

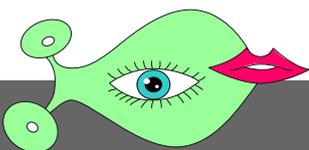
# European Foresight Platform

supporting forward looking decision making

[www.foresight-platform.eu](http://www.foresight-platform.eu)

„The role of forward-looking activities for  
the governance of Grand Challenges”

Insights from the European Foresight Platform



Funded under Socio-economic Sciences & Humanities



The role of forward-looking activities for the governance of Grand Challenges”  
Insights from the European Foresight Platform

This book is edited by following members of the EFP team:

Susanne Giesecke, AIT Austrian Institute of Technology GmbH, Austria

Annelieke van der Gießen, TNO Netherlands Organisation for Applied Scientific Research, The Netherlands

Stephan Elkins, Social Scientific Translation and Editing Services, Germany

Printed in Austria, September 2012

Layout & Graphic Design: Beatrice Rath

Contact: Beatrice Rath, AIT Austrian Institute of Technology [beatrice.rath@ait.ac.at](mailto:beatrice.rath@ait.ac.at)

EFP is financed by the European Commission DG Research. It is part of a series of initiatives intended to provide a 'Knowledge Sharing Platform' for policy makers in the European Union. More information on the EFP and on the Knowledge Sharing Platform is provided at [www.foresight-platform.eu](http://www.foresight-platform.eu)

ISBN 978-3-200-02811-1

## LEGAL NOTICE

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information. The views expressed in this publication are the sole responsibility of the authors and do not necessarily reflect the views of the European Commission.

# TABLE OF CONTENTS

---

## **Ron Johnston**

Preface 1

## **Matthias Weber**

FLAs and new Patterns of Governance of Research and Innovation 4

## **Susanne Giesecke/Dirk Johann**

Reach and Impact of Forward Looking Activities.  
Case Study Analysis of follow-up briefs 12

## **Annelieke van der Gießen/Elisabetta Marinelli**

The Value of FLA for Strategic Policy Making 22

## **Rafael Popper/Effie Amanatidou/Thomas A. Teichler**

Reach and Impact of Forward Looking Activities (FLA) Mapping:  
Towards a Fully-Fledged Futures Mapping Environment 32

## **Susanne Giesecke**

FLA as a Means of Participation in Modern Democratic Decision Making 45

## **Bas van Schoonhoven**

Grand Challenges and Foresight in EFP  
Healthy Ageing – Urban Europe – Smart Mobility 56

## **Vicente Carabias, Cristiano Cagnin, Karel Haegeman, Totti Könnölä**

FLA Anticipate Sustainable Development Challenges for Better Policy Support 63

## **Cristiano Cagnin**

FLA Orienting Innovation Systems towards Grand Challenges and Increased Governance 73

# Preface

## The Future of Forward Looking Activities

RON JOHNSTON\*

\* ACIIC Australian Centre for Innovation, Sydney, Australia

It is just three years ago, in October 2009, that the European Commission provided support, under the Framework Programme 7, for the European Foresight Platform (EFP) - supporting forward looking decision-making.

EFP was designed to succeed, and build upon, the pioneering efforts of the European Foresight Monitoring Network (EFMN). The EFMN provided the first comprehensive database of foresight projects, presented in a form that allowed easy interrogation and analysis, which rapidly became the essential starting point of foresight activities around the world. The other precedent was FORLEARN, the comprehensive Web-based foresight instructional tool, which I and many other practitioners drew upon in developing foresight capacity in many countries across the globe.

EFP, however, had a rather different remit to both EFMN and FORLEARN. Given the progress in the uptake and practice of foresight, this Coordination and Support Action was not intended to initiate, organise or perform foresight exercises. Rather, as the Chapter by van der Giessen and Marinelli shows, the aim was “to ensure systematic use and optimum benefit of foresight expertise and to identify and mobilise all relevant actors to enable EU-wide network and capacity building”. Three additional objectives were to interconnect with other networks, to identify the impacts of foresight on decision-making, and to provide input to foresight processes in Europe.

From a distance, it is interesting and perhaps telling, to reflect on the nomenclature of our field. Foresight is the term in most common use, but for some it carries a mystical, almost medieval flavour that is inappropriate to a decision-making tool for a twenty-first century government. The acronym FTA, which emerged from IPTS, has undergone a number of changes along the way to ‘future-oriented technology analysis’. Anticipatory intelligence has a powerful ring, but is something of a mouthful. And now we have FLA – forward looking activities, which must be about as generic as a label can get.

The achievements of EFP in these three short years have been considerable. A robust model of the value of FLA for strategic policy making has been developed, and is now providing a focus for continuing refinement.<sup>1</sup> A series of workshops on specific issues of major interest to EU policy makers (van der Giessen and Marinelli, van Schoonhoven) sought to demonstrate the value of FLA. The online Foresight Guide has been refined, and is being used by ever-widening audiences. A major advance has been made in FLA mapping, as shown in the chapter by Popper, Amanatidou and Teichler, detailing the development of a web-based tool capable of mapping foresight, forecasting, horizon scanning and impact/technology assessment studies. There are exciting prospects for the further refinement and application of this mapping approach.

Over the same three years or so, there have been many significant changes in the context in which FLA operates. One major change in context has been in the nature of policy-making, moving away from a relatively narrow expert-based rational model to one with a greater emphasis on engaging and enabling, through networking, participation, learning and building distributed intelligence. Both Giesecke and Cagnin draw attention to the shift from government to governance, within which FLA can be regarded as a new form of ‘deliberative governance’. But Giesecke warns us not to overrate

---

<sup>1</sup> For example, see the special issue of Foresight, Volume 14, No 1, 2012 on ‘Foresight impacts from around the world’.

our achievements in enhancing participation, and provides a framework for analysing the form and extent of participation via representation, formalisation of procedures and accountability for output and outcomes. The effective application of these models to transition societies appears to remain largely remote, at least at the present time.

Another major change in context has been in the framing, objectives and instruments applied to research and innovation policy. Weber points to a growing focus on linking the outcomes of research and innovation to national (or societal) needs, a greater recognition of the many inter-connected components of the innovation cycle, the challenge of guiding research and innovation under conditions of high uncertainty and the growing importance of agile institutional networks. This analysis leads him to identify the need for changes in governance structures, processes and culture.

A “strategic turn” emerging from the first of these changes has been the growing emphasis on Grand Challenges as guiding rationales for research and innovation policy. Cagnin explores the contribution FLA could make to orienting Innovation processes more effectively towards addressing grand challenges. He analyses innovation system functions, such as knowledge development and diffusion, to identify a range of changes which may be necessary to cater for addressing grand challenges, and the roles that FLA could play in facilitating these changes.

One of the agreed grand challenges is sustainability. Carabias et al have found that many future-oriented issues are well reflected in sustainability indicator systems. However, there is considerable potential to enhance their effectiveness by combining sustainability monitoring with FLA to develop more anticipatory approaches to orienting societal change towards sustainable development.

Of course it may be far too soon to analyse the extent to which FLA, and the research and innovation system, have responded to, and assisted in addressing, the grand challenges. But, even at this stage, I believe one would have to conclude that while some instruments have been developed to address grand challenges, such as the European Research Area, there has been little substantial progress towards their resolution. Issues of climate change, food security, resource supply and migration remain as intractable as ever. Indeed, there is scattered evidence across various media of a growing unwillingness to admit that the grand challenges are real, or that they require any concerted human intervention. In this view, FLAs are either irrelevant or subversive.

What of the progress of foresight/FTA/FLA? It could be argued that the field has entered a mature phase, with steady growth and progress on many fronts, but lacking the dramatic advances of the previous decade, in line with the general model of disciplinary institutionalisation. At this stage of disciplinary evolution, the emphasis shifts to diffusion, adoption, and refinement ie to the embedding of FLA as a ‘common sense’ good practice.

