FINNSIGHT 2015 – A FORESIGHT EXERCISE FOR THE SHAPING OF NATIONAL STRATEGIES

Ahti Salo[1], Ville Brummer[1], and Totti Könnölä[2]

[1]**Systems Analysis Laboratory, Helsinki University of Technology**

P.O.Box 1100, FI-02015 TKK, Finland

firstname.lastname@tkk.fi

[2]**Institute for Prospective Technological Studies, Joint Research Centre,**

Edificio Expo, C/ Inca Garcilaso, s/n, E-41092 Seville, Spain

totti.konnola@ec.europa.eu

Summary

In 2005, the Finnish Government took a Decision in principle on the development of a national strategy. This Decision spurred the two main funding agencies – the Academy of Finland and the Finnish Funding Agency for Technology and Innovation (Tekes) – to carry out *FinnSight 2015*, a joint foresight exercise that would provide inputs to this strategy, foster collaboration between these funding agencies and promote foresight and innovation activities at large. Towards these objectives, FinnSight 2015 engaged ten expert panels who identified key driving forces and characterized focus areas of competences, assisted by extensive deployment of Internet-based tools for collaborative work and intensive deliberations at facilitated workshops. In this paper, we describe the policy context and methodological support of FinnSight; in particular we report how challenges arising from the exceptionally tight schedule were addressed through foresight design, and what policy developments have taken place after to the publication of foresight results. We also examine FinnSight in view of several axes of balance, in the belief that this analysis may be instructive for the planning of large-scale foresight exercises that need to serve high-level policy objectives subject to unusually tight time constraints and expectations.

1 Introduction

As an instrument of strategic policy intelligence (Smits and Kuhlmann, 2004), foresight must often serve multiple objectives that are shaped by its particular policy context. Typically, these objectives include attempts (i) to prepare priorities in the research and innovation (R&I) system, (ii) to reorient the R&I system, (iii) to demonstrate the vitality of this system, (iv) to bring new actors to R&I debates, or (v) to foster new networks (Georghiou and Keenan, 2006). Ultimately, many of these objectives seek to strengthen the efficacy of innovation activities, for instance by improving the stakeholders' understanding of the R&I system or by fostering collaboration processes within innovation networks (cf. Hekkert et al., 2007; Salo et al., 2004).

In effect, the extent to which the objectives of a foresight exercise are decidedly instrumental (e.g., priority-setting) or largely informational (e.g., awareness-raising) has implications for subsequent planning decisions. These include, among others, choices about how many stakeholder groups will be consulted; whether the full diversity of their perspectives will be retained in the final results; and how strictly the participants must adhere to the use of proposed methodologies in their work. Indeed, questions such as these define multiple axes of balance, whereby the chances of conducting a successful foresight exercise can be much enhanced if they are explicitly recognized and harnessed in the pre-foresight phases (see, e.g., Irvine and Martin, 1984; Martin and Irvine, 1989; Rask, forthcoming). For example, the consideration of these questions can be employed in order to better align the methodological design of the exercise with its explicit (and sometimes even implicit) objectives.

In this paper, we describe *FinnSight 2015* (henceforth referred to as FinnSight), the national foresight exercise of the *Academy of Finland* and the *National Funding Agency for Technology and Innovation (Tekes)*, which was launched largely with the aim of informing – albeit indirectly – the development of the national strategy which is currently being implemented by establishing five Strategic Centres of Excellence in Science, and Technology. In our analysis, we present the policy context, management structures, methodological execution and key results of FinnSight. We also report some of the subsequent policy developments, and examine FinnSight in view of four axes of balance that are arguably helpful in the planning of foresight exercises. The methodological novelties of FinnSight are highlighted, particularly as concerns the combination of distributed work by individual panellists (which was assisted through Internet-based tools) and their interactive collaboration in group settings (which took place in facilitated workshops).

The rest of this paper is organized as follows. Section 2 outlines the policy context of FinnSight. Section 3 describes the methodological design, execution and main results of FinnSight and reports some subsequent policy developments in the R&I system. Section 4 examines FinnSight in view of the four axes of balance, and Section 5 concludes.)

2 FinnSight in Context

In comparison with many other countries, Finland has had an active and varied foresight scene, characterized by many activities that have been initiated by several key actors of the R&I system (see, e.g., Kaivo-oja et al., 2002; Andersen et al., 2007). For example, the Ministry of Trade and Industry has facilitated a so-called Foresight Forum (Könnölä et al., 2007); the National Technology Agency for Technology and Innovation (Tekes) has instituted extensive consultation processes with researchers and industrialists in its strategy development (Salo and Salmenkaita,

2002); and the Finnish Innovation Fund (Sitra) has sought to catalyze a constructive dialogue on impending societal challenges by establishing a so-called Future Forum. In addition to one-of-a-kind exercises, important elements of foresight activity are ingrained in policy processes at the highest level of decision making: for example, once during every electoral period, the Government produces a report on some salient aspects of the future of Finland. In the Parliament, this report is extensively debated by the Committee of the Future which produces a written response to it; both the Government's report and the Committee's response are then debated in a plenary session of the Parliament (see, e.g., Salo and Kuusi, 2001).

