Contents

Outline

The *BMBF-Foresight-Process* was launched in November 2007 and finished in June 2009. It was commissioned by BMBF ? the German Ministry for Research and Education with the following official objectives:

(1) Identification of new focuses in research and technology;

(2) Designation of areas for cross-cutting activities;

(3) Exploration of fields for strategic partnerships;

(4) Derivation of priority activity lines for R&D policy.

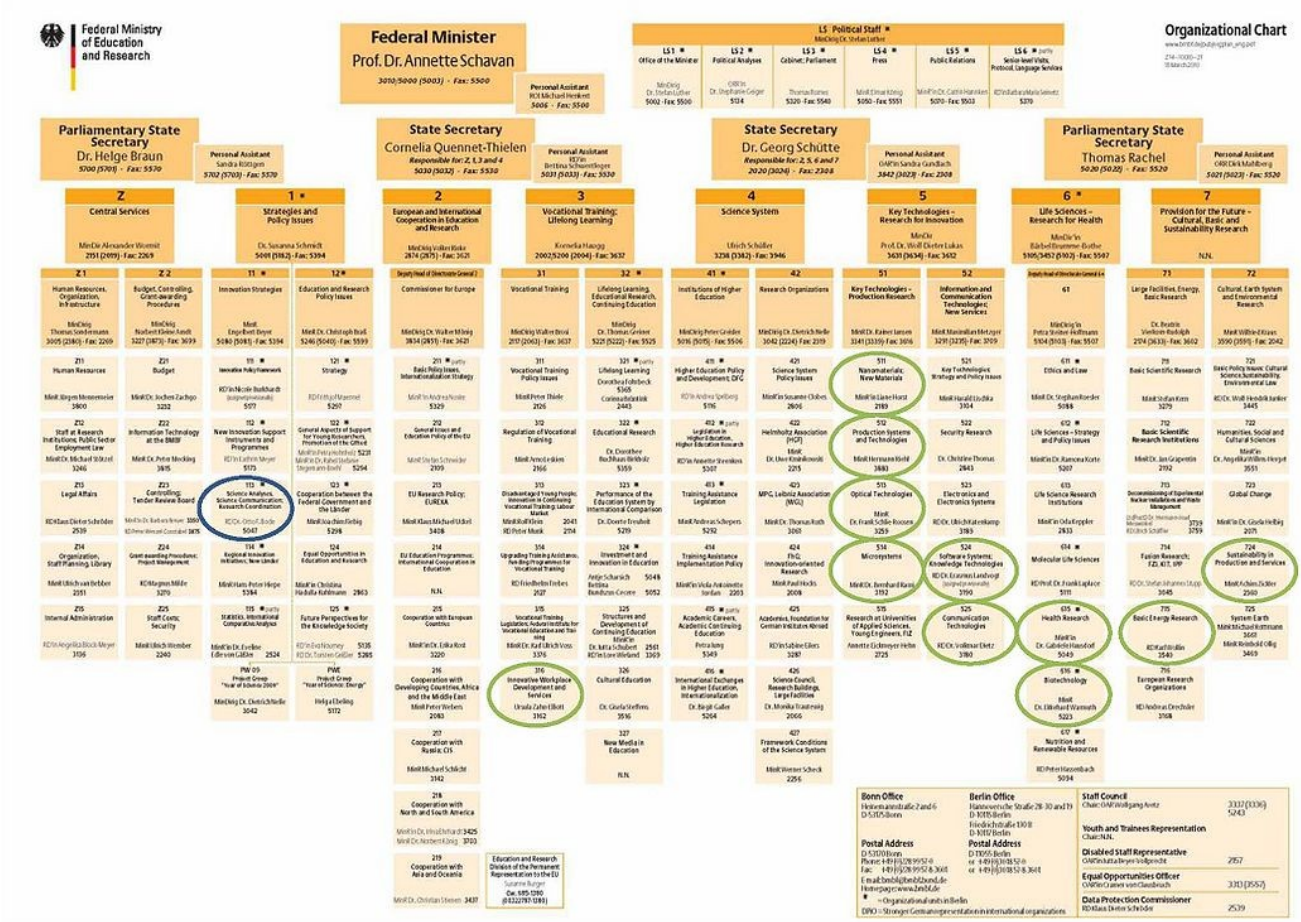
The project was carried out by two Fraunhofer Institutes: The Fraunhofer Institute for Systems and Innovation Research (ISI) and the Fraunhofer Institute for Industrial Engineering (IAO).

Context

There were four main context parameters influencing the design upfront as well as throughout the process:

- The BMBF organisational structure which is characterised by a number of departments each holding responsibility for a dedicated technology or innovation area and each running strategic processes to define

priorities. The strategic department that is responsible for the High-Tech Strategy as well as Foresight is located at the same hierarchical level as the technological departments. It has no mandate to define priorities for the technical department but its proposals can be taken up by the minister.