But on this score, there are still major challenges. As van der Giessen and Marinelli point out<sup>2</sup> “although plenty of foresight studies are being organized and more and probably better knowledge about the future is available, this anticipatory intelligence is hardly used in policy making, or it is used primarily to support choices made for other reasons and/or based on other knowledge”.

From one perspective, it could be argued that it was ever thus. There is abundant evidence of decision-makers making intuitive judgments which they then seek to test or justify by searching for supporting evidence. An alternative, and not necessarily mutually exclusive viewpoint, is that the absorptive capacity to effectively integrate FLA findings into decision making processes is still remarkably under-developed. One simple test is to examine the curricula being used to train management and decision makers – FLA is largely notable by its absence.

---

<sup>2</sup> Quoting van der Steen, M. and van Twist, M., ‘Beyond Use; Evaluating Foresight that Fits’, *Futures*, Vol. 44, No. 5, pp. 475-486, 2012.

In a report of this kind, it is appropriate to conclude by asking what of the future of FLA? It may be appropriate to borrow from the technology management literature the concept of the S-curve – the logistic curve of growth which is used in many fields. In its mature state, perhaps FLA is reaching the end of the current S-curve, and needs to discover a new one in order to find a new level of value and challenge. What might be the basis of a new S-curve? One candidate would have to be the use of the reach of the Internet to develop much higher levels of participation through ‘crowd sourcing’ mechanisms. Another, in the emerging age of cloud computing and ‘big data’ mining and analysis, might expand greatly the first tentative steps in FLA mapping.

**Ron Johnston**

Australian Centre for Innovation

15 September 2012

# FLAs and New Patterns of Governance of Research and Innovation

K. MATTHIAS WEBER\*

\* AIT Austrian Institute of Technology, 1220 Vienna, Donau-City Strasse 1, Austria

## 1 Introduction

Research and innovation (R&I) policy has undergone a number of important changes over the past years in Europe. Launched in 2000, the European Research Area has taken shape and gained new momentum after a major revision in 2007. Subsequently, a number of new instruments have been introduced that aim at improving the coherence of European, Member States' and regional R&I policies, such as ERA-Nets, Joint Programming Initiatives and the like.

Similar to other policy areas, R&I has equally been confronted with new demands on what it is supposed to deliver. Even if most countries have refrained from cutting severely R&I budgets in response to the still ongoing economic and financial crisis, the questions of what issues to focus on in R&I, and of how to build appropriate research portfolios in face of an uncertain future have been raised. In particular, we could observe greater emphasis being placed on research and innovation contributing to tackling Grand Challenges; complementary to the continuous efforts of improving the effectiveness of our research and innovation systems.

These are just some important reasons why forward-looking activities (FLAs) have recently attracted growing attention. The vision of ERA with its novel policy instruments requires strategic and forward-looking guidance, as does the intention to tackle Grand Challenges by means of R&I. In fact, forward-looking elements have been introduced to support new policy initiatives, such as European Technology Platforms, Joint Programming Initiatives, or the exploration of specific

sectoral and technology strategies.<sup>1</sup> High expectations have been expressed with regard to FLAs as means to help cope with an uncertain future, but also to support the level of policy coordination needed for addressing future challenges.

If, however, FLAs are to meet these high expectations, a number of requirements need to be met, in particular requirements with regard to the governance of research and innovation policy, but also with regard to the way of organising and doing FLAs. For instance, in order to become effective, FLAs need to be properly embedded in strategic decision-making processes. Until now, most FLAs provide interesting insights that could well be used in decision-making, but often remain at the margins of actual decision-making. As to the organisation of FLAs, it will be necessary to build appropriate institutional constellations to enable the production of the necessary anticipatory knowledge and feed it into decision-making. In a world that increasingly relies on the power of networks, FLAs equally need to build on novel organisational forms that allow striking a good balance between flexibility on the one hand, and being a reliable partner for decision-making on the other.

In the next section, I will first revisit in more detail a number of emerging developments in R&I policy, as the changing context into which FLAs need to be embedded. In particular, I will highlight a number of requirements that these developments raise for the governance of R&I

---

<sup>1</sup> See, for instance, the voluntary guidelines for Joint Programming Initiatives (JPIs), or the roadmapping experiences in various European Technology Platforms and Joint Technology Initiatives. Other sectoral strategies have been informed by dedicated European foresight projects, e.g. in manufacturing, ICT, agriculture, transport or energy.

policy. Against this background, consequences for future FLAs will be formulated, before some conclusions will be drawn on measures to be taken to make sure that FLAs can indeed provide the necessary inputs to strategic decision-making.

## 2 Emerging developments in R&I policy

When compared to other policy areas, R&I policy has without doubt gained in significance in the past few years. This is not only reflected in the growing or at least stable public budgets in time of economic and financial crisis, but also in the clearly stated expectation that research and innovation are crucial for economic recovery and the tackling of Grand Challenges. In order to be able to deliver on such high expectations, a number of novel developments can be observed in R&I policy, which refer mainly to the following four aspects:

- *The purpose of R&I policy:* Over the past years, we have seen a serious re-thinking of the purpose of R&I policy. Whereas the last decade of the 20<sup>th</sup> century was characterised by an approach of building the structures and institutions of research and innovation systems to ensure that they operate effectively and efficiently, the past ten years have seen a growing attention to whether the outcomes of research and innovation activities actually meet the needs of society. This “strategic turn” is spearheaded by a growing emphasis on Grand Challenges as guiding rationales for R&I-policy.<sup>2</sup> However, this shift in the purpose of R&I policy was tied to higher demands on its rationality and legitimacy. Clear rationales need to be provided what specific research programmes are expected to deliver, accompanied by high demands on accountability in financial and societal terms. FLAs have an al-

<sup>2</sup> See the report of the high-level group on ERA Rationales, which adapted the concept of Grand Challenges for the European policy context (HLG 2008).

most natural role to play here as instruments to help anticipating future impacts.

- *A broader perspective on research and innovation:* While in the past, research and innovation have been addressed by different mainly technology-centred policies and programmes, it is now increasingly recognised, not the least in the proposals of the Horizon 2020 framework programme, that R&I policy needs to cover the entire innovation cycle in an integrated manner, taking into account also demand-side policies such as regulation or public procurement.<sup>3</sup> In addition, the social dimension of innovation acquires growing attention; social innovation can be found as an issue not only in the social science research programmes, but increasingly also in technologically oriented programmes, for instance in health, security, and mobility. This is not surprising in view of the need for long-term processes of socio-technical change (“transitions”) that are needed for tackling Grand Challenges.<sup>4</sup> FLAs may not provide all the answers, but they can be used to project and explore the inter-dependencies and complexity of future transition paths.
- *Research and innovation under conditions of high uncertainty:* Basic research is meant to explore unknown territory, but significant parts of research and innovation are conducted to deliver solutions for known and sometimes still unknown problems. R&I policy and programming are often about providing guidance on what “relevant” research and innovation areas might be. Thematic research pro-

<sup>3</sup> See the European Commission’s proposal for a new framework programme for research and innovation “Horizon 2020” (EC 2011).

<sup>4</sup> The idea that dedicated policy approaches for inducing long-term processes of transformative change has been embraced with growing interest in several Member States. Different concepts are used for this purpose (Weber and Rohracher 2012), for instance transition management (Rotmans, Kemp and van Asselt 2001), functions of innovation systems (Bergek et al. 2008) or more broadly reflexive governance (Voß and Kemp 2006)

grammes are – to varying degrees – giving direction to the activities of research performing organisations. As the financial crisis, recent epidemics, but also the developments on the Southern Mediterranean have shown, these attempts of giving guidance take place against the background of high uncertainty, with unexpected and even disruptive developments occurring and asking for fast responses. The recent experiences have raised the awareness of the need to be able to deal with the unexpected, and to anticipate potential emerging issues in society. This situation calls for a combination of monitoring and exploratory intelligence, and of adaptive research portfolios that allow responding quickly once unexpected developments materialize.

