at the Ministry, responsible for developing policies and national programs for over 320,000 university faculty in some 1,100 higher education institutions throughout the country in the 1980s. The reform policies he and his colleagues developed such as academic ranking qualification, faculty responsibility system,

study abroad regulations, etc., improved the faculty profile significantly and provided a solid foundation for the rapid growth of higher education in China in the last two decades. In the late 1980s, Dr. Cao was managing the National Foundation for Outstanding Young Faculty in China – a government-sponsored program to support Chinese scholars abroad to return to Chinese universities for research and teaching. Many leaders in today's leading universities in China have been the beneficiaries of this program.

In his academic capacity, Dr. Cao was a Teaching and Research Fellow at the Harvard Institute for International Development and at the Harvard Graduate School of Education in 1994-98. During this period, he also served as a member of the Editorial Board of the Harvard Educational Review – one of the world's leading academic journals in the field of education. He has published articles, book chapters, country reports, and book reviews and has presented at major international conferences. In his 1996 article "Debating Brain Drain in the Context of Globalization", published in the British academic journal *Compare*, he coined the term "brain circulation" to explain the international exchange of scholars and the need for effective government policies.

Dr. Cao received his B.Sc. in Physics from the University of Science and Technology of China, an M.A. in Higher and Further Education from the University of London, and a Doctor of Education in Administration, Planning and Social Policy from Harvard University.

WILLIAM OMAR CONTRERAS LOPEZ

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William Omar Contreras López is graduated neurosurgeon (Rosario University, Bogota-Colombia). He received a fellowship in Spinal Cord surgery from the Curitiba Pontificia University, Curitiba-Brazil and a fellowship in Functional & Stereotactic Neurosurgery, Sao Paulo-Brazil. He worked as a general physician

in Bogota, Colombia (2001), as neurosurgeon in Colombia (2007) and Brazil (2008).

Honors and awards: Top 7 Young Neurosurgeon Latin America 2008; Fellowship the year AO spine Latin America 2008. In 2011, he was invited to the Meeting of Nobel Laureates at Lindau. His main research areas are: stem cells

human transplantation in neurodegenerative diseases; Huntington & Parkinson; neuro-oncology, spinal cord endoscopy, deep brain stimulation.

William Omar Contreras López is a member of the Colombian Neurosurgery Association, the

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DR. KERSTIN CUHLS

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Kerstin Cuhls has been working as a scientific project manager at the Fraunhofer Institute for Systems and Innovation Research ISI in Karlsruhe since 1992. Since October 2011, she is for one year professor at the University of Heidelberg, Institute for Japanology. Kerstin Cuhls took her degree in Japanese Studies, Sinology and Business Administration at the University of Hamburg. In 1993 she was seconded for four months to the National Institute of Science and Technology Policy (NISTEP) in Tokyo, Japan, to assist in setting up a scientific cooperation. In 1997 she was awarded a PhD at the University of Hamburg (Japanology) on technology foresight in Japan. In 2000 she assumed a teaching assignment on „Innovation Policy and Management in Japan“ at the University of Bremen, in 2009 further teaching assignments on „Innovations in Japan: Actors, Topics, Policy“ at the

Ruprecht Karls University, Heidelberg, and since 2010 „Futures Research“ at Freie Universität Berlin. From 2006 until 2007, Kerstin Cuhls fulfilled the intra-departmental, cross-cutting function of a foresight/perspectives coordinator at the ISI. From 2008 until 2010, she was Head of the Business Area „Futures Research and Foresight“. From 2007 until 2009, Kerstin Cuhls was project manager of the BMBF Foresight Process. She now manages follow-up projects. She already coordinated the German foresight studies Delphi ,93, Mini-Delphi 1995, Delphi ,98 and monitored the BMBF Futur Process, inter alia as „scientific secretariat“ for both evaluations by an international committee. Since 2000 she has been teaching in various seminars on foresight, priority-setting and Delphi method (UNIDO, ESTO/ EU, diverse).

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Michael Decker is professor for Technology Assessment at the Institute of Philosophy of the Karlsruhe Institute of Technology (KIT), spokesman of the „Key technology and innovation processes“ department in the Helmholtz “Technology, Innovation and Society” programme (since 2009) and deputy director of the Institute for Technology Assessment and Systems Analysis (ITAS) (since 2004). Michael Decker studied Physics (minor subject Economics) at the University of Heidelberg (1992 diploma). In 1995 he received his PhD degree with a doctoral thesis

about spectroscopic studies of oxygen in the high pressure combustion from the University of Heidelberg. In 2006, he habilitated at the Faculty of Applied Sciences of the University of Freiburg with a thesis on applied interdisciplinary research in technology assessment. From 1991 to 1995, he was research assistant at the Physical-Chemical Institute of the University of Heidelberg and between 1995 and 1997 post-doctoral scientist at the German Aerospace Center in Stuttgart. From 1997 to 2002, he worked as senior scientist at the European Academy for

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Prof. Dr. Carsten Dreher

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Univ.-Prof. Dr. Carsten Dreher was born in Hamburg in 1962. After finishing his studies of Industrial Engineering at the University of Karlsruhe (TU) he was Junior Research Fellow in the Forecasting and Assessment in Science and Technology Program (FAST) of the European Commission in 1988. From 1989, he worked as a researcher and project manager; from 1997 he was Head of the Industry and Service Innovation Department at the Fraunhofer ISI. In 1996, Dreher was Visiting Scholar at the Industrial Performance Center, Massachusetts Institute of Technology MIT. In 2005, he accepted the position of the German-Danish professorship of Innovation Research and Management set up

jointly by Syddansk Universitet and the University of Flensburg. Since 2009, Dreher has been professor for Innovation Management at the School of Business and Economics of Freie Universität Berlin. In addition, he is the director of the Center for Cluster Development that advises and supports the executive board of Freie Universität Berlin in terms of strategic research planning and mapping out, developing and implementing research emphases.

His main research interests are, among others, the development of innovation competences, strategic management of research and technology, as well as instruments for research, innovation and technology policy.

Dr. Christoph Ettl

Max Planck Society, Presidential Division Natural and Materials Sciences

From 1981 to 1988, Christoph Ettl studied Physics and Mathematics at the Ludwig-Maximilians-Universität in Munich (Diplom in Physics) and from 1984 to 1985 Theoretical Physics at St. John's College (Oxford, UK). Between 1989 and 1994, he was lecturer and research assistant at the Institute of Physics, University of Augsburg, and completed his dissertation in Materials Science (Mechanical instabilities in extended solid solutions near the crystal-to-glass transition). From 1994 to 1995, he worked as science editor for *Frankfurter Allgemeine Zeitung* (Physics, Mathematics and Computer Science). He worked as senior scientist at the Materials Division of the Faculty of Engineering (1997 – 2004)

and as Managing Director of the Centre of Excellence for Micro and Nano Materials (2000–2004) at the University of Ulm. Since 2004, he has been senior scientist at the Administrative Headquarters of the Max-Planck-Society in Munich, and in 2007 an Associate Director at the European Science Foundation (Strasbourg, France). His main interests lie in the area of science strategy, research perspectives, and science management. Christoph Ettl is a member of the German Physical Society (DPG). He received awards from Stiftung Maximilianum, German National Scholarship Foundation and the Award for Scientific Achievement from Swabian Industry Association (1994).

PROF. DR. ERIKA FISCHER-LICHTE

Institute for Theater Studies, Freie Universität Berlin

Erika Fischer-Lichte studied Slavic Languages and Literature, German Language and Literature, Theatre Studies and Philosophy at Freie Universität Berlin and Hamburg University. In 1972, she received her PhD from Freie Universität Berlin. Since 1996 she has been professor of Theatre Studies at Freie Universität Berlin and, since 2008, director of the International Research Center for Advanced Studies on “Interweaving Performance Cultures”. She is also spokesperson for the International Research Training Group “InterArt” at Freie Universität Berlin. Between 1999 and 2010, she was speaker of the Collaborative Research Centre 447 “Performing Cultures”. Prior to joining her current position at Freie Universität Berlin, she chaired the Institute of Theatre Studies at Johannes Gutenberg-University Mainz (1990 – 1996) and was professor of Comparative Literature at Bayreuth University (1986 – 1990) and of German Literature at Johann Wolfgang

Goethe-University Frankfurt/Main (1973 – 1986). Erika Fischer-Lichte’s main research areas are theory and history of theatre; aesthetics; theory of the arts; methodology; interweaving cultures in performance; performativity. She is Panel Chair of the commission of the European Research Council for the field “Cultures and Cultural production” and a member of Academia Europaea and Academy of Sciences at Göttingen, Berlin-Brandenburg Academy of Sciences (BBAW), German Research Council/Wissenschaftsrat (1999 – 2005); president of International Federation for Theatre Research / IFTR (1995 – 1999); a member of the Senate and Main Committee of German Research Foundation (1993 – 1998), and president of Gesellschaft für Theaterwissenschaft (1991-1996). In 2010, she received the Berliner Wissenschaftspreis awarded by the Governing Mayor of Berlin and in 2006 she was awarded Doctor Honoris Causa by the University of Copenhagen.

ANDREA FRANK

Stifterverband für die Deutsche Wissenschaft e.V., Capital Office

Andrea Frank studied Regional Sciences North America, Political Sciences, Sociology and German as a foreign language at the University of Bonn and at Mount Holyoke College (USA). In 2011 she completed the Executive Master of Public Management at the Hertie School of Governance, Berlin. Since 2006, Andrea Frank has been working with Stifterverband für die Deutsche Wissenschaft as Head of Programmes for research, transfer and dialogue science and society. Between 2000 and 2006 she worked for

the German Rectors’ Conference (HRK) in Bonn and Berlin as project manager and head of unit, where she was responsible for higher education projects in South Eastern Europe (Albania, Montenegro, Kosovo), higher education policy (focus on North America and developing countries) and the competence centre for the “Bologna-Process”. Prior to joining HRK she was a lecturer for the Robert Bosch Foundation at the University of Pécs, Hungary (1999 – 2000).

PROF. DR. CHRISTIAN HACKENBERGER

Institute of Chemistry and Biochemistry, Freie Universität Berlin

Christian Hackenberger completed his undergraduate studies and pre-diploma in Chemistry at the Albert-Ludwigs-Universität Freiburg. He continued his graduate studies at the University of Wisconsin/Madison with Prof. Samuel H. Gellman. From 2000 to 2003, he did PhD research with Prof. Carsten Bolm at the RWTH Aachen. Between 2003 and 2005, he held a postdoctoral position at the Massachusetts Institute of Technology (MIT), Cambridge, USA (research work with Prof. Barbara Imperiali). Since 2005, Christian Hackenberger is leader of a working group in the Emmy Noether-Program of the DFG at Freie Universität Berlin where he habilitated in 2011 and is currently professor for Bioorganic Chemistry (since 2011). His research interests lie in the area of chemical biology, development of new chemoselective ligation and modification strategies, Staudinger

reactions, semi-synthesis of naturally modified proteins, peptide and protein synthesis, glycoproteins, multivalency, structural behaviour of modified proteins. He is a member of the German Chemical Society (GDCh) and the American Chemical Society (ACS). Christian Hackenberger received numerous honors and awards, among others, the Heinz-Maier-Leibnitz-Award of the DFG (2011), the ADUC-Price of the GDCh for junior investigators (2011), the Karl-Winnacker-Scholarship of the „Fonds der chemischen Industrie“ (FCI) (2011), a Recognition in the competition „Junior investigator of the year 2010“ (2010), the „Plus 3“-Award of the Böhringer-Ingelheim Foundation (2010), the Price of the GDCh section „Macromolecular Chemistry“ (Fachgruppe Makromolekulare Chemie) (2009), and the Price of the Otto-Röhm Memorial Foundation (2008).

DR. PETER HEIL

Leibniz Association, Evaluation Office

Peter Heil received his PhD in Contemporary History from the University of Cologne (1995). From 1987 to 1992 he studied History, Politics and Public Law at the University of Trier (M.A.). Between 1995 and 1997, he was a postdoc researcher in History at the Saarland University, Saarbrücken.

From 1998 to 2008, he was Programme Director at the Department for Collaborative Research Centers/Cluster of Excellence of the German Research Foundation (DFG). Since April 2008, he has been Head of Division at the Evaluation Office of the Leibniz-Association.

STEFAN HERMANS

European Commission, Directorate General for Research and Innovation

Stefan Hermans is currently Head of the 'Skills' Unit in DG Research and Innovation at the European Commission.

His tasks include the promotion of the development of the skills base to foster the European Research Area, the creation of an open and attractive labour market for researchers, and the modernisation of the research and innovation dimensions of universities.

Before joining DG RTD in 2008 as Head of the 'Universities and Researchers' Unit, he was Secretary of the European Employment Committee following several other functions in DG Employment, Social Affairs, Industrial Relations and Equal Opportunities. He also worked as project officer in Education and Training at the European Commission.

DR. HEINRICH HÖFER

Federation of German Industry (BDI), Department Research, Innovation, Technology and Health

Heinrich Höfer studied Economics and in 1977 he received his PhD degree in Economics from the University of Cologne. Since 1986 he has been working for the Federation of German Industries (BDI) where he held different positions at the Press and Information unit, as assistant to the President, as Director Small and Medium-sized Enterprises Policy and Director Technology and Innovation Policy. Since 2008 Heinrich Höfer holds the position of the Managing Director Research, Innovation, Technology and Health. Prior to joining BDI, he worked, among others, as assistant teacher and researcher to professor Willgerodt (Professor for Economics and Economic Policies) at the University of Cologne (1976 – 1979), staff member of

the Department for General Economic Policy at the Federal Ministry of Economics, Bonn (1979 – 1981), Head of Department for Public Relations and Director of the Junior Chamber of Commerce in Heidelberg, Chamber of Industry and Commerce, Heidelberg-Mannheim (1982 – 1986).

Heinrich Höfer is, among others, a member of the R&D Working Group Business Europe, Fachkommission Innovation und Wachstum des Wirtschaftsrates der CDU, Working Group Higher Education of Confederation of German Employers' Associations (BDA), Federation of German Industries (BDI) and German Rectors' Conference (HRK) as well as member of the aca-tech expert group.