Yet, these many activities notwithstanding (or possibly due to the proliferation thereof), there have been no foresight exercises on a scale that would match the scope and the level of ambition of some large-scale national exercises elsewhere (for relevant examples in Hungary, France, Germany, and United Kingdom, see Attila (2003), Durand (2003), Cuhls (2003), and Keenan (2003), respectively). This may have been because Finland is a small country where results from even seemingly isolated foresight activities can be brought to bear on policy making through informal coordination, as the chances of having some experts participating in several such activities may be higher than in large countries. Furthermore, the overall institutional structure of the Finnish innovation system has remained largely unchanged for some time: in consequence, there has been less need for establishing national thematic priorities that would transcend the boundaries of individual institutions, or the more specific concerns that are typically relevant to S&T policy instruments such as research and technology programs (cf. Salo, 2001; Salmenkaita and Salo, 2002).

This situation changed in April 2005 when the Government took a Decision in principle on the structural development of the public research system at large. In this Decision, the Government emphasized that the research system is to be developed in its entirety, with the aim of improving the quality and relevance of research and development activities. The Government also noted that key measures towards this end will include the establishment of shared priorities, the strengthening of the national and international profile of research organizations, and the establishment of selective decision processes making based on foresight. Furthermore, this Decision obliged the Academy of Finland[1] and the Finnish Funding Agency for Technology and Innovation[2] (Tekes) to deepen their collaboration in the context of funding activities and even in the context of other R&I instruments, with the aim of enhancing the impacts of public R&I funding and facilitating the formation of larger research units. Finally, the Decision stated that the Science and Technology Policy Council should develop by the end June 2006 a national strategy for establishing Strategic Centres of Excellence in Research and Innovation.

In effect, the Government's Decision ascribed the Academy of Finland and Tekes new responsibilities. These two main funding agencies for basic and applied technological research (which have annual funding appropriation of some 297 million euros and 527 million euros in 2008, respectively) were charged with the task of initiating joint foresight activities that would provide informational inputs to the shaping of the national strategy. This task involved many new challenges: for example, although these two funding agencies had collaborated extensively within major research programs (see, e.g., Salo and Salmenkaita, 2002), they did not have prior experience from joint consultative activities that would transcend the concerns of these specific R&I policy instruments. Yet, the very remit of the foresight exercise – for which the apt title

[1] See http://www.aka.fi/en-gb/A/

[2] See http://www.tekes.fi/eng/

"FinnSight 2015" was coined – implied that a large-scale consultative process was called for, to ensure that the exercise would tap the expertise of leading researchers and industrialists, and that its results would build on broad enough a basis to ensure credibility and legitimacy. This exercise also had to be conducted subject to an exceptionally tight time-frame, because the foresight results had to be published by June 2006.

3 Process Design and Implementation

3.1 Early Preparations and Management Structures

The initial preparations of FinnSight were started in early 2005 at a time when the Government's Decision was known to be forthcoming. At this stage, Raimo Väyrynen, the President of the Academy of Finland, and Veli-Pekka Saarnivaara, the General Director of Tekes agreed that they would launch a joint foresight exercise, and that this foresight exercise would be carried out essentially in expert panels (although neither the number of these panels nor their thematic positioning were specified at this stage). This initial intent was followed by establishing a project organization. The Steering Group[3] that consisted mostly of civil servants in the top management of the funding agencies, and Väyrynen and Saarnivaara took turns in chairing its consecutive meetings. In addition, a so-called Core Group was appointed, with responsibility for the planning and methodological support of the exercise, assisted by the guidance that the Steering Group provided through its discussions and decisions on key matters (e.g., approval of project plans, definition of panel titles, and appointment of panel chairmen). The Core Group consisted of civil servants from both funding agencies[4], except for the first author who acted as its chairman and also as the project manager of FinnSight.

3.2 Foresight Panels and Phases of the Foresight Process

The delineation of foresight panels was an iterative process where the Core Group first explored some alternative rationales for choosing these titles (also in view of international benchmarking) and then developed a tentative proposal that was debated by the Steering Group. After extensive discussions, the Steering Group chose to establish the following panels:

1. Learning and Learning Society
2. Services and Service Innovations
3. Well-being and Health
4. Environment and Energy
5. Infrastructures and Security

[3] The members of the Steering Group were (in alphabetical order) Martti af Heurlin (Tekes), Pirjo Kyläkoski (Tekes) Arto Mustajoki (University of Helsinki), Anneli Pauli (Academy of Finland) Veli-Pekka Saarnivaara (Tekes), Raimo Väyrynen (Academy of Finland).

[4] The members of the Core Group were (in alphabetical order) Eija Ahola and Pirjo Kyläkoski (Tekes), and Annamaija Lehvo, Paavo Löppönen, Anu Nuutinen (the Academy of Finland) and Ahti Salo (Helsinki University of Technology, project manager). Ville Brummer and Totti Könnölä also belonged to the research team at the Helsinki University of Technology.

6. Bio-expertise and Bio-society
7. Information and Communications
8. Understanding and Human Interaction
9. Materials
10. Global Economy

Apart from its title, each panel was characterized by a description of about 150 words, exemplifying some scientific disciplines and associated technologies, as well as some domains of their potential application in industry and society. This notwithstanding, the panellists were explicitly encouraged to deliberate how they would construe the scope of their panels: that is, the short panel descriptions thus merely conveyed impressions of potentially relevant themes, in the understanding that the panels would re-interpret and re-define their impressions.