Picture 1. Foresight within the BMBF organisational chart

- The German High-Tech-Strategy that was already in place when the foresight started had defined a set of key technologies as well as four key lead markets. The Foresight was meant to operate independently from the High-Tech Stratgey complementing its mid-term range with a long term perspective.
- The legacy of the preceding exercise FUTUR that had been highly participatory involving a wide range of stakeholders including citizens and came up with seven priority fields few of which had found their way into BMBF policy. Many BMBF actors felt through FUTUR priorities were to be imposed on their own strategic planning. Accordingly the Foresight had to face an atmosphere of mistrust and scepticism towards Foresight within BMBF but also within the wider innovation system where many people who had been actively involved into FUTUR were disappointed on the little impact.
- The federal elections in Germany autumn 2009.

The Foresight Design

As an immediate consequence of these context parameters the Foresight-Department at first adopted a rather careful ?undercover? approach with little publicity within or even beyond BMBF. Furthermore, there was a pointed absence of participatory elements. It was carefully avoided to present any outcomes before the elections, in order not to tie the Foresight to the current political situation. Later on, when the results were communicated within BMBF, the strategic department emphasised the service function of Foresight to the departments. The aim was to offer a reservoir of insights for the departments to use within their own strategic planning.

The concept developed by the consortium answered to these requirements by proposing the following set of methods for identifying emerging S&T topics:

- high-level expert workshop for structuring the STI landscape
- bibliometric identification of top-cited articles
- in-depth desk research and literature review
- expert interviews
- online expert-survey for assessment of STI topics
- high level international expert panel with two members per STI field to be interviewed twice using a semi-structured guideline

Participation

The notion of "expert" was applied in a strict sense of highly recognised competence in STI fields. Only a few social scientists were included. Through the international monitoring-panel, expertise from 30 international top-experts was gathered. In the online-survey 10000 selected experts were approached and 2650 gave at least a partial answer. In the first workshop 70 experts participated, most of them distinguished researchers and representatives of key players in the German ST landscape. In the final conference the audience was opened up a little for the first time with 160 participants invited to discuss the outcomes.

Focus

In response to the BMBF requirements the Foresight adopted an explicit technology push perspective without any reference to socio-economic framework conditions. Accordingly throughout the first phase the focus was strictly on identification of emerging S&T topics. Later in the process, when the crosscutting priorities were defined response to future socio-economic framework conditions was used as assessment criterion.

Scope

As a starting point for the analysis the 14 HTS STI fields were adopted with only slight modifications. Social Science was not taken into account even though there is a department funding social science research in BMBF. For each HTS field, two theme-co-ordinators from the two Fraunhofer-Institutes were appointed to carry out the review of the field. This structure was kept throughout the Foresight exercise.

Running the Foresight

In the course of the Foresight the original concept was modified and revised several times in response to changing requirements of the client e.g. to improve coordination with other ongoing strategic processes. Also the approach was adapted in a responsive way to accommodate the nature of the outcomes.

The following steps can be distinguished:

Structuring

The initial structuring of the field was carried out within the first national expert workshop as outlined above. To allow for cross-cutting perspectives, two thematic groups (e.g. nanotechnology and materials science) were working together. As a result, each of the 14 fields came out with a structured mindmap that formed the point of departure for the analysis of the theme coordinators and the international expert interviews. The initial topics were assessed with respect to long-term relevance as well as degree of adoption by BMBF. The most important long-term topics with little BMBF adoption were considered the most interesting for the Foresight process.

Scanning

Using the structure of the mindmap, the coordinators carried out an in-depth scanning of emerging long term topics through desk research, bibliometric analysis and national expert interviews. The members of the international monitoring panels were interviewed in depth to assess emerging topics in their field. Throughout the scanning the theme coordinators checked for overlaps.

Assessment

All topics identified were assessed with respect to criteria defined by BMBF:

- Long-term relevance (more than 10-15 years)
- Relevance to German industry
- Relevance to environment
- Relevance to quality of life

The highest scoring topics were subjected to an online survey were the topics were assessed with respect to these criteria again by a wider group of experts. For each of the 14 fields experts were selected to participate in the survey. However, respondents were free to answer questions in other than their core field of expertise. The same assessment was requested from the members of the international monitoring panel. Finally, taking all the assessments into account, the theme-coordinators selected between 5 and ten top-future topics within their fields.

In-depth information on the methods deployed for the identification of emerging S&T topics can be found in the first report.

Synopsis

At some point during the scanning, a researcher from the Foresight team reviewed the relevant long-term topics in all fourteen fields and identified ?nodes? i.e. perspectives where a number of topics seemed to be converging. These nodes were tentatively outlined and put-up for debate with the theme co-ordinators, BMBF and the external experts.