DR. MARIA JEPSEN

European Trade Union Institute (ETUI), Research Department

Maria Jepsen holds a PhD in economics from the Free University of Brussels (ULB). She is currently the Director of the research department at the European Trade Union Institute (ETUI) and chargée de cours (associate professor) in labour economics at the ULB. Before joining the ETUI as a senior researcher in 2001, she worked as assistant professor and research fellow at the ULB from 1996–2001. Maria Jepsen's main research interest is in gender studies and comparative studies of the impact of welfare states on labour supply, wages and working conditions. In recent years she has also focused on the construction and development of social

policy on the European level and how this interacts with the national settings. Maria Jepsen is a member of the Belgian Central Council on the Economy (Conseil central de l'économie) and the Belgian Higher Level Council on Employment (Conseil supérieur pour l'Emploi). She is also a member of the Foresight Advisory Committee of Suez Environnement and a former member of the European Research Advisory Board (EURAB), the Social Science and Humanities advisory committee at the European Commission DG Research, as well as of several expert groups on women in science and science and governance.

PROF. DR. STEFAN JOOS

Helmholtz Association, Research Department

Stefan Joos studied Biology, Biophysics and Genetics at the University of Freiburg, Germany and the University of Maine, Orono, USA. From 1987 to 1991, he continued his PhD studies of Molecular Biology at the University of Freiburg and subsequently held a Postdoc at the Helmholtz Center for Environmental Diseases in Munich (1991 – 1992). Between 1992 and 2006 he headed a research group within the Department of Molecular Genetics at the German Cancer Research Center (DKFZ) in Heidelberg, and obtained the Venia legend in the field of Molecular Human Genetics from the University

of Heidelberg in 2001. His major research was dealing with the analysis of complex cytogenetic aberrations in different tumor types. He published 78 scientific publications, co-authored 10 book articles and received the Karl Muss-hof Award at the 5th International Symposium of Hodgkin's Lymphoma in Cologne in 2001. Since 2008, Stefan Joos is heading the Research Section at the Helmholtz Head Office in Berlin. His work primarily focuses on the generation of network structures allowing interdisciplinary scientific approaches.

DR. WILHELM KRULL

Volkswagen Foundation, Hannover

Since 1996, Wilhelm Krull has been running the Volkswagen Foundation – following his studies in German, Philosophy, Education and Politics, an appointment as a DAAD lecturer at the University of Oxford, and leading positions at the Wissenschaftsrat (German Science Council) and at the headquarters of the Max-Planck-Gesellschaft (Max Planck Society). Besides his professional activities in science policy as well as in the promotion and funding of research, he was and still is a member of numerous national, foreign and international committees. At present he is the Chairman of the Board of the Foundation Georg-August-Universität Göttingen, a member of the Governing Board of the Central European University in Budapest, of the Scientific Advisory Commission of the State of Lower Saxony, and of the Board of Regents of the Max Planck Institute for Biophysical Chemistry in Göttingen, the Max Planck Institute for Psychiatry in Munich, the Max Planck Institute for Gravitational Physics in Potsdam and Hanover, as well as further Max Planck Institutes in Potsdam and Radolfzell. In 2004/05, he

was a member of a commission of experts for the evaluation of the Science Foundation Ireland. In 2005, he chaired the founding committee for the new Academy of the Sciences in Hamburg. Together with a commission of leading personalities in the German higher education system in the same year, he formulated a framework for a future-oriented higher education and research system in Germany. From 2003 to 2005, he was chairman of the Hague Club, an association of some 25 major European Foundations and from June 2006 to May 2008 he chaired the Governing Council of the European Foundation Centre. In June 2008 Wilhelm Krull was elected Chairman of the Bundesverband Deutscher Stiftungen (Association of German Foundations). In the recent past, he received the following distinctions: in 2001, he was honored with the Leibniz-Medal of the Academy of Sciences and Literature Mainz, in 2007, he received the Swedish Order of the Polar Star, in 2009, he was appointed Honorary Senator of the University of Konstanz, in 2010, he received the State Award of Lower Saxony.

PROF. DR. STEFAN KUHLMANN

Department of Science, Technology, and Policy Studies (STØPS),
University of Twente

Stefan Kuhlmann is Chair of the Department of Science, Technology, and Policy Studies (STØPS), a member of the programme council of university's 'Institute for Innovation and Governance Studies' (IGS), and leader of the Twente Graduate School programme "Governance of Knowledge and Innovation". He is President of the "European Forum for Studies of Policies for Research and Innovation (Eu-SPRI Forum)". He is a political scientist and studied also history (University of Marburg, Germany; graduation 1978); 1986 he received the degree of PhD in political science (Dr.rer.pol.), at University of Kassel, Germany; 1998 he got a 'habilitation' (2nd doctorate) in political science at this university.

Since 1979 Stefan Kuhlmann has been involved in studies of research and technological innovation as social and political processes – with changing entrance points and perspectives. During the last two decades he has analysed science, research and innovation systems and public policies, focusing on the dynamics of governance. Until summer 2006 he was managing director of the Fraunhofer Institute for Systems Innovation Research (ISI), Germany, and Professor of Innovation Policy Analysis at the Copernicus Institute, University of Utrecht, The Netherlands.