Two further aspects in the definition of panels are noteworthy:

- The tenth panel on Global Economy was proposed by the Steering Group, further to the recognition that globalization is a major determinant of the development of R&I systems. Apart from covering economic and some other sciences (as a topic of scientific inquiry in their own right), this panel was also ascribed a "horizontal role", because it was ascribed the role of supporting other panels by synthesizing key statistical information data and economic forecasts for the other panels.
- The delineation of panels combined some complementary rationales. First, some panels – such as "Information and communications" – were partly driven by the comparatively strong global position of Finland, while others – such as "Bio-expertise and Bio-society" and "Materials" were linked to rapid advances in generic sciences and their application. Second, a deliberate decision was taken *not* to establish panels based on traditional industry clusters (i.e. forest industries, construction), partly in view of earlier cluster-oriented studies (that is, had the panels had been defined based on such "sectorial" boundaries, the risk of arriving at "conventional" results might have been greater). Third, some panels – such as "Services and Service Innovations" and "Understanding and Human Interaction" – had rather new and even evocative titles. These panels were motivated by the perceived importance of these multi-faceted phenomena which, however, do not yet pose equally well-established fields of scientific inquiry or innovation activity.

Because FinnSight was a foresight process of *two* funding agencies with different but complementary roles in the R&I system, it was imperative to achieve a proper balance in addressing the intertwined components of research (of greater concern to the Academy of Finland) *and* innovation (of greater concern to Tekes) in the R&I system. This, together with the large differences in the funding processes of these funding agencies[5], implied the external expert panels should have full autonomy in their future-oriented deliberations, and they should be built in a balanced manner. In addition to scientific fields and technological areas, even other

[5] The funding decisions of the Academy of Finland are taken by external scholars (usually university professors) that serve on its councils, while Tekes takes its funding decisions based on the judgment of its own experts.

dimensions of balance had to be addressed (e.g., gender issues, representation of geographical regions).

The balanced composition of the panels was ensured by appointing researchers and six industrialists onto each panel (whereby the Academy of Finland would propose the researchers and Tekes the industrialists). Towards this end, both funding agencies generated lists of prospective panellists who were then approached after coordinating discussions in the Core Group. A further measure for ensuring the balance of panels step was that each panel had two chairmen, one from the academia and one from industry. The responsibilities for reporting the panel results were delegated to these two chairmen who received a financial compensation for this duty (unlike the other panellists).

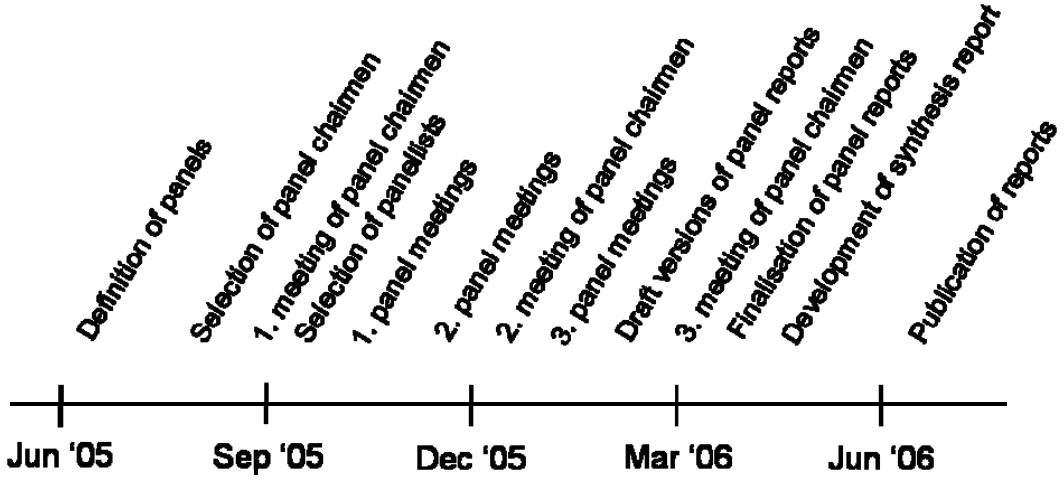

Figure 1 Schematic outline of the schedule of FinnSight 2015

The foresight process – which was designed by the Core Group and approved the Steering Group – was based on panel-centric work where each panel would have three half-a-day meetings. In addition to the panel meetings, three additional meetings were held among the twenty panel chairmen with aim of enhancing the exploration of panel interfaces and ensuring that the panels would proceed in a sufficiently coordinated manner. These three meetings were held (i) before the first panel meetings (whereby the chairmen met each other and resolved questions concerning the objectives of the exercise), (ii) after the second panel meeting (whereby they presented early results to each other and discussed panel interfaces), and (iii) after the third meeting (whereby they sought to identify synergies at these interfaces) (see Figure 1).

Due to the tight schedule, the first panel meetings had to be organized soon after the panel chairmen had been appointed by the Steering Group. At this stage, the panel chairmen were invited to comment on the lists of prospective candidates that had been prepared by the Academy of Finland and Tekes. The chairmen were also invited to propose additional candidates; however, the decisions as to which candidates would be invited were taken by the Core Group, which could ensure that the many issues of balance (incl. gender, regions, representation of scientific fields, technological areas, and industrial sectors) were addressed.

It is noteworthy that the dates for the two initial panel meetings were fixed by the panel chairmen *before* the panellists were selected: thus, the panellists were appointed only on condition that (i)

they were interested in and willing to contribute to FinnSight and (ii) they were able to attend the two initial meetings. Thanks to this latter requirement, the process could be started quickly so that the first panel meetings were organized about seven weeks later than the initial meeting of the panel chairmen.

