



## The methodology combination of a national foresight process in Germany

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### ABSTRACT

In September 2007, the Federal German Ministry for Education and Research (BMBF) launched a new foresight process which aimed at four specific targets. To achieve them, a tailor-made combination of methods was applied. This paper focuses on the concept design of the process and explains one of the methods – the future online survey – in more detail.

The German Foresight Process of the BMBF delivers results on different levels: broader future fields as well as single future topics. Both kinds are relevant and selected according to a set of criteria. Some of the results of this foresight process will be directly integrated into national policy activities, others are just more indirectly filtered into the innovation system of the specific sectors in the country. The future fields are all cross-cutting issues based on science and technology. All of them are specifically knowledge dynamic fields.

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### 1. Introduction

In September 2007, the Federal German Ministry for Education and Research (BMBF) launched a new foresight process in order to sustainably safeguard Germany's status as a research and education location. The process started with four objectives and was tailored along them. "The BMBF Foresight Process" as it was called, subtitle "Implementation and Further Development of a Foresight Process," was conducted by a consortium comprising the Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI) and the Fraunhofer Institute for Industrial Engineering (Fraunhofer IAO). Other institutions like the Technical University of Berlin, the Institute for Nanotechnology (INT) of the Research Centre Karlsruhe, the RWTH Aachen, the Austrian Research Centres GmbH (ARC), Systems Research Division – Dept. of Technology Policy, the Manufacture Secretariat Germany of the German "Verband deutscher Maschinen- und Anlagenbauer" (VDMA) supported the approach. The process linked both foresight and monitoring in its integrated approach.

The process had impacts along the six functions of Foresight for policy-making that recently emerged in the Foresight debate (informing policy, facilitating policy implementation, embedding participation, supporting policy definition and reconfiguring policy structures, as well as the symbolic function, see [1]). Accordingly, the German BMBF Foresight Process addressed all these dimensions, albeit with different emphases and in different stages with a new combination of methods. The process was considered to be the major approach of a German ministry in science and technology foresight. Nevertheless, it is not the only one and had strong links to the previous science and technology foresight processes on a national level [13,16,17,28,29]. Even as follow-up of the High-tech Strategy of the government [2], administrated in the same ministry, several sector foresight activities were performed (e.g. in Health, Environmental Issues or Information and Communication) and formulated in roadmaps.

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## 2. Objectives of the national foresight process

The BMBF itself in a call for tender formulated four specific targets. They were derived from previous foresight experiences and formulated by the responsible department (Referat). The BMBF Foresight Process aimed at:

- 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

## 3. Combination of methods and topic fields

In order to achieve these targets, a tailor-made combination of methods was applied. The process started by monitoring present-day science and technology and was broadened to look into the future of the next 10 to 15 years – and even further. It took into account the developments at the national as well as the international level. As there is not one single methodology that can be used as in an input–output model, like in most foresight processes world-wide [see 3–6] a combination of methods had to be used to meet all the requirements of the objectives (see Fig. 1).

In order to address objectives 1 and 2, in the foresight approach, well-known search strategies as well as other methods from innovation research, from international foresight activities [3] were taken into consideration, as well as new, creative methods. The themes to be investigated, both national and international, were further developed by experts taking into account existing forward-looking road-mapping and strategy processes from the public and private sector.

The first phase stressed the national search for weak [7] and strong signals [like in 8], while the international search was focused on the later second phase. As there is not a single methodology for searching procedures, the methods contained quantitative methods like bibliometrics as well as qualitative approaches like workshops, expert interviews, internet and qualitative literature searches. A new approach of inventor scouting (identifying young inventors and interviewing them) added to the methodology. For the evaluation of the topics, a set of criteria was worked out. This was the basis for an online survey but also the pre-judgements of the selection phase.

The foresight search activities were flanked by a monitoring process. With the assistance of an international panel, latest developments in various technological-scientific subject areas were analysed, consolidated and processed in order to attain a reliable description of the international “state-of-the-art.” For the monitoring process, an international panel of well-known and acknowledged experts who have an overview in their fields were asked about the current state and new developments in research and technology. In a second wave nearly 1 year later, they were once more interviewed to consolidate their opinions and give feedback on topic candidates for BMBF that met the requirements of the objectives.

The process therefore started with desk research, research in databases and the internet. This search was combined with a bibliometric approach. Literature was analysed. Experts were identified and interviewed in order to find the most promising topics in research and technology for the next 10 to 15 years or even further in the future. These topics should still be in the research or development phase during this time. Topics that will already be in the implementation phase during the next years, or are already transferred to innovations in 10 years' time were excluded from the lists of topics to be considered. For first selections, a set of criteria was developed together with BMBF.

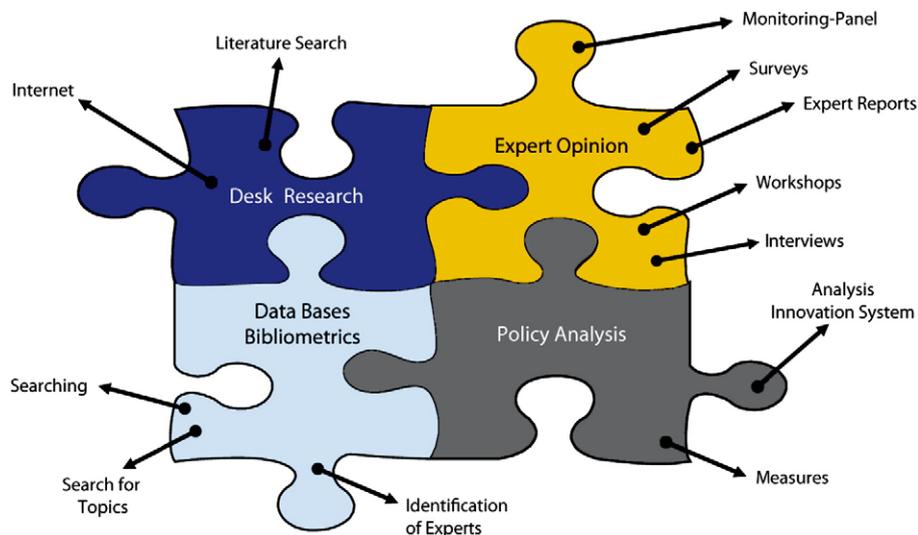


Fig. 1. Combination of different methods.

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