Stefan Kuhlmann publishes widely in the field of research and innovation policy studies. He is a co-editor of "Research Policy" (the leading journal in the field), an Associate Editor of the

“International Journal of Foresight and Innovation Policy (IJFIP)”, on the Editorial Boards of “Science and Public Policy”, of “Asian Research Policy”, on the Editorial Advisory Board of “Evaluation, The International Journal of Theory, Research and Practice”, and on the Editorial Board of “Zeitschrift für Evaluation”. Recent publications include (selection):

- Smits, R.; Kuhlmann, S.; Shapira, P. (eds.) (2010): “The Theory and Practice of Innovation Policy. An International Research Handbook”, Cheltenham, UK (Edward Elgar); ISBN 978 1 84542 848 8.
- Edler, J. / Kuhlmann, S. (2008): Coordination within fragmentation. Governance in knowledge policy in the German federal system. In: “Science and Public Policy”, Vol. 35, Nr 4, May 2008, pp. 265 – 276.
- Heinze, T.; Kuhlmann, S. (2008): Across institutional boundaries? Research collaboration in German public sector nanoscience, In: “Research Policy”, 37, 888 – 899.
- Functions of Innovation Systems: A new approach for analysing technological change. In: “Technological Forecasting & Social Change”, vol. 74, 2007, Issue 4, 413 – 432 (with Hekkert, M.P. / Suurs, R.A.A. / Negro, S. / Smits, R.).

DR. CORNELIS MENKE

Die Junge Akademie

Since 2009, Cornelis Menke is Dilthey Fellow (Volkswagen Foundation) at the Institute of Science and Technology Studies at the University of Bielefeld where he also holds the position of the director of the Junior Research Group in History, Philosophy, and Sociology of Science, ZiF / BGHS (since 2008). Cornelis Menke received his PhD degree in philosophy from the Department of Philosophy, University of Bielefeld (2007, Thesis On the methodological value

of predictions). From 1994 to 2002, he read Philosophy, Classics and Physics at the Humboldt University Berlin. Since 2010, Cornelis Menke is an elected member of the Junge Akademie at the Berlin-Brandenburg Academy of Sciences and Humanities and the National Academy of Sciences Leopoldina. His main research interests are: philosophy of science, methodology, social epistemology, history of science and history of philosophy of science.

PROF. DR. EUCLIDES DE MESQUITA NETO

State University of Campinas (Unicamp), Brazil

Graduated from the Federal University of Paraná, Brazil, (1978) with a degree in mechanical engineering has received his master's degree, also in mechanical engineering, from University of Campinas – UNICAMP (1979 – 1981). He earned a PhD from the Institut fuer Mechanik at the University of Hannover (Germany) (1983 – 1989, as the recipient of a fellowship from the German Academic Exchange Service – DAAD) and completed two postdoctoral placements at the Institut fuer Angewandte Mechanik at the Technical

University of Braunschweig (Germany) (1992 – 1993 and 2005 – 2006). He is professor in the Department of Computational Mechanics in the Faculty of Mechanical Engineering (FEM) at UNICAMP. He is currently Vice-President for Graduate Studies at UNICAMP (2009 – 2013) and is member of the Coordination for Engineering at São Paulo Research Foundation, FAPESP. He is a member of the ASCE Elasticity Committee. He is the recipient of a CNPq research fellowship since 1990.

PROF. DR. RONGPING MU

Chinese Academy of Sciences, Institute of Policy and Management

Rongping Mu was born in October of 1960 in Hefei of Anhui Province of China and received his B.S. (1983) and M. S. degree (1990) from the University of Science and Technology of China, and his PhD degree (2001) from Technische Universität Berlin, Germany. Rongping Mu has been working as a teacher in Hefei University of Technology from 1983 – 1990, and has been working at the Institute of Policy and Management (IPM), Chinese Academy of Sciences (CAS) since 1990.

Rongping Mu is now director-general and professor of the Institute of Policy and Management, Chinese Academy of Sciences (CASIPM), director-general of the CAS Center for Innovation and Development, editor-in-Chief of the Journal of Science Research Management (an academic monthly). He is also Vice President and Secretary-General of the China High-tech Industry Promotion Society (CHIPS), Vice President of the Chinese Association for Science of Science and S&T Policy Research (CASSSP).

Rongping Mu has published more than 30 papers in peer-reviewed journals and international conferences, and drafted some documents concerning the National Innovation Policies and the Five Year Plan for National Capacity-building for Innovation. He has published one book with the title “Technology Transfer from Germany to China: Case Studies on Chinese Carmakers and Parts Suppliers” in English, and some other books concerning Technology Foresight towards 2020 in China, and innovation Development Policy. He has led more than 20 research projects entrusted or financed by the National Development and Reform Commission (NDRC), the Ministry of Science and Technology (MOST), National Natural Science Foundation of China (NSFC), Chinese Academy of Sciences (CAS), and EU commission. His research interests include S&T and Innovation Policy, Technology Foresight, R&D Management, and Competitiveness of High-Tech industry.