- *Networks as flexible policy instrument:* The aforementioned broadening of our perspective on R&I, and the high level of uncertainty require new and more flexible policy instruments. The collaborative nature of R&I, its global embedding, socio-technical interdependencies of long-term change processes, and the need to cope with the unexpected imply that traditional planning approach to policy development and implementation will fall short of the emerging requirements. While there is no catch-all solution to the need for better instruments, institutional networks seem to be a promising response to growing complexity, uncertainty and ambiguity in R&I. This is recognised increasingly in European R&I policy, where several new network-type instruments have been introduced and tested in recent years. FLAs can fulfil an important function as soft coordination mechanism in this regard, in particular to bridge between regional, national and European policy

levels, but equally between the different line ministries and DGs.<sup>5</sup>

These four directions of European R&I policy point to a growing need for FLAs, and important steps have already been taken to give them more prominence. The need for multi-level policy coordination, for instance, is increasingly recognised and also practiced in new types of committees (e.g. SCAR – Standing Committee on Agricultural Research) and policy instruments (e.g. JPIs and the envisaged European Innovation Partnerships). However, it is fair to say that forward-looking activities are not yet an integral part of policy-making at European level. In particular, a forward-looking culture would require using FLAs to inform strategy processes within organisations, not only at the interactions between them. Overall, R&I policy will need to be better underpinned by forward-looking intelligence, if it is to advance along the lines of the four developments outlined above. Ultimately, this raises the questions of what kinds of governance is appropriate for R&I policy to embrace a forward-looking approach, and what kind of organisational configurations for FLAs. These two points are going to be addressed in the two subsequent sections.

### 3 New requirements for the governance of R&I policy

These new developments in R&I policy can only be realised effectively if corresponding changes in the governance of R&I policy are introduced. In other words, the governance framework must support the kind of policy developments outlined. However, current governance structures and processes, as well the organisational cultures, rather tend to hinder than to facilitate the four developments outlined. In spite of recent advances, innovation still tends to be primarily understood in technological terms. The willingness to accept failures is not very developed, but will essential if uncertainty is taken seriously. And policy directorates and agencies still tend to operate

---

<sup>5</sup> See, for instance, Georghiou and Weber (2011) where the needs for policy coordination in connection with innovation policy are outlined, or Harper and Georghiou (2010) on climate change and agriculture.

as autonomous “silos” rather than as hubs in inter-institutional networks. The rhetoric of Grand Challenges has nevertheless started to take root in R&I policy over the past two years, but ultimately the launch of Horizon 2020 will be the litmus test whether this shift in rationales will indeed become effective at European level.

The aforementioned developments affect all the different dimensions of governance; captured here by the three headlines of governance structures, governance processes and governance cultures. It is also important to note that governance issues apply both at the level of policy and strategy making as well as at the level of policy implementation.

### **Governance structures**

The organisational structures of future governance systems will need to be much more flexible, open and resilient than today; able to respond to unexpected development, while at the same time providing stability and clear responsibilities to ensure the ability to act in a reliable way. This requires putting an end to the strict demarcation of areas of influence and control between different “silos”. Currently, these power structures are hardly questioned; formal consultation mechanisms have been put in place to fulfil the most urgent coordination needs. Alternatively, networks could be put in place that permeate vertical, horizontal and multi-level boundaries between organisations, and allow harmonizing the different policy areas and levels relevant to, for instance, specific Grand Challenges, from policy strategy to implementation. The European Innovation Partnerships, while still in need of being further tested, could potentially take on such a coordinating role.

### **Governance processes**

On the basis of this kind of open and flexible governance networks, transparent processes need to be put in place to ensure the key functions of policy strategy development and implementation. Some of these functions shall be briefly mentioned:

- *Exploration and anticipation* of the future space of possibilities is a primary function of research, but if research policy is to guide, frame and enable

research, it must embark on exploring the landscape of future challenges and opportunities in a systematic and regular manner. This may be supported by modelling as well as by creativity-led approaches, in line with the scope of FLAs. This exploratory function should not only look into thematic challenges, but equally at major changes in the ways we are likely to conduct research and innovation in the future.<sup>6</sup>

- *Orientation* and the definition of major directions for research are needed if we want to pursue research for societal or economic reasons, complementary to the exploratory function of basic research. Orientation and guidance are particularly important in the context of research and innovation for Grand Challenges, where the joint efforts of a broad range of research actors, policy-makers and stakeholders are needed.
- The *participation of stakeholders* when defining major directions for research is important for two main reasons: first of all, to take into account their views and expectations on what is worth or needed pursuing in the future, and second, to ensure their commitment to a joint agenda. In other words, participation is also a means to ensure the adjustment of actor strategies, ranging from research policy to research performance, and thus to enhance coherence of policy strategies with stakeholder interests.
- *Coordination of strategies and activities* is important to ensure policy coherence in several regards, namely horizontally (i.e. between R&I policy and sectoral policies), vertically (i.e. between policy strategy and implementation), multi-level (i.e. between European, national and regional levels), and temporally (i.e. to ensure a good and harmonised timing of policy impulses by different agents). Through the participation of stakeholders, the

---

<sup>6</sup> See, for instance, the EU-funded projects INFU – Innovation Futures ([www.innovation-futures.org](http://www.innovation-futures.org)), and RIF – Research and Innovation Futures 2030 ([www.rif2030.eu](http://www.rif2030.eu)).

coordination with their strategies and activities can be facilitated.

- *Experimentation, monitoring and learning* are essential governance functions in the face of high uncertainty, in order to enhance the ability to realize adaptive and flexible policy strategies. This implies that the scope of monitoring should be broadened beyond the compliance check of specific programme objectives (which is widely practiced today), and look rather for novel insights and lessons to be learnt from failures that are unavoidable (but also essential) if an explicitly experimental policy approach is pursued in order to better cope with uncertainty. It is obvious that this principle can only be effective if it is used in both policy strategy and implementation.

As already mentioned, for these governance processes to have an impact, they must address both the levels of policy strategy development (e.g. at the levels of ministries and/or EC Directorates General) and policy implementation (e.g. agencies in charge of specific programmes), and involve ideally also research performing organisations.

### **Governance culture**

An often under-estimated dimension of governance is constituted by the cultural aspects of decision-making in organisations. Government bodies still tend to be dominated by a hierarchical planning paradigm that is based on the assumption that comprehensive knowledge allows full control of future events. It is reflected, for instance, in an administrative logic, and associated reporting mechanisms, that ignores the inherently open nature of research and innovation. Such a culture is obviously detrimental to the need to take decisions under conditions of complexity and uncertainty - if not to say ignorance (Loveridge and Saritas 2012). It is also reflected in a lack of incentives for civil servants to take risks and behave as policy entrepreneurs, able and allowed to move agendas forward and embark on the kinds of experimental approaches that will be needed in the future to explore new solutions

for Grand Challenges. At the same time, it is obvious that such a more risk-prone governance culture will only be acceptable to the public and the Parliaments, if principles of transparency are fully respected.