3.3 Analytical Concepts and Methodological Support

To support for the future-oriented deliberative process, "units of analysis" in terms of key concepts were defined in order to provide structure to the panel discussions and to enhance the comparability of panel outputs. These concepts would have to assist the exploration of future developments and their implications for scientific and technological competences; in addition, they had to be sufficiently generic to assist all the panels, and to facilitate the development of meaningful priorities at a suitable level of aggregation.

The following key concepts and templates were the employed in FinnSight:

- *A driving force* was defined as an event or a development that could contribute to the realization of changes with significant implications for future R&I activities. Apart from a brief descriptive title, each driving force was characterized with the help of a template containing a detailed description (what is the event or development about?) and separate analysis of its significance and impacts (why is this force relevant to R&I policy and R&I activities?). The driving forces were linked either to (i) essential changes in the global context, (ii) growing needs in Finnish industry and society or (iii) anticipated scientific and technological achievements.
- *A focus area of competence* was defined as a community of collaborating actors that (1) create or apply knowledge that is based on R&I activities and (2) and, by doing so, seek to respond to societal and industrial needs. Items in the template for each competence included questions on (i) what scientific fields and technological areas the focus area was linked to (ii) what societal and industrial needs would be addressed by strengthening the focus area, (iii) what kinds possibilities the focus area would offer for the concrete application of related knowledge, for instance by way of innovations, (iv) through what actions and measures the development of the focus area could be best promoted.

3.4 Panel Meetings

To engage the panellists before the actual panel meetings, the panellists were requested to propose, comment revise and evaluate either driving forces (first panel meetings) and focus areas of competence (second and third panel meeting) before the panel meetings.

Specifically, about three weeks before the first panel meeting – the purpose of which was to address driving forces that would set the stage for the development and prioritisation of focus areas – each panellist was requested to propose three to five driving forces using the template. The resulting proposals were collated into a compilation document which was made available to the panellists. Using the 1-to-7 Likert scale, the panellists were then invited to assess (i) the probability of each driving force (i.e., how likely was it that the change would unfold as described?) and (ii) the significance of the factor (i.e., how significant was this driving force for future R&I activities?). Apart from their ratings, the panellists were also asked to provide verbal comments to justify their assessments.

In each panel, the result of this prior consultation process was a collated document containing some 30 to 50 driving forces, together with numerical assessments and written comments that helped identify the most important ones. This compilation document – containing both the initial proposal and their assessments – was circulated to the panellists about three days before the workshop. For each driving force, the full distribution of the assessment ratings was displayed; this conveyed information about the variability of perceptions among the panellists.

In the first panel meetings, this compilation document served as a background document that helped set the stage and clarified the scope of issues that deemed relevant to remit of the panel. Prior to these meetings, however, the Core Group encouraged the panel chairmen to pay particular attention to possible omissions and to examine possible interrelationships among the proposed driving forces. The meetings were facilitated by the two chairmen who had quite a bit of liberty in guiding the workshop discussions. In most panels, these discussions were captured by building MindMap® charts which – together with the compilations document – served as a written record that was useful for later reporting.

In the same vein, before the second panel meeting the panellists were requested to provide 3-5 proposals for focus areas of competences through the Internet-questionnaire which was based on the template. The resulting proposals were then subjected to Internet-based assessment so that the other panellists could evaluate the focus areas with regard to (i) current level of expertise in Finland (i.e., how strong a basis do Finnish actors have in the development and applications of knowledge pertaining this focus area of competence?) and (ii) the future demand for this expertise (i.e., how strongly will the generation and of knowledge in this focus area of competence respond to the societal and industrial needs in 2015?). In addition, the panellists were requested to indicate their opinion of whether the focus area was among the most important third, the second most important third, or the least important third out of all the focus areas by the panellists. In this way, the generation of focus area of competences was started before the second meeting; but practically in all panels, this assessment phase was started only after additional focus areas of competences had been generated, inspired by the discussions that were held in the second meeting.

The responsibility for synthesizing the panel reports was assigned to the panel chairmen. One reason for this was the desire to ensure that the panel chairmen would be fully responsible for the panel results. Moreover, the Core Group did not have enough editorial capabilities for assisting the panels, nor did its members have much substantive knowledge about the scientific and technical matters addressed in the panel reports. To assist the chairmen in enhancing the readability and consistency of the panel reports, a professional journalist was hired in an editorial role.

The Internet-based questionnaires before the workshop meetings offered many benefits. First, they ensured that all panellists could contribute equally to the process, and that they could more quickly arrive at a shared understanding of what topics were seen as relevant by the panel as a whole. Second, the compilation documents were useful to the panel chairmen, because they could start the development of the panel reports from an extensive set of documentation (instead of merely trying to recall discussions at earlier panel meetings); the documents also helped mitigate the risk that two chairmen would have exercised an unduly strong influence on the contents of the reports. Third, the templates of the main concepts (i.e., driving force, focus areas of competence) helps ensure the attention would be focused on topics that were aligned with the objectives of the exercise, and that would offer possibilities for deriving priorities for future R&I efforts.