DR. MARKUS MÜLLER-NEUMANN

BASF SE, Science Relations and Innovation Management

Dr. Markus Müller-Neumann is presently the Senior Manager of Science Relations and Innovation Management at BASF SE in Ludwigshafen, Germany. He has had a distinguished career at BASF and has held numerous positions including Team Leader/Senior Manager - Strategic Planning and Information Center (BASF), Head - International Marketing Research (Knoll/BASF Pharma), Assistant to the Chairman of the Board/Member of Corporate Development Staff (Knoll/BASF Pharma), Project Manager - Development of Pharma Proteins and Manager - Corporate Licensing (Knoll/BASF Pharma), and Laboratory Head, Biotechnology Dept., BASF. In addition to his position at BASF, he recently became Chairman of the Strategy Implementation Group Innovation at CEFIC, the European Chemical Industry Council, Brussels. Furthermore, he is

a member of the expert committee for research and education politics of the German Chemical Industry association (VCI), the European Industry Research Management Association (eirma); he is also cooperating with study groups at the National Academy of Science and Engineering (acatech) and the Federation of German Industry (BDI). He holds a lectureship at the Cooperative State University Mannheim, International Business. Dr. Müller-Neumann graduated from the Aloisiuskolleg, Bonn-Bad Godesberg, where he passed his Abitur. He entered the University of Cologne to study Biology and received his Master's Degree (Diplom). He continued at the University of Cologne to complete his PhD at their Institute of Genetics, followed by accepting a position as Scientific Assistant at the institute.

PROF. DR. RICHARD MÜNCH

Institute of Sociology, University of Bamberg

Since 1995, Richard Münch has been Professor of Sociology at the Otto-Friedrich-University in Bamberg. He studied Sociology, Philosophy and Psychology and in 1971 he received his PhD degree from the Ruprecht-Karls-University in Heidelberg. In 1972, he habilitated at the University of Augsburg. He held professorship positions for Sociology at the Heinrich-Heine-University Düsseldorf (1976 – 1995) and at the University of Cologne (1974 – 1976). He was also Visiting Professor at the University of California, Los Angeles (UCLA). His main research areas are social theory and comparative macrosociology. He is a Chair of the Advisory Board of the Max Planck Institute for the Study of Societies, Cologne, a member of the scientific directorate of the Institute for European Politics (IEP), Berlin, a member of the Council of the

German Society for Sociology (DGS) and spokesman of the interdisciplinary Ph.D. program “Markets and Social Systems in Europe” at the University of Bamberg. Richard Münch received a number of honors and awards – Reinhard and Emmy Heynen Award Society of Friends of the University of Düsseldorf (1985), the Honorary Medal of the University of Düsseldorf (1987), the Honorary Medal of the University of Bamberg (1998). Since 2009 he has been a member of the Berlin-Brandenburg Academy of Sciences and Humanities. He served as editor of following journals: *American Journal of Sociology* (1982 – 1985); *Current Perspectives in Social Theory* (1985 – 1989), *Soziologische Revue* (1998 – 2005), *Zeitschrift für Soziologie* (2000 – 2005), *Sociological Theory* (2007 – 2009).

PROF. DR. JENS ODDERSHEDE

University of Southern Denmark, Rector

Jens Oddershede has been rector of the University of Southern Denmark since 2001 and prior to that, he was dean of Science and Engineering at the same university (1992 to 2001). He graduated from Aarhus University in Chemistry and Physics in 1970. Since 2005, he has been the Chairman of the Danish Rector's Conference. He was vice-chairman for the same organisation (2002 – 2005). He has acted as member and chairman of several boards on university politics, and in research councils, research parks and venture companies. He is professor of Chemistry within the field of quantum chemistry. Jens Oddershede specializes in the theory of electronic structure, and he has published about 180 papers and a monograph. He has been visiting professor at several US and European universities. His main research areas

are: theoretical molecular physics and quantum chemistry, in particular the development and applications of methods (polarization propagator methods) for direct calculation of electronic spectra, radiative lifetime and linear and non-linear response properties like dynamical dipole polarizabilities and hyperpolarizabilities, spin-spin coupling constants, nuclear magnetic shieldings and magnetizabilities, using both fully relativistic (4-component) and non-relativistic methods; theory and calculation of non-linear optical properties of materials, and the calculation of stopping powers and shell corrections as well as mean excitation energies and other dipole oscillator strength sum rules are among the current research interests.

PROF. DR. SEERAM RAMAKRISHNA

National University of Singapore, NUS

Professor Seeram Ramakrishna, FEng, FNAE, FAAAS is the author of book *The Changing Face of Innovation* (<http://www.worldscibooks.com/business/7558.html>). He is an advisor and sought after speaker worldwide on global trends of higher education, scientific research, and innovation. He participates in round table discussions organized by various think tanks, World Bank, OECD, India, and ASEAN. He is trained as a materials engineer at the University of Cambridge, and received general management training from the Harvard University. Various global databases including Thomson Reuters ISI Web of Knowledge places him among the top one per cent of materials scientists worldwide (ESI rank is 30). He is an elected

international fellow of major engineering societies and academies in Singapore, ASEAN, India, UK and USA. He is a professor at the National University of Singapore and held several senior leadership positions which include Dean of Engineering, Vice-President of research strategy, Vice-President of International Federation of Engineering Education Societies, and Founding Chair of Global Engineering Deans Council. His passion led to substantial academic partnerships with institutions such as MIT, UC Berkeley, University of Cambridge, Imperial College, French Grand Ecoles, TUM, ETH, Technion, Peking University, and IITs in healthcare, energy, water and sustainability.