Two main rationales for forming new fields emerged:

- Bottom up science and technology dynamics

Emerging S&T topics that could not be adequately addressed within the established S&T framework

- Dynamics of socio-economic framework conditions

Future challenges that could not adequately be addressed within the existing S&T framework.

In this way, four potential cross-cutting priority areas were identified:

ProductionConsumption2.0

Transformative, systemic innovation for sustainable patterns of production and consumption.

Human-Technology-Cooperation

Adequate understanding of closer forms of human-technology interaction through integrated social science and technology research.

Living-Spaces

Spatial concepts accomodating changing patterns of life and value creation.

Modelling

Generic challenges of model based knowledge generation such as dealing with complexity and multiple scales.

File:Crosscutting areas.ppt

Later on, three more areas were added:

Understanding Ageing, Time research, Energy pathways. The names were a constant source of creative debate and changed a number of times.

Prospective Analysis of cross-cutting RTI Fields

In a next step, the team proposed key research perspectives and potential actor constellations for each identified cross-cutting priority-area. These proposals were based on interviews with key actors, desk research and bibliometric analysis. In two cases, workshops were carried out, where sctors from different fields discussed the

proposals of the team.

Recommendations

For each field recommendations for BMBF were elaborated suggesting measures to further explore and underpin the potential priority-areas.

Embedding into BMBF

After the future topics and new cross-cutting future fields were tentatively fixed, the Foresight-Department decided to introduce the findings to the S&I departments on request. Accordingly, after some time the report was sent to all departments. The Foresight team was requested to present the findings in the established areas and the proposed future priority areas, to selected departments. In most cases the synopsis work was appreciated by the departments as a welcome complementary perspective allowing them to situate their own field in the bigger picture whereas the findings in their own arena were sometimes contested.

Finally, a short paper summarizing the proposed cross-cutting research fields was agreed upon by all departments and submitted to the minister.

Communication to the Public

In a final conference the results were presented to a selected audience of ca. 200 S&T actors. The new priority areas were presented and discussed.

The reports will be launched publicly as a reservoir of knowledge and ideas available to BMBF on 3rd of May 2010. An online forum will be set-up for specific debate on each suggested new priority field.

Tangible Outcomes

In its several reports, the Foresight produced the following main outcomes:

- Within fourteen established Research and Innovation areas:
    - Detailed review of current expectations on upcoming research topics
    - Assessment of long term relevance of these topics
- Proposal of eight new priority areas for research and innovation including
    - Sketching of potential actor constellations for each area
    - Recommendations for building up the area

Evaluation

The Foresight was complemented by an evaluation that monitored the effect of several individual elements such as the presentations to the departments. You can read more about the evaluation of the BMBF-Foresight-Process here.

Follow-Up

In immediate follow-up to the Foresight process the BMBF strategic departments launched the following three activities:

- Workshops with several departments to discuss ways of addressing the new priority areas
- Strategic dialogues in the innovation system around the new priority areas
- Tracking system to observe the development of the new areas and of the relevant socio-economic and technological framework conditions

Practitioner's Conclusion

The BMBF Foresight may have managed to walk the fine line in two classical RTI Foresight dilemmata:

technology push vs demand pull perspective (through the introdcution of a truely integrated type of perspective)

top down vs bottom-up approaches (through the reservoir approach).

Furthermore, the process seems a striking example of the challenge of dealing with the strong embedding of S&T perspectives into the institutional framework. It is well known that much of existing "priority identification" is just reproducing the existing frame of thinking. As soon as a new proposal transcends this framework it will automatically challenge the organisational structure. At the same time, as in the case of BMBF the established structure often welcomes the introduction of a bird's-eye-view from outside.

It is somewhat frustrating that te bulk of resources were spent to review and reproduce the status-quo and current thinking, leaving comparatively little time and money to explore the new, extra-systemic areas. On the other hand, without this grounding in the current thinking the cross-cutting perspectives would have lacked credibility.

Could it be the case that the main contribution Foresight has to make in terms of RTI priorities is the introduction of new perspectives rather than the identification of "new" topics?

Proposals for new topics are often either classified as utopian or long-established, whereas new perspectives allow various actors to rethink their positioning.

Theoretical Perspectives

It would be interesting to explore what the BMBF Foresight experience implies for possibilities to turn an optimization approach into disruptive foresight or mode2 foresight that is recognizing change in the conditions of change (Miller 2007). In a way an extremely strong intra-systemic optimization approach turned into recognition of extra systemic change without any explicit methodological attempt to do so. Maybe in a classical STI policy context disruptive foresight is only possible in a Trojan Horse manner?

The follow-up activities show a strong tendency towards "embedded foresight" which is discussed as the latest foresight generation.

The search framework shaped by HTS and BMBF organisational chart can be interpreted as Ansoff's mentality filter.

References

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External links

The BMBF Foresight Process