## **4 Consequences for FLA**

The arguments raised point to opportunities for FLAs to make a difference in R&I policy. Strategically oriented forms of R&I policy and governance need to be underpinned by corresponding strategic intelligence. However, for FLA to play its role, it will be necessary to rethink its functions, its relationship with decision-making, the organisational models upon which it is based, and the methods it applies. According to current definitions, FLAs aim at inspiring future oriented strategic decision-making, providing fresh insights into current trends and possible disruptive events, and building shared visions of the future. As such, FLAs are a useful means to create common understanding and form a basis for joint perspectives and visions. They cover participatory and action-oriented foresight processes as well as forecasting studies, technology assessments and horizon scanning activities. FLAs thus have a large scope and can be used for several purposes: to build contrasted visions of the future; to anticipate potential disruptive events; to inspire new EU policies; to assess policies and measures; or to develop joint agendas.<sup>7</sup>

### **The role and functions of FLAs**

From a governance perspective, foresight is probably the most interesting concept under the broad headline of FLAs, because it combines participatory process elements with systematic future exploration.<sup>8</sup> It thus goes be-

<sup>7</sup> See also [http://ec.europa.eu/research/social-sciences/forward-looking\\_en.html](http://ec.europa.eu/research/social-sciences/forward-looking_en.html). The Voluntary Guidelines for JPIs position FLAs in several places along the policy cycle (ERAC 2010).

<sup>8</sup> According to the European Foresight Platform EFP, foresight can be defined as "a systematic, participatory, future-intelligence-gathering and medium-to-long-term vision-building process aimed at enabling present-day decisions and mobilising joint actions. It can be envisaged as a triangle combining 'Thinking the Future', 'Debating the Future' and 'Shaping the Future' ([www.foresight-platform.eu](http://www.foresight-platform.eu)).

yond merely informing policy and addresses the following six main functions (based on da Costa et al. 2008):

- *Informing policy*, i.e. to generate insights regarding the dynamics of change, future challenges and options, along with new ideas, and to transmit them to policy-makers as an input to policy conceptualisation and design. This includes horizon scanning as an instrument of early warning and anticipation of the unexpected.
- *Facilitating policy implementation*, i.e. to enhance the capacity for change within a given policy field by building a common awareness of the current situation and future challenges, as well as new networks and visions amongst stakeholders. Better coherence of policy implementation across different agencies is one of the benefits of this FTA function.
- *Embedding participation in policy-making*, i.e. to facilitate the participation of stakeholders and civil society in the policy-making process, thereby improving its transparency and legitimacy, and ultimately coherence with stakeholders' strategies.
- *Supporting policy definition*, i.e. to jointly translate outcomes from the collective forward-looking processes into specific options for policy definition and implementation. Policy coordination in its different facets is a major benefit of this function.
- *Reconfiguring the policy system*, i.e. changing structures and processes in a way that makes the policy system more apt to address long-term Grand Challenges.
- *Symbolic function*, i.e. to indicate to the public that policy is based on rational information and transparent processes.

While not each and every foresight activity may address all these functions, they seem to be

---

compatible with several of the requirements for R&I policy governance highlighted before. In particular, foresight seems suitable to support the key characteristics of future governance processes. The function "reconfiguring the policy system" assigns even a potential to contribute to a change in governance structures of R&I policy (even if in the very end the corresponding structural changes are highly political choices). The governance culture seems particularly difficult to change, but by using foresight in practice participants may actually be convinced of the benefits of a forward-looking approach to decision-making, which may ultimately contribute to a change in governance culture as well.

### ***Embedding in decision-making***

The aforementioned six functions may describe the potential of foresight to support policy-making, but there is widespread agreement in the community that this potential is largely unmet. Several projects have been conducted over the past years, aiming to better understand the impact of foresight in the different stages of policy-making and implementation, and ultimately to learn how to better design foresight processes to be likely to have an impact (da Costa et al. 2008, Havas et al. 2010) One of the main reasons for the poor impact must be seen in the lack of embedding of FLAs in decision-making. Currently, FLAs are conducted too distant from decision-making and represent just one input among others. If strategic thinking is to be taken seriously in policy-making, forward-looking approaches will have to become an integral part of the strategy development processes to prepare decision-making. This has also been recognised by the European Forum on Forward-Looking Activities (EFFLA) that advises the European Commission on FLAs in relation to research and innovation. As a consequence, strategy processes at European level should become more systematic, transparent and inherently forward-looking (EFFLA 2012). First efforts of this kind can be observed in some of the recently launched Joint Programming Initiative (JPIs); with foresight being part of the voluntary guidelines they are supposed to follow.

### ***New organisational models for FLA***

The need to design strategy processes at European level needs to be paralleled by changes in the way FLAs are organised. If FLAs are supposed to be of help when dealing with disruptive changes and Grand Challenges, new organisational models for “systems of FLA” need to be devised, which need to fit the aforementioned open governance model. Recently, we can observe a move from individual FLA programmes and projects to new variants of institutionalising FLAs; a move that seems to be well suited for addressing the emerging needs of decision-making (Weber et al. 2012). Moving towards flexible network models around a stable organisation that is well connected to decision-making processes has been suggested as an alternative to the still dominant project-based approach to FLAs, both at European and at national levels.

### ***Novel directions in FLA methods***

Also in methodological terms, the emphasis will need to shift. Without being exhaustive, five important directions of emerging methodological developments shall be highlighted:

- From the identification and selection of promising future technologies, we need to move towards more continuous horizon scanning activities that aim at spotting technological as well as societal weak signals.<sup>9</sup>
- Creative thinking is likely to become more important if we are to tackle unexpected and potentially disruptive developments. At present, our capabilities and abilities of anticipation are too limited to explore seemingly unlikely futures. New modelling techniques (e.g. experimentation with agent-based models) may be equally helpful for stimulating creativity as novel interactive methods.
- In order to prepare for more uncertain times, portfolio approaches are a promising avenue to devise robust and adaptive policies (Eriksson and Weber 2008).

- New participatory tools, not the least using social media, offer the potential to bring society, stakeholders and policy-makers closer together.<sup>10</sup>
- Another type of interactive processes may be needed to bring FLAs closer to decision-makers. These need to be designed in a specific way in order to be action-oriented, efficient in terms of investment of time to be attractive and effective.<sup>11</sup>

### ***Shaping mental frameworks and individual capabilities***

FLAs will not become effective just on the basis of better embedding, new organisational models and refined methods. The sensitivity of decision-makers, stakeholders and society in general needs to be enhanced, their capabilities to deal with future-oriented strategies enhanced. In many regards, this may simply require better training of individuals in approaches to strategy development, in foresight and more generally in complex systems thinking. Many tools and experiences are available, but if forward-thinking in R&I policy is to be taken seriously, training and education will be crucial to ensure that the necessary absorptive capacities for forward thinking are built by individuals as well as by organisations.

## **5 Conclusions**

This brief analysis has pointed out that in view of the emerging developments in the nature of R&I policy imply corresponding changes in the governance of R&I policy. These changes enhance the potential significance and usefulness of FLAs in several regards. However, in order to realize the potential, a number of important elements need to be addressed, both in terms of changes in the governance of RTI policy, and in terms of shaping the organisation and practices of FLA.

<sup>10</sup> Currently, there are a number of projects under way that explore the potential of social media for FLAs, for instance in the context of security research.

<sup>11</sup> The EU-funded project FarHorizon has advanced the success scenario methodology as a means to involve influential decision-makers in action-oriented foresight experiences.

<sup>9</sup> See for instance the EU-funded projects iknow and SESTI – Scanning for Emerging Science and Technology Issues.

With regard to the governance of R&I policy, it seems evident that strategy processes with an inherent forward-looking orientation need to become more common practice in the preparation of major policy decisions (such as, e.g., the future framework programmes); processes that are systematically embedded in the European institutions' decision-making processes and that combine longer-term orientation with shorter-term relevance. There are some first promising examples of such efforts, like in the already mentioned JPIs, some European Technology Platforms or in the emerging European Innovation Partnerships. These practices could also play a more significant role in the European institutions themselves and not only at their fringes. One of main side-effects of such processes is the contribution they can make to policy coordination. In fact, FLAs have the potential to operate as soft coordination mechanisms between different public policy domains, but also between public and private sector, between government policy and societal stakeholders. In order enable a tight embedding of FLAs in decision-making, it is first and foremost necessary to establish systematic, transparent and regular strategy processes. While this will require some experimentation and learning, it is essential for enabling policy-making to cope with upcoming Grand Challenges and disruptions in an informed and forward-looking manner.