3.5 Management of Panel Interfaces

The panellists had a considerable amount of freedom in interpreting the suggested scope of their panels. This, together with other reasons, made it necessary to pay attention to panel interfaces (understood in terms of topics that would be potentially relevant to several panels):

- First, the panels were purposely not oriented along the lines of industrial sectors (or any other clear taxonomy), wherefore the examination these sectors, for instance, called for the analysis of panel interfaces (for example, advances in relation to forest-related industries were discussed in panels on Environment and energy, Bio-expertise and bio-society, Materials, and Global economy, among others).
- Second, because FinnSight was a comprehensive exercise, there was a need to ensure that no unintended omissions would arise due to possible misperceptions about what topics the other panels would cover.
- Third, the importance of cross-disciplinary synergies in the development of path-breaking innovations suggested that explicit attention should be devoted to the opportunities offered by combinations of the focus areas that were deemed important by the different panels.

The coordination of panels was supported by three meetings for the panel chairmen. The first of these was held at in September 2005 whereby the President of the Academy of Finland and the General Director of Tekes presented the objectives and also motivated the participants; at this meeting, the panel chairmen could pose questions of clarification and they also had a chance to learn to know each other. At the second meeting – which was held after the second panel meeting – the panel chairmen presented tentative results from their panels to the other chairmen. At this meeting, some cross-cutting topics with connection to several panels were identified and subjected to further exploration in the third panel meetings. Finally, the last chairman meeting was held after all panels had their third meeting. At this one-day meeting, much of the attention was devoted to the synergies at the panel interfaces.

Also some other measures provided support for the exploration of panel interfaces. First, the modular process design ensured that the panels produced their analyses using the same concepts (cf. Brummer et al., 2008), which made it easier to compare and synthesize their results. Second, the questionnaires supported the consideration of interfaces in that the panellists were requested to specify which other panels their driving forces or focus areas were relevant to; these proposals were brought to the attention of the chairmen of these respective panels. Third, results from the Internet-surveys were made available to all panels, which equipped all the panels with the possibility of examining what topics the other panels were considering (even if these possibilities were not extensively harnessed).

3.6 Foresight Outputs and Their Dissemination

Each panel produced a panel report of some 30-40 pages that focused on the driving forces and focus areas of competences that it deemed central for the development of the R&I system. In their reports, the panels were encouraged to examine a manageable number of topics (i.e., some half a dozen driving forces and about ten focus areas). This recommendation, together with the same heading structure of each report, helped ensure that the reports were analytical enough (in the sense that the driving forces and focus area of competences were explored in

sufficient depth) and also readily comparable (in the sense that the different reports could be readily contrasted).

Specifically, each panel identified about 6-10 focus areas of competence and, for each of these, elaborated the underpinning scientific and technological bases, relations to emerging societal and industrial needs, with illustrations of future possibilities by way of concrete manifestations (such as innovations). Often, the panels also presented their thoughts as to how the focus area might be best developed through R&I and other policy measures. Examples of these focus area are given in Table 1.

Panel	*Examples of focal competence areas*
1. Learning and learning society	• Neurological, cognitive, motivational and social basis of learning • Practices of life-long learning, the education system and informal learning • Civic skills and competencies, life control and social innovations
2. Services and service innovations	• Business competence in services • Culture and adventure services • Renewal of public services
3. Well-being and health	• Physical exercise and nutrition research • Mental health and substance abuse research • Home care and telecare technologies
4. Environment and energy	• Operation of ecosystems • Water systems and water cleaning technologies • Smart sensors and new energy conversion and storage technologies
5. Infrastructure and security	• Environmental know-how and technology • Logistic know-how and security of supply management • Integration know-how
6. Bio-expertise and bio-society	• Complete use of renewable natural resources • Development of bioproduction • Measurement methods and diagnostics • Management and modelling of biological knowledge
7. Information and communications	• Sensor technology applications • Data mining, analysis, management and retrieval • Bio-information technology
8. Understanding and human interaction	• Multicultural competence • Life-long learning and understanding • Deep understanding of own culture
9. Materials	• Printed electronics • Biomimetic materials • Controlled synthesis of polymers
10. Global economy	• Assessment and management of global risks • Impacts of business globalisation on national economies • Management of innovation processes

Table 1 Examples of focal competence areas identified by FinnSight panels.

Apart from the ten panel reports, a synthesis report of some 70 pages was published, aimed at a general audience and policy makers who might not have the opportunity to peruse the full panel

reports. The first part of the synthesis report summarized selected driving forces from all the panel reports. The second part had sections on each panel, highlighting the focus areas that the panel had stressed in its own report. The third part explored synergies at panel interfaces, building upon the results from the third meeting for the panel chairmen. The synthesis report was produced by the civil servants on the Core Group, assisted by editorial support. It was also translated into English, Chinese and Japanese.

The panel reports were published on June 13, 2006 in the Auditorium of the Museum of Contemporary Art (Kiasma) in central Helsinki. This event was attended by close to two hundred participants, including many influential R&I policy makers. The agenda consisted of presentations on the rationale and significance of FinnSight (President of Academy of Finland, General Director of Tekes), the foresight process (project manager), and highlights of results from four panels (chairmen of panels on Well-being and health; Information and communications; Materials; Global economy). The results were also commented by an eminent industrialist (the CEO of TietoEnator, a major ICT company) and an esteemed academic (Chancellor of the University of Tampere). After the event, there was a separate press meeting where journalists had a chance to pose questions. Further to the publication of the reports, FinnSight received quite a bit of media attention, as evidenced by the large number of related articles in professional magazines, for instance.

3.7 Subsequent Policy Developments

Because foresight is a highly systemic instrument with close linkages to other policy processes that contribute to the development of the R&I system, it is not straightforward to assess to what extent subsequent policy developments may have been influenced foresight recommendations (cf. Smith, 2000; Smits and Kuhlmann, 2004). Indeed, such developments often build on various processes of sense-making and negotiation that draw upon on foresight conclusions. With this proviso, we briefly characterize selected policy developments that have been influenced and or at least informed by FinnSight.