DR. WOLFGANG ROHE

Stiftung Mercator, Centre for Science and Humanities

Wolfgang Rohe studied German Language and Literature, Theology, Education and Philosophy at the University of Münster and 1987 he took his State Teaching Examination. In 1990, he received his PhD in German Philology. From 1990 to 1992, he worked as research assistant at the University of Münster. Wolfgang Rohe was Programme Director at the Department for Collaborative Research Centers (1992 – 2000)

and Head of the Strategic Planning Unit (2000 – 2002) at the German Research Foundation (DFG). From 2002 to 2008, he was Head of the Research Policy Department at the German Council of Science and Humanities (Wissenschaftsrat), and since 2005 also Vice Secretary General. Since 2008, Wolfgang Rohe has been Director of the Centre for Science and Humanities at the Mercator Foundation.

DR. FABIANA SCAPOLO

European Commission, Joint Research Centre

Fabiana Scapolo has been working at the European Commission, Directorate General Joint Research Centre (JRC) since 1999. She is located at the JRC Headquarters in Brussels where she is part of a newly created Unit on Science Advice to Policy, Innovation and Horizon scanning. Her task is to contribute in the shaping setting up of a corporate intelligence function called Anticipation at the JRC. This function is studying technological and societal trends and events, which may affect future European public policies by applying horizon scanning and Foresight. From May 2008 since September 2011, she worked in the Work Programme

and Strategy Unit of the Joint Research Centre where she was in the development of the new JRC Strategy for the period 2010 – 2020, and on the development and monitoring of JRC's work programmes. Previously she was working at JRC-Institute for Prospective and Technological Studies in Seville (Spain) where she was responsible of the Foresight activities. She has been working on several projects aiming at reinforcing the position of the JRC-IPTS as a centre for Foresight at European and international level. She is interested in the advancement of the application of Foresight as an instrument for policy-making formulation.

DR. ULRICH SCHREITERER

Social Science Research Center Berlin (WZB)

Graduating from triple major studies in Sociology, History, and German Literature at Marburg, the LSE, and Bielefeld in 1977, Ulrich Schreiterer took his Ph.D. in Sociology there in 1988 while he had worked full-time with the University's Planning Council and as Head of the Rector's Office from 1978 on. Between 1990 and 1995, he was first a staff member and then Head of Division at the German Council for Science and Humanities (Wissenschaftsrat). After quitting there, he did consultancies for international higher education and research development. 1997, he became a project manager at the Center for Higher Education Development (CHE), a subsidiary of the Bertelsmann-Foundation, and in 2003, a Senior Research Scholar

and Lecturer in Sociology at Yale University. As of June 2008, he holds the position of a Senior Researcher at the Social Science Center Berlin (WZB). His fields of work include the governance of higher education, the globalisation of research, and research policies. Recent publications: Traumfabrik Harvard. Warum amerikanische Hochschulen so anders sind. Frankfurt/New York: Campus 2008; Exzellente Zukunft – Beobachtungen zur Dritten Förderlinie. In: Stephan Leibfried (Ed.): Die Exzellenzinitiative. Zwischenbilanz und Perspektiven. Frankfurt/New York: Campus 2010, 85 – 113; Science diplomacy at the intersection of S&T policies and foreign affairs (with Tim Flink). In: Science and Public Policy 37(9), November 2010, 665 – 678.

DR. DAGMAR SIMON

Social Science Research Center Berlin (WZB)

Dagmar Simon studied Political Science and German Language and Literature at the Johann Wolfgang Goethe University in Frankfurt and at the Freie Universität Berlin. She received her doctorate at the Department of Political Science, Freie Universität Berlin in 1986. Since 1989, she is working at Social Science Research Center (WZB) and since 2008 she is head of the Research Group “Science Policy Studies” (WZB). At the WZB Dagmar Simon headed, amongst others, the projects “Start-up Culture for foundations at universities and colleges”, “Institutional effects of evaluations” and “Forming of judgments in peer review. International case studies on the evaluation of scientific institutes”. From 2006 to 2007, she coordinated the Institute for Research Information and Quality Assurance (iFQ), Bonn. Dagmar Simon’s main research interests are scientific research,

evaluation research, organization studies, and gender studies. Dagmar Simon is appointed to the Working Group „research-oriented standards for equality treatments“ of the German Research Foundation (DFG) (2009 – 2013). Since 2009, she has been appointed to the Project Advisory Board „New Governance of Universities“ at Hans-Böckler-Foundation. Since 2008, she has been a member of the interdisciplinary Working Group “excellence initiative” of the Berlin-Brandenburg Academy of Sciences and Humanities and has been a reviewer for Dutch research funding organizations. Since 2003, she has been a reviewer for the Federal Ministry of Education and Research. Dagmar Simon is co-editor of the magazine “Leviathan” and a member of the scientific advisory board of the “WSI-Mitteilungen”.

SIMON SOMMER

Jacobs Foundation

Simon Sommer holds graduate degrees in Cultural Studies, Media Studies, and Musicology from the Universities of Maryland, USA, and Lüneburg, Germany. After graduating in 2001 he became a management consultant with McKinsey & Co. From 2002 – 2005 he worked as officer for strategy and quality assurance at the Volkswagen Foundation in Germany. From 2005, he worked as an independent consultant in research evaluation, conducting several

international projects, e.g. for the German Science Council (Wissenschaftsrat), the Vienna Science and Technology Fund (WWTF), the German Federal Ministry of Science and Education (BMBF) and the German Aerospace Center (DLR). Since 2006, he has been responsible for the research funding activities at the Jacobs Foundation, Zurich, one of world’s largest private foundations supporting children and youth development.

PROF. DR. BARBARA SPORN

Wirtschaftsuniversität Wien

Barbara Sporn, Professor of University Management (on leave) has been Vice-Rector at the WU (Vienna University of Economics and Business) since 2003. She studied Psychology (Pepperdine University), Law (University of Vienna) and graduated in Business Administration from WU Vienna, where she also received her PhD in Social & Economic Sciences in 1991 and her Habilitation in 1999. Prior to her election to Vice-Rector, she held a Visiting Research Fellowship at the SIHER and NCPI at Stanford University, an Acting Assistant Professorship at Stanford University's School of Education and has been a Visiting Research Scholar at New

York University as well as at the University of Michigan's School of Education and the University of California at Berkeley, Center for the Studies in Higher Education. Barbara Sporn is, among others, a member of the European Academy of Sciences & Arts, the AOM, EAIR, CHER, Austrian-American Educational Commission and member of the R&D Committee of the EFMD. Her research expertise focuses on leadership and organization in higher education, university adaptation and change, international and comparative higher education, globalization of higher education, knowledge management and IT in non-profit organizations.

PROF. DR. MICHAEL ZÜRN

Social Science Research Center Berlin (WZB)

Michael Zürn is the director of the Research Unit "Transnational Conflicts and International Institutions" at the WZB Social Science Research Center Berlin. Between 2004 and 2009 he was the Founding Dean of the Hertie School of Governance. From 2002 to 2004, he was the director of the special research field 597 „Transformations of the State“ at the University of Bremen. Between 2001 and 2003, he was the director of the Institute of Political Science at the University of Bremen. He was also a co-founder and Board Member of the Graduate School of Social Sciences at the University of Bremen. From 1997 to 2000 he headed the Centre for European Law and Policy, Bremen. Between 1993 and 1996, he was director of the Institute for Intercultural and International Studies (InIIS) and since 1993

professor of Political Science and International Relations at the University of Bremen. He is a member of the Berlin-Brandenburg Academy of Sciences and Humanities, the Advisory Board "Normative Orders" of Johann Wolfgang Goethe University of Frankfurt am Main, the International Academic Council (IAC) of the Barcelona Institute for International Studies (IBEI), the Executive Committee of the Development and Peace Foundation (SEF) and the Scientific Board of Directors of the German Council of Foreign Relations (DGAP). His main research areas are multi-level governance, legal regulation of international politics (rule of law), politicization of international institutions, international security, environment and economic policy; international relationships.

List of Participants

PROF. DR. SLIM ABDENNADHER	German University in Cairo
PROF. DR. PETER-ANDRÉ ALT	Freie Universität Berlin University Board
MICHAL ANDRÁ	Freie Universität Berlin Institute of Chemistry and Biochemistry
INA ANDREES-OSTOVAN	Fraunhofer Institute for Interfacial Engineering and Biotechnology
CLAUDIA ARNTZ	Universität zu Köln
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Center for Cluster Development

The **CENTER FOR CLUSTER DEVELOPMENT (CCD)** plans and promotes long-term development of research activities at the Freie Universität Berlin.

A central element of the “International Network University” strategy for the future, which received an award in the Excellence Initiative, is the targeted development of research alliances termed “Focus Areas”. The core idea of the concept is that scholars and scientists from various departments, disciplines, and institutions work together on large-scale research projects aimed at exploring topics that are highly relevant across a broad cross-section of society. This approach helps strengthen and further develop emphases within the research conducted at the Freie Universität Berlin.

Since its establishment in March 2009, CCD services have supported the establishment of interdisciplinary Focus Areas and their incorporation in the science hub Berlin Brandenburg. CCD, as one of the three strategic Centers of the Freie Universität (along with Dahlem Research School and Center for International Cooperation), is tasked with providing assistance and support for the successful building, management, and development of these overarching and permanent Focus Areas at the Freie Universität Berlin, along with other cooperative research projects. The CCD supports efforts to more sharply delineate specific topics and to develop suitable management capacity and provides assistance in making contact with appropriate potential sources of funding.

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