Forward-looking activities, at their end, need to undergo a major change process as well. Key functionalities, such as regular horizon scanning, should be embedded in stable organisational nodes, as part of extended FLA networks and a shared FLA infrastructure that combines decentralised monitoring and scanning functions, platforms of knowledge exchange and opportunities for mutual learning. Such a new system of FLA could support both policy strategy development as well as the coherent implementation of policies.

Developing the skills and the mental frameworks of the individual will be a decisive precondition for such a move towards a forward-looking policy-making culture. What matters here are not so much a matter of specific methodological FLA skills, but rather the ability to deal with decision-making under conditions of high uncertainty, with incomplete and often

ambiguous information about the future, with a broad participation of stakeholders, and with a high degree of transparency.

## Sources and References

- Bergek, A., Jacobsson, S., Carlsson, B., Lindmark, S., Rickne, A., (2008): Analyzing the functional dynamics of technological innovation systems: a scheme of analysis, *Research Policy*, 37, 407–429
- Da Costa, O., Warnke, P., Cagnin, C., Scapolo, F. (2008): The Impact of Foresight on Policy-Making: Insights from the ForLearn Mutual Learning Process, *Technology analysis and strategic management* 20 (2008), No.3, pp.369-387
- ERAC (2010): Voluntary Guidelines on Framework Conditions for Joint Programming in Research, European Research Area Committee, Brussels
- EC (2011): Proposal of the European Commission for a new framework programme for research and innovation, 30 November 2011, Brussels
- EFFLA (2012): 1st EFFLA Policy Brief, European Forum on Forward-Looking Activities, Brussels
- EFP (2010): Foresight and Forward-Looking Activities – Exploring New European Perspectives. Summary of major findings, Kick-off Conference of the European Foresight Platform EFP, Vienna, 14-15 June 2010
- Eriksson E.A., Weber K.M. (2008): Adaptive Foresight. Navigating the complex landscape of policy strategies, *Technological Forecasting and Social Change*, Vol. 75, pp. 462-482
- Georghiou, L., Weber, M. (2011): Dynamising innovation policy. Giving innovation a central role in European policy. Final Synthesis Report, FarHorizon Project, Vienna/Manchester
- Harper C.J., Georghiou, L. (2010): Foresighting the AgriClimate Ecology: Application of breakthrough technologies to adaptation to climate change in agriculture. Final Synthesis Report, FarHorizon Project, Manchester
- Havas, A., Schartinger, D., Weber, M. (2010): The impact of foresight on innovation policy-making: Recent experiences and future perspectives, *Research Evaluation*, Vol. 19, 2, pp. 91-104
- Loveridge, D., Saritas, O. (2012): Ignorance and uncertainty: influences on future-oriented technology analysis, *Technology Analysis and Strategic Management*, 24, 753-767
- Voß, J.-P., Kemp, R. (2006): Sustainability and reflexive governance: introduction, in: Voß, J.-P., Bauknecht, D., Kemp, R. (Eds.): *Reflexive Governance for Sustainable Development*, Edward Elgar, Cheltenham, 3–28
- Weber M., Rohracher H. (2012): A systems approach to transition dynamics: Towards new rationales for legitimizing goal-oriented policy strategies, *Research Policy*, Vol. 41, 1037 – 1047
- Weber, K.M., Cassingena Harper, J., Könnöla, T., Carabias Barceló, V. (2012): Coping with a fast-changing world: Towards new systems of future-oriented technology analysis, *Science and Public Policy*, 39, 153-165

# Reach and Impact of Forward Looking Activities

## Case Study Analysis of follow-up briefs

SUSANNE GIESECKE\*, DIRK JOHANN\*

\* AIT Austrian Institute of Technology, 1220 Vienna, Donau-City Straße 1, Austria

### Abstract

What is the impact of foresight?

Although foresight is employed widely by public and private users, there is little knowledge about the role, use and impact of foresights. The European Foresight Monitoring Network, for instance, has described more than 2000 foresights projects which were organised in the last 15 years, though, only a few studies have analysed the impact of these initiatives. This article aims to empirically investigate selected foresight projects. We want to identify those factors that support the implementation of foresight results and are used by various stakeholders, e.g. the customers, organisers, participants of workshops, public, interest groups.

---

## 1 Follow-up assessment

The compilation of briefs written for EFP and for the predecessor project EFMN is a valuable source for further research of foresight, on innovation systems and on policy activities in S&T and related fields. Since briefs are generally written shortly after a foresight process was finalized, the time frame is too short to give an assessment of the foresight as such and on the effects on the innovation system. However, the questions, “does foresight make a difference for the innovation system in focus” and “are recommendations implemented”, remain crucial. At this point considerable learning output can be generated. This has hardly been assessed before. For this reason, we will draw upon the compilation of the first 160 briefs that were produced between 2005 and 2008 to do a follow-up assessment of some of the exercises covered. The foresight processes covered in those briefs have been completed some time ago and will be adequate for consideration of result assessment.

For this article a small sample of about five initiatives was chosen for a review on some FLA initiatives and to ask what we can learn in retrospect. These examples were: FISTERA (No. 9, No. 221), European Manufacturing Vision (ManVis, No. 53, No. 228, forthcoming),

Transport and Mobility in an Enlarged Europe (No. 19, No. 220), the Columbian case (No. 21, No. 218) and the Greek National Technology Foresight (No. 16, No. 162).

Among those five cases are three which were funded by the European Commission on three different sectoral developments: ICT (FISTERA), transport (Transport and Mobility in an enlarged Europe), and manufacturing (ManVis).

The central purpose of the FISTERA project was to make a contribution to the creation of a common vision and approach towards the Information Society in an enlarged Europe in 2010. Six years after the project was concluded the follow-up brief aimed to extract key lessons learned and asks what the mid-term to long-term implications from this foresight exercise were, in particular how effective the FISTERA project was to feed the findings into a process of strategic priority-setting in Information Society Technologies (ISTs) at the European level.

The follow-up brief **From Transport Forecasting to “Mobility Science”** recapitulates a foresight exercise on ‘Transport and Mobility in an Enlarged Europe – 2020’. Almost eight years after the exercise, we look back in order to ask for the lessons learnt in a field that used to be dominated by forecasting and long-term projec-

tion. The motivation for this foresight was to test the applicability of some foresight methods for envisioning transport and mobility futures, to specify impact pathways, develop a monitoring system, find alternatives to mainstream policy assessment methods and transport models with regard to identifying external impact factors not necessarily related to transport. Finally, the idea was to clarify the pathways by which external and policy variables affect transport and mobility.

Recapitulating the project “**Manufacturing Visions – Integrating Diverse Perspectives into Pan-European Foresight (ManVis)**” we investigate how effectively the Delphi method was deployed to examine a wide spectrum of aspects underpinning the future trajectory of European manufacturing with a particular emphasis on the elaboration of scenarios.

Two Briefs focused on national foresight exercises: Colombia and Greece. The Greek follow-up (No. 162) presented findings about perceived impacts and success factors of the **Greek National Technology Foresight Programme**. This exercise was described in Brief No. 16. The main aim of the Greek Technology Foresight was to develop a set of key guidelines to assist the central administration in designing the national research and innovation policy, on the one hand, and the business world in its strategy planning, on the other.

The follow-up brief **Embedding Foresight in the Colombian Innovation System** reconsiders the evaluation of the Colombian Technology Foresight Programme (CTFP). It is actually a follow-up of an evaluation summary of the Colombian national foresight and in such focused on the appropriateness and adaptation of the evaluation framework. It also discussed the effects for the spread of a foresight culture in Colombia that have been induced or stimulated by the evaluation of the CTFP. Finally, it looked in the institutional mechanisms in support of the social appropriation of the CTFP’s output and results.

We analysed material from such exercises and interviewed the organizers. In addition, several interviews with participants and sponsors of the exercises were undertaken. We conducted the interviews on the basis of the results and their implementation as well as on the overall

effects of the particular foresight in focus. For each assessment a short supplement to the original brief was or will be produced, in agreement with the interviewees.

In this article we analyse the cases and draw upon the lessons that can be learnt from these experiences – lessons from best and from worst cases, lessons for foresight practitioners, clients, sponsors.

## 2 Motivation

Why do we think an assessment can bring new insights in the usage, meaning and set up of Forward Looking Activities? From empirical evidence we found that there is only little empirical account for the impact of Forward Looking Activities or Foresights and no coherent analytical approach in social sciences exists to assess the impact. Further, the outline of an FLA usually puts only little attention on the increase of the impact. Existing handbooks and guidelines give only little advice on how to set up a FS in order to increase or assess the impact.

All these aspects reflect the motivation of organizers to assess the reach and impact of Forward Looking Activities. They want to know if and in what way their work and their professional methods support the objectives of their projects and what can be altered to become more effective and more efficient.

Sponsors and clients of Forward Looking Activities are interested in the value of such activities and to receive some evidence that their investment is such a project actually pays off. Often, they have to justify the use of public money with regard to the outcome and the cost-efficiency. This necessity has only recently been taken up more prominently, for examples by Foresight scholars such as Jack Smith, Ron Johnston et al. (2012) even though the evaluation and assessment of FLAs has always been an issue, especially for national exercises sponsored by the individual governments. In most cases however, such evaluations are not publicly accessible, as for example the case of the German FUTUR (Giesecke 2005).

From our perspective, Forward Looking Activities are both, top-down and bottom-up processes. This is to say that the structure is usually provided by the sponsor and the organizer. But they can also be organized from civil society groups. Apart from the two groups of players – sponsors and organizers – there will always also be participants. These can be stakeholders, experts, or people from civil society. A strict distinction of these groups is not possible. Every person, no matter if she is a stakeholder, a sponsor, an organizer or representative of another group will be part of civil society as well. This is why we have to be aware that we all carry several roles when dealing with a FLA. The potpourri of methods used in an FLA will help to structure the roles and the entire process of the activity.

### Assumptions

While doing the assessment of the five cases we started with the following assumptions:

- The impact of Foresight depends on the design of the process and on the methods selected; and at the same time on the institutional environment: culture, experience, knowledge, learning, etc. which facilitates dissemination and implementation of the results (or not).
- Applying certain methodologies from organisational development can increase the impact of Foresight.

## 3 Looking at three types of actors

As indicated above, in this report we will deal with three different groups of actors: the sponsors (or clients), the organizers and the participants. Here we will not deal with the wider public even though this would be an interesting study but with a slightly different focus. In our example cases participants are experts in the foresighted area as well as stakeholders in the sense of concerned actors. We will discuss the role of the three groups in the following sections with regard to the structure of the FLA and the final impact.

### Role of the client

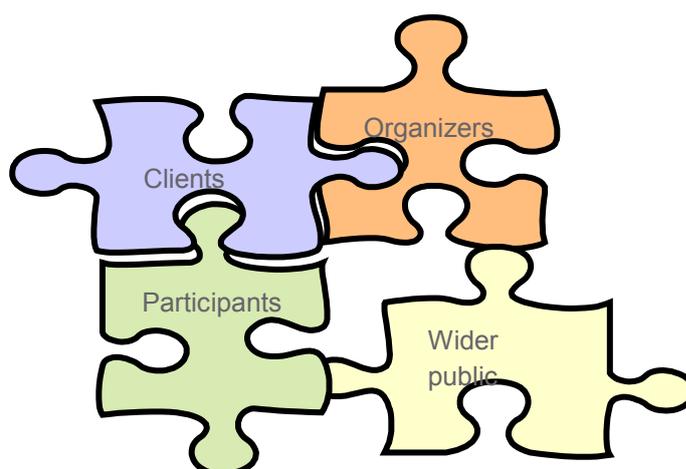
With regard to the role of the client (or sponsor) we found that several points are important to make an FLA successful: Organisers and

clients need to clarify the assignment and objectives. Further, the client should have and demonstrate his/her commitment to the exercise. His/Her visibility in the process needs to be balanced delicately.

It is important that the client proves some resonance in response to the results of the FLA. This will make a difference in the political decision making system. Thus, it is one of the challenges in the role of the client to find a proper way for his/her visibility and to the right balance between active participation and passive observation. From the cases we recapitulated it became evident that a „Spokesperson“ (champion) within the political or administrative structure is important for the FLA in order to speak out for the topics/outcomes in the respective agency s/he represents. This can be a ministry, a Directorate General, etc. A confident „standing“ within the organisation is needed in order to achieve a certain impact. This person has to close the gap between the exercise and the policy making; that is to say between vision building, recommendations and implementation of results.

### Role of the organisers

With regard to the organizers and moderators (also called contractors) of an FLA we encountered the following important phenomena: First of all they are confronted with some “expectation management” in order to motivate participants first of all to be interested in the exercise,



that to physically or virtually take part in it and then to engage in the actual interaction with the other participants. At the same time the organizers have to be aware of unrealistic expectations otherwise they will create a hype

and unrealistic expectations in the imagination of the participants and the inability to fulfill these expectations will result in disappointment, sometimes even frustration on all sides.

Another of our findings was that the organizers generally do not reflect the theoretical background they have in their mindset. It is, however, important to be aware of one's norms and individual or even collective mind set and to accept that other, e.g. clients or participants do not necessarily share these values. Many foresight activists and FLA practitioners share idealistic approaches on how certain developments can be approved and how to reach certain goals. These might date back to the beginnings of the first systemic foresight approaches and to Robert Junck. Others might pursue the principles of Herman Kahn and his scenario approach. And a third group might not be aware of any of these approaches.

Another aspect that can be an obstacle during the FLA is that many big international projects (for example at EU level) are usually quite inflexible with regard to adaptation of new methods or approaches and do not allow the deviation from the original design. This can be a problem as FLA cannot be fully planned but usually need some room for maneuver to react to unexpected outcomes of individual work packages or milestones.

An additional aspect to consider for the organizers is an understanding of the roles and the options of shaping politics. If this understanding is missing, the results of the FLA will lack usability for policy implementation. Some of the cases we have looked at suffered from this lack. In the Greek case, for example, the participants considered the results as very valuable but they were not necessarily relevant for the policy of the client. As Amanatidou puts in her recapitulating Brief: "The networking under the programme was achieved at the individual rather than organisational level. Thus, the fragmentation among the actors in the national research and innovation system remained. In fact, it was major obstacle to the overall success of the exercise and the uptake of the results." (2009, p.3)

In most cases, the understandings of the roles and options of policy makers might be very limited and policymakers and administrators will be confused if not irritated if FLA organizers assume roles that are not suitable for them. As one interviewee put it: "... you have to know your role, because every time you go too far you get killed".

Not only at the end of an FLA is it important to consider formulating realistic recommendations regarding implementation into the policy cycle. Organizers of FLAs have to be aware to understand the structures and procedures of their clients if the results of the project are to be accepted and even have a longer lasting impact. This can become a very delicate issue because outcomes of FLAs tend to be more normative than pragmatic. Even though some results may represent a consensus of various stakeholder participation processes this does not mean that they find a positive resonance by the client organisation. Unless the FLA is merely process oriented disruptive ideas about future prospects are not very likely to have any impact according to the intention of the FLA organizers.

The matter becomes even more complicated in cases where the FLA is not directly commissioned by a policy client but where it is a funded research project or a similar funded activity. If the FLA is not a mandated exercise there will be no direct client for the output or outcome. This was the case in the "Transport and Mobility in an Enlarged Europe – 2020". The nature of this exercise as a research project where the Foresight team was free to choose the methodology of the project was one reason why the policy side did not feel bound to making use of the results any more or less than they usually do (Giesecke 2012, p.2).

One issue that links the organizers and participants, but also in some incidents the clients, is the enthusiasm the organizers need to spread to motivate their participants. In our research we come across the phenomenon that some professional FLA organizers with a lot of routine are able to spread the enthusiasm at the beginning of the exercise. Especially if the enthusiasm gets lost over the course of the exercise, this will have a negative effect on the

dynamic and outcomes. For example, the Greek National Technology Foresight Programme started with enthusiasm, but gradually lost in importance and attention received. The Transport Foresight raised high expectations among the participating experts but at the actual workshops the organizers yielded to the structure of their concept instead of letting the enthusiasm of the discussions lead the dynamics of the event formats.

### 3.1 Role of participants

As with the other two groups of actors, participants can take a multi-faceted role as well. With regard to the last point in the paragraph above, prospective studies and processes that are closely developed according to the structure of the client organisation face the danger of “mainstreaming”. This danger is even greater if representatives from the client organisation have a strong position and visibility in the FLA. But the same holds true for any participant or group of participants who are dominant in the interactive processes. Their opinion might dominate the discussion and the direction of the while process if the moderators are not capable of ensuring a balance. In this respect, certain hierarchical positions or dependencies among some group of participants might hamper the unbiased flow of discussion and exchange of ideas within the interactive processes. Consequently, this might lead to “cognitive closure” (Georghiou/Keenan 2006), new viewpoints are missing in the end and the results achieved are not very new or original.

Unbalanced distribution of power like this bears the danger of de-motivation other participants if their views are not sufficiently taken into account. This can undermine the entire process. The question arises to which degree it is profitable to invite people known for thinking out of the box and who can take a stand without dominating the debate.

This brings us to the point that the FLA process and results strongly depend on the participants: the fact of their appearance, their number, expertise, opinion, engagement, mindset, etc. In motivating stakeholders or other people to participate, we found that the strongest motivations were interest in the discussion of contents, the networking with prominent players,

and the diversity of participants. The latter meaning that some participants represent industry, some science, some policy making, some societal subsystems, etc. The strongest motivation clearly is the strengthening of existing networks: People are looking forward to meet colleagues and experts from other areas. Additional motivations for experts and stakeholders to participate actively in an FLA, to take on the strain of travelling far distances and to commit their precious time were to trace new research questions and informing each other on the state of the art.

Another advantage of broad participation from various sectors and subsystems is to facilitate access to a broader knowledge base, better understanding of different perspectives, greater awareness of the sources of knowledge, increased understanding of the scope and limitations of Forward Looking Activities, and finally, greater legitimacy of the work and results.

## 4 Definition of objectives

Apart from the roles of different actor groups some activities are important to consider when conducting an FLA with the aim of having a measurable impact. First of all it is important to define the objectives. This seems to be natural, however we found that in general objectives are not clearly defined, this leaves a lot of room for interpretation and misunderstanding between the parties. As Amanatidou reports in her brief on Greek National Technology Foresight, this programme seemed to “have suffered from a major misunderstanding” about that the General Secretariat for Research and Technology wanted and what the contractor understood they wanted. This kind of misunderstanding was rooted in a rather vague formulation of the objectives already at the beginning to the FLA and negatively affected the scope and the focus of the exercise. Both parties, clients and contractors, were not able to establish a clear understanding about the needs of the client and the expectations regarding the FLA (Amanatidou 2009, p. 3).

Further, in many cases it is not clear if a consensus is to be achieved or rather, if the plurality of opinions should be maintained. In other

cases, the objectives of the FLA are defined by the organizers only, without any reference to political strategy building (e.g. developing and testing new methods)

If there is little consideration on the existing structures at the client's organisation it is not very likely that the results will fit for smooth implementation.

What we also found for our astonishment was that at the end organizers and clients direct only little attention to the degree of achievement of the objectives, especially with regard to the content.

And finally, what makes implementation difficult is that there are almost no accompanying measures for transferring the results into the policy cycle. Clients are usually left alone with the results and are facing the burden of translating the output of the FLA into the given structure of their home organisation.

## 5 Changing boundaries of methods

A proper set and mix of methods needs to be selected and adjusted to the process and a couple of terms need to be clearly defined that are commonly used but with different connotation. From our assessments it became clear, for example, that there is not much communication or agreement on what is meant by „representation“ or „representativeness“ and „participation“ during the course of the FLA.

In the context of representativeness of participants, the balance in nominating experts should be considered, i.e. countries/regions, gender, sector/academic disciplines is favorable in order to avoid one dominant group that will set the mainstream. Of course, it always depends on the context and objectives of the FLA if a balanced approach is appropriate and feasible. One FLA design does not fit all situations: methods and practices should be adapted so that they fit the needs of the local context.

Accordingly, the spectrum of FLA methods is not limited. On the contrary as FLA or Foresight become more popular and are applied

also in the contexts of more academic disciplines and institutional settings the method portfolio can profit from integrating approach of neighbouring sectors and disciplines, for example from organisational sciences. There should be awareness that FS is a *process* that might not come to a definite end. Some FLA processes might actually need a pre-foresight as would have been useful in the case of Greek National Technology Foresight to define the objectives and needs for that exercise. Other FLAs and their clients need some guidance after the actual exercise to support policy makers in how to reformulate and implement the results.

One approach to prepare the ground for more efficient implementation of results and to contribute to a continuous understanding of the client's needs and structures is to install a board of advisors. This set-up can be helpful to have knowledgeable spokespersons of good reputation in the client's organisations that are aware of the policy processes and the people in charge and who can transfer valuable information with the proper interpretation into both directions.

Finally, all cases in our study contributed to the impression that social sciences can contribute to the design and implementation of FLAs to a very high degree, even if its focus is a technological or industrial one. Failure to identify social science inputs at the beginning of a FLA could cause problems in the efficient use of time, integration of social analysis, and implementation of results.

## 6 Stimulate organisational learning

For the organizers it is crucial to stimulate organisational learning because if key people, teams and (sometimes) rationales of a program are not maintained (at least until sufficient organisational learning has been achieved), there is the danger that organisational memory can be lost. The need for absorptive capacity describes the ability to understand, incorporate and apply FLA concepts and practices within the institutions. Inclusion of the practices of the institutions involved facilitates the operationalisation of recommendations into specific action plans.

In the 2020 transport foresight exercise, some transport systems modeling experts and transport planners were involved. Some of them thought that foresight was an interesting way to gain contextual variables for a broader range of assumptions behind the model simulations. However, they questioned if they could integrate foresight into their own work partly because they thought that this was not what their clients wanted.

From the perspective of the foresight participants, though, it was interesting to see the introduction and use of qualitative methods in a transport-related foresight exercise. In fact, more transport policy strategy activities have broadened their scope of methods since then (Giesecke 2012, p. 3).

In terms of organisational learning, some FLAs reflect the transformation of the discipline in which the exercise is held. It would be too much to state that FLAs have a major impact on this transformation and it would also be hard to prove such a statement. However, as we can see from the transport foresight, new disciplines and approaches took part to discuss the transformation of transport sciences. It reflects some new approaches in transport economy which emerged, for instance using life cycle or scenario concepts. Behavioural approaches gained currency to better understand travel behaviour and mobility demands. A wider range of qualitative methods entered a rather quantitatively oriented transport research and planning environment. The change

is also reflected in the nomination of chairs at universities. In sum, foresight activities emerged in addition to traditional transport forecasting approaches. Traditional methods of transport demand prognosis have been supplemented by foresight approaches to better understand and diversify the underlying assumptions behind the prognoses (Giesecke 2012, p. 3).