In the same month when the results of FinnSight were published, the Science and Technology Policy Council decided to establish Strategic Centres for Science, Technology and Innovation[6] in fields that are important to the future of Finnish society and business and industry. These Centres – which are organized as non-profit seeking companies owned by the state, research institutes, universities and private companies – will establish new ways allocating resources to research activities, in keeping with research plans that are jointly agreed upon by companies, universities and research institutes, with the aim of fostering research that will offer possibilities for the commercial deployment of results within 5 to 10 years. These Centres seek to build a highly efficient framework for enhanced collaboration between companies, universities, research organisations. In the first phase, five strategic centres will be established (i.e., energy and environment; metal products and mechanical engineering; the forest cluster; health and well-being; and information and communication industry and services). To-date, the company structure has already been established for three[7].

Although the establishment of these Centres cannot be attributed to FinnSight, the results of FinnSight were published when the development of the strategic research plans for these

[6] See http://www.tekes.fi/eng/strategic_centres/

[7] See, e.g., http://forestcluster.com/en/Main_Page , http://www.tivit.fi/ .

Centres was about to start. Also, several FinnSight panellists have contributed to the establishment of these Centres, which has created informal links between FinnSight and the Centres. Indeed, even if the tight schedule of FinnSight was a challenge for the process design, this schedule was nevertheless well-justified by the need to ensure that the results would be made available at an opportune moment.

Within the two funding agencies, the Academy of Finland and Tekes, FinnSight has served to inform their respective strategies. In view on many citations, FinnSight has also served as a source of information for various regional and institutional strategy processes in Finland. It has also aroused quite a bit of international interest, considering that references to FinnSight reports have been made in policy documents in countries such as Japan, South Korea and Canada, as well as by the European Commission. The fact that the synthesis report was translated into English, Chinese and Japanese has apparently contributed to this effect.

One of the objectives of the FinnSight was that it should encourage other actors of the R&I system to initiate foresight activities. Here, it is noteworthy that Sitra, the Finnish Innovation Fund, launched a so-called Future Forum already when FinnSight was running. This Forum was organized as a panel-centric process which, in contrast to FinnSight, focused on somewhat more general questions of societal well-being and economic policy. The activities of this Forum and FinnSight were loosely co-ordinated; but not formal interdependencies were established (e.g., in the sense that the results of the Future Forum would have depended on those of FinnSight).

Furthermore, in 2007 the Ministry of Trade and Industry started a process towards the establishing a National Innovation Strategy, with the remit of addressing what policy measures the broadening scope innovation policies would call for. This mostly workshop-based process focused on 11 themes of which addressed structural issues (e.g., regional innovation policy; intellectual property rights; demand-orientation innovation activities). The objectives of this process – whose results were published in June 2008 – thus complemented those of FinnSight which purposely did not address any structural questions.

4 Reflections on FinnSight

To-date, no formal evaluation of FinnSight has been carried out; however, the panellists were requested to provide feedback on the foresight process and the panel reports in April 2006. In this survey, more than 95% of the respondents[8] indicated that the foresight process had been rewarding to them (in the sense that responded with a 5, 6 or 7 on a Likert-scale from 1 – fully disagree to 7 – fully agree). Likewise, 90% noted that their contributions had been properly accounted for in the reports; and 88% thought that FinnSight will be important to the development of the Finnish R&I system. Furthermore, well over half the panellists (54%) reported that they had consulted at least four other experts beyond the other panellists before submitting their proposals for driving forces and focus areas.

More generally, as an instrument of strategic policy intelligence (Smits & Kuhlmann, 2002) foresight exercises such as FinnSight must respond to implicit and explicit expectations that are placed on them by diverse several stakeholders. Here, it is instructive to consider FinnSight in view of several axes of balance (Rask, forthcoming). Indeed, these objectives can rarely be met

[8] The respondents included 57 out of the120 panellists.

unless the exercise achieves an adequate balance with regard to design attributes that pertain to alternative uses of results, modes of stakeholder participation, perspectives on analytical methodologies and management styles, among others. We therefore reflect on FinnSight along four design attributes (see also Könnölä et al., forthcoming) that are concerned with (i) instrumental vs. informative use of foresight conclusions; (ii) exclusive vs. extensive engagement of stakeholders; (iii) consensual vs. dissensual development of recommendations; and (iv) fixed vs. autonomous management of the process.

4.1 Instrumental vs. Informative Use of Foresight Conclusions

In terms of alternative modes of harnessing foresight conclusions, *instrumental use* of foresight refers to the development and deployment of results for specific and foreseen decision-making situations, while *informative use* refers to the development of an improved shared understanding of the R&I system and possibilities for improving it (but not necessarily with close links to any particular decision making situation).

Along this axis, the Government's Decision towards the development of a national strategy, together with the central role of its two funding agencies in the implementation of strategy, FinnSight had offered at least some (albeit indirect) possibilities for instrumental uses of its results: at the very least, the panellists could pursue their work, convinced that policy makers would be interested in studying the results. For some other stakeholders in the R&I system (e.g., universities, industrial federations, private enterprises), however, the role of FinnSight has been largely informative.

4.2 Extensive vs. Exclusive Stakeholder Engagement

Extensive stakeholder engagement refers to foresight approaches where the number of participants is high and where possibilities for participation may be opened to all interested participants from different stakeholder groups (even if this may cause a certain degree of unpredictability and cause management challenges). In contrast, *exclusive stakeholder engagement* refers to expressly controlled stakeholder participation that may be driven, say, by the need to ensure a balanced representation of the different stakeholder groups.

Along this attribute, FinnSight was unequivocally characterized by exclusive stakeholder engagement. This was partly because the panel approach, together with the tight schedule, placed constraints on the number of participants that could be invited; moreover, there was a need to achieve a balance of scientific and technological fields, to ensure that the conclusions would be well-founded (thus mitigating the possibility that some fields would be under- or overrepresented due to a less controlled process of inviting participants). This notwithstanding, some steps towards broader stakeholder engagement were taken, most notably by encouraging the panellists to consult their own professional networks when making their contributions to panel work.

4.3 Consensual vs. Dissensual Development of Recommendations

Consensual development of recommendations can be understood as the creation of jointly characterized priorities, collaborative networks and future actions, with an emphasis on points of mutual agreement and apparent consensus. This can be contrasted with *dissensual development* where the emphasis is purposely on the full range of diverse priorities that may be

suggested by different value networks and coalitions which, in turn, may reflect rivalling visions and even incompatible perspectives on the future (Könnölä et al., 2007).

Along this attribute, FinnSight was quite close to the consensual approach. To some extent, this was because the panellists were encouraged to collaborate with the aim of generating shared deliverables that would reflect their joint reflections. Indeed, because the panel reports characterized focus areas in a way that suggested the panels had by and large succeeded in reaching a consensus these (which was indeed usually case), they were possibly more amenable for instrumental uses in decision making. But some methodological steps retained dissensual perspectives as well: for example, the compilation of documents from the Internet-based questionnaires showed the full distributions of the panellists' assessment ratings (although these distributions were not, however, retained in the development of the final panel). Some commentators noted that this variability might have been of interest to deserve publication (cf. Ansoff, 1985; Könnölä et al., 2007); and some observed that the panel reports were of a greater interest than the synthesis report which, again, represented a step towards distilling consensual messages from the panel reports.

4.4 Fixed vs. Autonomous Management

Fixed management can be characterized as centralized approach where the scope and the methods of the foresight exercise are defined during its earliest phases and also consistently imposed through reasonably tight controls. In contrast, *autonomous management* refers to more open-ended processes that are intermediated by the foresight co-ordinators (the Core Groups) who facilitate relatively autonomous participant-led activities, which is often the case in expert panel work (Salo et al, 2004).

In FinnSight, a balance along this dimension had to be achieved to ensure that the process would contribute to the attainment of foresight objectives whilst avoiding the risks of imposing too onerous a methodology that might be ineffective or even resented by the panels. Some aspects of fixed management were adopted by deciding on a systematic methodology that lent the same conceptual and sequential structure to the work of each panel; this helped ensure that panels would produce coherent and comparable outputs.

This notwithstanding, the panels enjoyed full freedom in choosing what topics they would focus on: indeed, the panels were not 'fed' by *any* prior information, and thus all results could be attributed to the panels themselves. Also, the panel chairmen had quite a bit of freedom in facilitating the panel meetings as they saw best: here, the aim was to ensure that the chairmen would take charge of these meetings, and that they could also adapt the use of methodological tools that were offered to them (e.g., MindMap®) in a responsive manner (Salo et al., 2004). While this did lead to some divergence between panels (e.g., in terms of how they used compilation documents from the Internet-based questionnaires, for instance), the partial autonomy that was accorded to the chairmen was motivated on the grounds in that it empower them better than the imposition of some strict facilitation methodology.

4.5 Discussion

Although no thorough assessment of FinnSight has yet been made, we venture to make some evaluative observations based on informal feedback. First, the exercise was successful in that the panels focused on substantive changes and characterized competence areas that would be important for the further development of the R&I system. Here, the shared analytical framework

– which consisted of driving forces and focus areas of competences – was vital in directing the panels' efforts towards the objectives of the exercise. In effect, this framework helped mitigate the risk that the panel discussions would drift to structural issues (which are often easier to debate, because the are relevant to all and may therefore arouse more lively debates than substantive R&I matters that may be relevant only to some).

Second, in terms of its methodological approach, FinnSight was unique thanks to the extensive combination of Internet-based questionnaires and facilitated workshops. This combination of approaches helped ensure that all panellists could contribute to the process, and that the contributions of all panellists would be duly reflected in the panel reports. It also alleviated the burden of the panel chairmen who could effectively build on the compilations documents when writing the panel reports. Also, from the view of the perceived balance of the exercise, it was better that all the materials were developed by the panels themselves. This approach largely obviated the need to 'feed' the panels with background documentation (which would have necessitated uneasy choices as to what material the panels should have been provided with).

Third, panels that addressed R&I domains that were more directly suggested by the titles (e.g., health and well-being, materials) found it easier to establish the boundaries of their work than those had somewhat less conventional and more 'nebulous' titles (e.g., learning and learning society, understanding and human interaction). In consequence, these latter panels spent more time on clarifying their objectives; but on the other hand, and they did produce insightful and even partly surprising characterizations. This suggest that 'unusual' characterizations of panels may generate fresh perspectives; but that more time may be required to lay the grounds for the generation of such perspectives.

Finally, FinnSight results were published at an opportune moment in June 2006 when the Government decided to establish Strategic Centres of Science, Technology, and Innovation. This offered some possibilities also for instrumental use of foresight results, not least because the process design made it possible to characterize focal competence areas that would merit explicit R&I efforts. This notwithstanding, the many-faceted processes of using the results were beyond the remit of FinnSight which, as a foresight activity, was emphatically framed as a foresight exercise that would produce informational results, in the understanding that different stake-holders of the R&I system would benefit from these and exploit them in whatever ways that they would see pertinent.

5 Conclusions

In this paper, we have given a reflective account of FinnSight, with an emphasis on its policy context, methodological support, and subsequent policy development. Specifically, because it was partly motivated by the Government's Decision to establish a national strategy, FinnSight had to be completed subject to a usually tight schedule to ensure that its results would become available in a timely manner so as to permit their effective use in various strategy processes. This challenging context also motivated the use of novel methodologies, such as (i) the definition of "units of analysis" (driving forces, focus areas of competences) that were aligned with the objectives of the exercise; and (ii) the extensive deployment of Internet-based tools that helped solicit inputs for all panel members and thus supported the development of panel reports. Based on positive experiences from FinnSight, we believe that such approaches may be helpful also in other contexts where expert panels are required to generate coherent and comprehensive reports in the presence of tight timeframes and high policy expectations.

References

1. Andersen,P.D., Mads Borup, M., Borch, K., Kaivo-oja, J., Eerola, A., Finnbjörnsson, T., Øverland, E, Eriksson, E.A., Malmér, T., Mölleryd, B.A. (2007). Foresight in Nordic Innovation Systems, *available online: http://www.risoe.dk/rispubl/art/2007_113_report.pdf.*

2. Ansoff, I. (1975). Managing Strategic Surprise by Response to Weak Signals, *California Management Review* 17(2), 21–33.

3. Attila, A. (2003). Evolving Foresight in a Small Transition Economy, *Journal of Forecasting* 22(2-3), 179-201.

4. Brummer, V., Könnölä, T., Salo, A. (2008). Foresight within ERA-NETs: Experiences from the Preparation of an International Research Program, *Technological Forecasting and Social Change* 75(4), 483–495.

5. Cuhls, K. (2003). From Forecasting to Foresight Processes – New Participative Foresight Activities in Germany, *Journal of Forecasting* 22(2-3), 93-111.

6. Durand T. (2003). Twelve Lessons Drawn from 'Key Technologies 2005', the French Technology Foresight Exercise, *Journal of Forecasting* 22(2–3), 161–177.

7. Georghiou, L., Keenan, M. (2006). Evaluation of National Foresight Activities: Assessing Rational, Process and Impact, *Technological Foresight and Social Change* 73(7), 761-777.

8. Hekkert, M.P., Suurs, R.A.A., Negro, S.O., Kuhlmann, S., Smits, R.E.H.M. (2007). Functions of Innovation Systems: A New Approach for Analysing Technological Change, *Technological Forecasting and Social Change* 74(4), 413-432.

9. Irvine, J., Martin, B.R. (1984). Foresight in Science: Picking the Winners. *Dover, London*.

10. Kaivo-oja J., Marttinen J., Varelius J. (2002). Basic Conceptions and Visions of the Regional Foresight System in Finland, *Foresight* 4(6), 34-45.

11. Keenan, T. (2003). Identifying Emerging Generic Technologies at the National Level: the UK Experience, *Journal of Forecasting* 22(2-3), 129–160.

12. Könnölä, T., Brummer, V., Salo, A. (2007). Diversity in Foresight: Insights from the Fostering of Innovation Ideas, *Technological Forecasting and Social Change* 74(5), 608-626.

13. Könnölä, T., Ahlqvist, T., Eerola, A. Kivisaari, S., Koivisto, R. (forthcoming). On Classifying Foresight Projects: Reflections from the Management of a Foresight Portfolio at a Contract Research Organisation, *Technological Analysis & Strategic Management*.

14. Martin, B.R., and Irvine, J. (1989). Research Foresight: Priority-Setting in Science. *Pinter Publishers, London*.

15. Rask, M. (forthcoming). Foresight – Balancing Between Increasing Variety and Productive Convergence, *Technological Forecasting and Social Change*.

16. Salmenkaita, J.-P., Salo, A. (2002). Rationales for Government Intervention in the Commercialization of New Technologies, *Technology Analysis and Strategic Management* 14(2), 183-200.

17. Salo, A. (2001). Incentives in Technology Foresight, *International Journal of Technology Management* 21(7), 694–710.

18. Salo, A., Kuusi, O. (2001). Developments in Parliamentary Technology Assessment in Finland, *Science and Public Policy* 28(6), 453-464.

19. Salo, A., Könnölä, T., and Hjelt, M. (2004). Responsiveness in Foresight Management: Reflections from the Finnish Food and Drink Industry, *International Journal of Foresight and Innovation Policy* 1(1-2), 70–88.

20. Salo, A., Salmenkaita, J.-P. (2002). Embedded Foresight in RTD Programs, *International Journal of Technology, Policy and Management* 2(2), 167-193.

21. Smith, K. (2000). Innovation as a Systemic Phenomenon: Rethinking the Role of Policy, *Enterprise & Innovation Management Studies* 1(1), 73–102.

22. Smits, R., and Kuhlmann, S. (2004). The Rise of Systemic Instruments in Innovation Policy, *International Journal of Foresight and Innovation Policy* 1(1-2), 4–32.