



ELSEVIER

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

 ScienceDirect

Technological Forecasting & Social Change 74 (2007) 608–626

**Technological  
Forecasting and  
Social Change**

## Diversity in foresight: Insights from the fostering of innovation ideas

Totti Könnölä<sup>a,1</sup>, Ville Brummer<sup>b,2</sup>, Ahti Salo<sup>b,\*</sup>

<sup>a</sup> VTT Technical Research Centre of Finland, Kemistintie 3, P.O.Box 1002, Espoo, FIN-02044 VTT, Finland

<sup>b</sup> Systems Analysis Laboratory, Helsinki University of Technology, P.O.Box 1100, Helsinki, FIN-02015 TKK, Finland

Received 18 October 2005; received in revised form 10 May 2006; accepted 13 November 2006

### Abstract

Foresight activities have often provided support for objectives such as priority-setting, networking and consensual vision-building. In this paper, we draw upon complementary evolutionary perspectives and discuss these objectives from the viewpoint of *diversity* which may be vital in contexts characterized by technological discontinuities and high uncertainties. We also argue that although the scanning of weak signals has been widely advocated in such contexts, the solicitation of ideas for prospective innovations may provide more focused, action-oriented, and comparable reflections of future developments. For the analysis of such ideas, we develop a collaborative foresight method *RPM Screening* which consists of phases for the generation, revision, multi-criteria evaluation, and portfolio analysis of innovation ideas. We also report experiences from a pilot project where this method was employed to enhance the work of the Foresight Forum of the Ministry of Trade and Industry in Finland. Encouraging results from this project and other recent applications suggest that *RPM Screening* can be helpful in foresight processes and the development of shared research agendas.

© 2006 Elsevier Inc. All rights reserved.

*Keywords:* Foresight; Innovation processes; Internet-based consultation; Multi-criteria decision analysis; Portfolio modeling; Path dependence

### 1. Introduction

In the 1980s, publicly funded foresight activities were largely seen as an instrument for assisting in the development of priorities for S&T resource allocation [1]. Later on, stakeholder participation and

\* Corresponding author. Tel.: +358 9 4513055; fax: +358 9 4513096.

E-mail addresses: [totti.konnola@vtt.fi](mailto:totti.konnola@vtt.fi) (T. Könnölä), [ville.brummer@tkk.fi](mailto:ville.brummer@tkk.fi) (V. Brummer), [ahti.salo@tkk.fi](mailto:ahti.salo@tkk.fi) (A. Salo).

<sup>1</sup> Tel.: +358 20 722 6127; fax: +358 20 722 7007.

<sup>2</sup> Tel.: +358 9 4513055; fax: +358 9 4513096.

networking have been viewed as increasingly essential dimensions of foresight activities for ‘wiring up’ the innovation system [2]. Reports from recent participatory foresights, in turn, have emphasized the importance of common vision-building as a step towards the synchronization of the innovation system [3].

These overarching trends can be regarded as complementary dimensions of how foresight can strengthen the long-term performance activities of the innovation system. They are also reflected in the taxonomy of Barré [4] who distinguishes between objectives for (i) setting scientific and technological priorities, (ii) developing the connectivity and efficiency of the innovation system, and (iii) creating a shared awareness of future technologies. Yet, because these objectives tend to be inherently consensual, it is pertinent to draw upon evolutionary perspectives which recognize the historical accumulation of innovation capabilities (e.g., [5]). In particular, these complementary perspectives emphasize the importance of evolutionary flexibility and adaptability of innovation systems, especially in contexts characterized by technological discontinuities and high uncertainties. We therefore posit that a key issue in foresight activities for the fostering of innovation capabilities and activities is *diversity*; defined as the condition or quality of being diverse, different, or varied [6].

Diversity is likely to be crucial during the early development stages of innovation cycles characterized by multiple alternatives and dissimilar beliefs [5]. This notwithstanding, attempts to promote diversity need not resort to fragmental ‘anything goes’ approaches that would thwart the exploitation of economies of scale, for instance (e.g., [7]). Rather, they call for the explicit recognition of diverse perspectives on techno-institutional co-evolution and the purposeful formation of new coalitions with specific technological trajectories [8], with the aim of creating viable alternatives for existing dominant designs and also for escaping conditions of techno-institutional ‘lock-in’ [9–11]. Indeed, Grabher and Stark [12] observe that too dense or too extensive networks may decrease the adaptability of an economic system. This suggests that an adequate level of balance is desirable in the structuring of ‘loosely coupled’ networks.

The relevance of diversity for foresight objectives has important implications for methodological choices and management activities. For instance, the ability to anticipate alternative different futures may be enhanced by various dimensions of diversity, of which the open-ended consultation of different stakeholder groups and the analysis of variability in their statements are but two examples. Interestingly enough, consultation processes of this kind are integral to the methods for the scanning of weak signals which, however, tend to produce relatively unstructured pools of ‘signals’ [13,14]. Arguably, such processes can provide results that are more amenable to subsequent analyses if a narrower characterization is adopted in the definition of the relevant ‘units of analysis’, for instance by focusing on innovation ideas that can be viewed as reflections of weak signals. Also, because the resulting ideas can be contrasted more meaningfully than loosely defined ‘signals’, they can be subjected to systematic evaluations with regard to multiple perspectives [15].

In this paper, we develop a new foresight methodology *RPM Screening* which consists of distributed generation, mutual commenting, iterative revision, multi-criteria evaluation and portfolio analysis of innovation ideas. This method – which builds on the Robust Portfolio Modeling methodology [16] – responds to diversity considerations in that it engages different stakeholder groups, encourages them to submit ideas on prospective innovations, and explicates multiple perspectives in the evaluation and analysis of these ideas. We also report experiences from the use of this method in the Foresight Forum of the Finnish Ministry of Trade and Industry. In this Forum, *RPM Screening* was employed to support expert groups working on three themes i.e. (i) nutrigenomics, (ii) health care and social services and (iii)

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات