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Bridging the gap between foresight and market research: Integrating methods to assess the economic potential of nanotechnology ☆

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Abstract

This paper discusses how to bridge the gap between foresight research oriented to the long-term, and traditional market research oriented to the medium to short term, when applied to an early stage of a technology's life cycle. It proposes using an integrating approach, i.e. a combination of methods and both foresight and traditional market research. A mix of complementary methods for the acquisition and analysis of data is presented in a case study. This helps to overcome the deficits of some qualitative foresight methods and quantitative methods often used in traditional market research and allows us to examine research results from the different methods applied both on their own and as a group. In the absence of a single fully-fledged and accepted economic approach, this paper argues that combined *market research* and *foresight modules* are the best possible approach for analyzing the economic potential of emerging technologies like nanotechnology. In the future, similar applications of such

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market foresight modules may be useful, for example, as elements of foresight. They will also be useful in studies of emerging technologies (e.g. converging technologies, cognitive science and Web 2.0) where traditional market research does not produce a realistic market assessment.

Keywords: Traditional market research; Foresight; Nanotechnology; Integrating research methods; Emerging technologies

1. Introduction

Foresight is usually seen as a systematic collective process of reasoning about the future, which suggests possible courses of action. Quite often it is a participatory process involving the stakeholders concerned with a particular issue. It always envisages a number of alternative futures, and has a typical time horizon of 10–20 years.[1] The benefits of foresight are threefold. Firstly, the involvement of relevant actors in the debate creates ownership and orients actors towards policy objectives (*soft coordination*). Secondly, the joint learning process as results from the foresight activities leads to better connectivity in the innovation arena through networking and improvement of knowledge flows [3]. This leads to better innovation capability. Finally, anticipatory intelligence is created from a wide diversity of viewpoints and knowledge sources, which serves as a base for future-oriented decision making. In particular, technology foresight is "an instrument of strategic policy intelligence which seeks to generate an enhanced understanding of possible scientific and technological developments and their impact on economy and society" [4]. It does not focus on technology in a narrow sense but sees technological change as being embedded in broader change in the economy and society. It therefore "provides a process for linking science and technology more effectively to wealth creation and improvements in the quality of life" [5].

Foresight has long since moved away from the early predictive "forecasting approaches", based on trend extrapolation and expert consultations, towards a "third generation of foresight" [6]. This takes a holistic view and applies a wide range of methods to structure stakeholder dialogue to create collective intelligence. Technology forecasts, which provide information about technological trends are, however, still an important input into the foresight processes. *Traditional market research* differs from foresight in many respects. Not only is the time horizon much shorter (usually 5–10 years) but also the purpose is different. While foresight orients decision making (for policy and also business) in a general way and only in specific cases does it lead to concrete strategy building [7], traditional market research can be used for concrete short to medium-term company business and strategy planning [8,9].

In this paper, we discuss a study on the economic potential of nanotechnology, which uses elements from both foresight and traditional market research. The study was carried out by an interdisciplinary team of economists, social scientists, engineers, physicists and chemists over a period of 2 years. It aimed to assess realistically the market volume and relevance of nanotechnology, both in Germany itself and in an international context. It also aimed to bridge the gap between foresight and traditional market research, by doing empirical research on the economic potential of a specific emerging technology and *using methodological elements of the traditional market research module and the foresight module*. We will use the example to show how elements from both modules can be combined to create a better understanding of the future development and diffusion of emerging technologies. This combination yields a somewhat

[1] See FORLEARN online foresight guide [2].