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## Medical technology decisions in The Netherlands: How to solve the dilemma of technology foresight versus market research?

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### Abstract

In this article, we discuss a dilemma consisting of the market-oriented perspective of users of medical technology versus the long-term technology foresight perspective. The context of medical technology is interesting, because we have to cope with complex future-oriented multi-level and multi-actor strategic decision making. In order to deal with this dilemma we suggest combining the results of a (group) expert opinion forecasting approach with a more market-oriented scenario-approach. More specifically, we use the results of the Delphi-technique as the main input for the development of various capacity (Market-based) scenarios. We exemplify this approach by a real life example directed at the future of imaging techniques for cancer care in The Netherlands and focus on a set of scenarios that deal with the application of the MRI-technique in the period 2005–2015. The Delphi-panel's expectations with respect to imaging technology representing the technological forecasts, combined with other relevant developments (such as demographic and epidemiological developments) are translated into alternative inputs for assumptions of the scenario-model. This model is basic to the future projections in terms of needed MRI-scanners, manpower and investments. We argue that the results provide motivation to continue to explore the methodological interesting area of innovation, aligning the market-oriented perspective of users of (medical) technology with the long-term technology forecasting perspective.

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## 1. Introduction

Continuous technological developments spur future-oriented research. Forecasting or foresight can help people and organizations to plan for the future and to make rational decisions [1,2], it is about the description and, if possible, prediction of the future state and impacts of certain trends, events and issues in order to support the development of strategic policy options and plans [cf. 3].<sup>1</sup> Technological forecasting involves the future developments of technological phenomena. Tushman and Anderson [4, p.440] define technology ‘as those tools, devices, and knowledge that mediate between inputs and outputs (process technology) and/or that create new products or services (product technology)’. They indicate that ‘technological change is a bit-by-bit, cumulative process until it is punctuated by a major advance’.

In healthcare, medical technology refers to ‘techniques, drugs, equipment and procedures used by healthcare professionals in delivering medical care to individuals, and the systems within which such care is delivered’ [5, p.1/2]. In this article, we take the perspective of strategic decision makers in healthcare. Strategic decision makers in healthcare act on the national, regional as well as on the hospital level. (Medical) technological forecasting informs these strategic decision makers on profound technological and other relevant developments, which are induced through fundamental and applied research performed in research institutes and the industry. Based on this and on more or less subjective estimations of market developments (e.g. in terms of expected numbers of patients), strategic decision makers may make capacity decisions. Strategic decision making processes with respect to the introduction of new medical innovations in general require actors from various disciplines or backgrounds and include institutions on various policy levels. The introduction of the Magnetic Resonance Imaging (MRI)-technique on a hospital level, for instance, needs the involvement of local administrators, radiologists, technical professionals, medical specialists and advisory councils on the regional and national level. MRI is increasingly important, because as Ringertz [6, p.84] states ‘Imaging of human internal organs with exact and non-invasive methods is very important for medical diagnosis, treatment and follow-up’, he also argues that the development of MRI ‘represents a breakthrough in medical diagnostics and research’. MRI is an imaging technique that combines a strong magnetic field with radio waves and can be used to (functionally) visualize organs, especially soft tissue in detail [7].<sup>2</sup> This technique has other features compared for instance with Computer Tomography (CT), which is based on X-ray technology.

For dealing with strategic problems in this context, both a long-term view on the technology and a more market-oriented approach focusing at the users of medical technology (i.e., medical specialists) are needed, which indicates a dilemma. Because on the one hand, as Tauber [8] discusses, market research as such might not be the best solution to deal with this as it is too much oriented on the market or the user’s perspective. According to Tauber, the users’ view can be myopic, because their orientation and understanding will be more inclined towards incremental changes. Especially in the case of new medical technology decisions, pure market-orientation might not render adequate results. On the other hand, when it comes to disruptive or discontinuous innovations, technological forecasting might be too much geared to the technological characteristics as such and possibilities and/or positive trade-offs related to that, but lacking — because of the many (interacting) uncertainties — sufficient market-orientation. For example, the well known V2000-debacle for Philips in the seventies is a case in point [9]. Lynn et al. [10] discuss

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<sup>1</sup> Although we recognize that there is conceptually a difference between forecasting and foresight [2]; in the context of this article both concepts concur.

<sup>2</sup> In the context of this article we confine our discussion of the MRI-technique to its relevance for oncology.

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