With regard to organisational learning the ManVis foresight provided an important platform to learn about manufacturing research priority topics and the needed adaptations at the level of companies and innovation systems. Beyond the identification of research needs a concrete achievement of the ManVis foresight grounded in the strong integration of key stakeholders from both public policy and industry from the new Member States in the long-term planning of European research funding for manufacturing (Johann/Marinelli 2012).

And the Colombian case provides some insight into organisational learning as well. The “shift from networks and individual exercises [...] to more institutionalisation towards centres of excellence” is an important step to “take on responsibility for preserving knowledge and for allowing lessons learned to be carried forward in a long-term framework” (Popper/Georghiou et al. (2010). In this sense, the evaluation revealed that a move away from the somewhat centralistic approach to anchor the foresight process in COLCIENCIAS towards a more effective institutional mechanism was a necessary step to better embed foresight in the Colombian STI system. COLCIENCIAS recent decision to institutionalise the foresight practices in the framework of the Colombian Technology Foresight Programme by establishing the Colombian Foresight Institute (COFI) at the Universidad del Valle (Cali) can be considered an important move to enhance the aptitude for learning and thus strengthen the contribution of foresight to reorienting the Colombian STI system. In this arrangement, multiple organisations will be able to conduct foresight (Johann 2012b).

## 7 Dissemination of results

In our case studies not much attention was paid to the dissemination of results, which might be hindering regarding the impact of the FLA: Most organizers of FS have no knowledge on who is using their results, documents, papers, or who is citing them, working with them.

Generally there is no proper dissemination strategy except for the homepage, distribution of documents to the participants, clients, sometimes presentations and talks at public events, conferences (the general public or communities outside the FS focus are not addressed).

In some cases of European Foresights members of the Commission will read Policy Papers in order to write Green or White Papers. To improve this situation some interviewed organizers and clients have suggested issuing more short and concise policy briefs in the future. This format is more appealing to policy makers and more likely to be read than thick final reports of several hundred pages.

Apart from this, a broad communication strategy can support reaching a wider audience and experts from various disciplines and sectors. This could include general information material, material for journalists, the use of social media etc. For specific audiences, such as committees of a national, regional or the European parliament, more professional information campaigns are required. This may help to prevent interesting and important foresight outcomes ending up in the drawers of public administrations. Not only is the content important, but the layout has to be appealing too while the policy briefs should be concise and short as well.

Organisers are usually not aware if the FLA is of any use to the participants, or of which use; often they are not sure if participants have read preparatory documents, final documents etc. To improve this situations, follow-up surveys online, by email or telephone are recommended to support the awareness of the outcomes and publication and to get a feedback.

Especially for the Colombian case we can conclude that the evaluation came at the ap-

propriate time to develop recommendations on how the foresight outputs, results and knowledge generated during the second cycle of the Colombian Technology Foresight Programme could be better appropriated by the stakeholders and embedded in a broader strategic policy context. In particular, an improved dissemination strategy and the search for alternative ways of institutionalising foresight are central pillars for engaging future resources and a broad set of stakeholders in a dynamic and self-reinforcing learning process based on which a foresight culture can develop in line with the evolving STI policy system in the Colombian context (Johann 2012b).

## 8 Benefits of Forward Looking Activities

Forward Looking Activities can have multifold benefits, however it is very common, that these are not exploited to a large extend and that the biggest gain is achieved by the organizers. This impression may however be biased due to the fact that organizers are more aware of the benefits and also have an interest in assessing the relative impact. Usually, organisers have the highest learning curve, and are able to reuse the design of FS for other purposes. Also, organisers see some use in FLA experience from their research perspective as they may advance in methodological approaches.

Benefits are often also derived from the methodological progress within the FLA. It is usually the organizers who report this benefit than any of the two groups. But the organisers also claim that the methodological progress is to the benefit of the FLA community and related disciplines if disseminated properly.

In the case in the “Transport and Mobility in an Enlarged Europe – 2020” the organisers were able to show that monitoring proved to be an alternative to modeling and inspired more social scientists to get involved in transport futures studies, combining qualitative and quantitative approaches (Giesecke 2012, p. 3).

Similarly, participants take important research questions home, and enhance knowledge in Foresight design and methods. Networking is named among the highest benefits in all the

cases we looked at. This holds true for participants as well as for organizers. Even several years later the networks that were established or reinforced in the FLA still exist and are used for mutual exchange, co-authoring of papers and proposals.

All participants might gain from the fact that informal structures and processes are laid open (e.g. administration, policy making), and that new possibilities for synergies emerge from FLA processes.

FISTERA also prompted complementary action at the level of the member states by giving impulse to several follow-up foresight initiatives at the national level. For example, Austria (Foresight on Information Society in Austria – FISTA), and Hungary (Information Society Technology Perspectives – IT3) used the FISTERA approach to develop national IST foresights. We can therefore conclude that FISTERA not only contributed to establishing foresight for forward looking IST priority-setting at the European level but that it also inspired foresight practitioners at the national level.

The FISTERA foresight marked an important milestone in counteracting forward looking perceptions based on technological determinism in the field of IST, which fail to provide an adequate perspective of technological futures. The timing for the establishment of a pan-European platform was favourable as foresight tools for priority-setting are proliferating, although interviewed experts and clients stated that FISTERA stayed far behind its set goal to establish a pan-European community concerned with IST futures. Nevertheless, FISTERA's contribution to creating a European vision for IST has been an important first step towards establishing a discussion platform for IST foresight from a European perspective (Johann 2012a).

Benefits from ManVis were that the Delphi survey results provided a broad basis for public discussion on the future of manufacturing in Europe. In particular, by complementing previous foresight studies intended to improve the self-understanding for the European manufacturing industry it constituted an important pillar for the development of a strategic manufacturing research agenda on

the European level. Beyond its intended effects, the ManVis foresight also had some important unintended effects such as making a central contribution to the definition of research needs of the new Member States that accessed the European Union during the 2004 enlargement. In the context of the catch-up and the shifting competitive advantages due to the expectable salary increases in the new Eastern Member States, an unintended but central achievement of the ManVis foresight process was the involvement of these new Member States in the development of a Strategic Research Agenda on Manufacturing in Europe.

The outcomes of the Manvis project served to bring manufacturing experts with different national and professional backgrounds together to discuss the generated visions and the possible paths for securing the Future of Manufacturing in Europe. The results of the ManVis project have been fed into the Seventh Framework Programme (Johann/Marinelli 2012).

## 9 Synthesis and final remarks

Finally, we can already make some statements about the contributions that an FLA can make with regard to an institutional or systems change. It is important to state that expectations regarding FLAs should not be too great.

- The theoretical foundation of FLA is relatively weak; implicit assumptions of certain theories and biases that are transported with FLA or Foresight approaches (knowledge-based view, complexity-based views, risk society).
- FLA has only limited capabilities to overcome inertia and path dependency, because FLA is usually part of the systems ("Foresight should overcome lock-in" Georghiou/Keenan, 2006).
- Foresight is sometimes functionalized to legitimize existing paradigms and political strategies. Foresights are hardly ever disruptive.
- It is important to involve clients and policy makers in a balanced way, between loose and tight coupling to lay the ground for a later implementation of results.

## Sources and References

Amanatidou, Effie (2009) : Greek National Technology Foresight Programme Perceived Impacts and Success Factors. EFP Brief No. 162.

Georghiou, Luke and Michael Keenan (2006): Evaluation of national foresight activities. Assessing rational. Process and Impacts. In: Technological Forecasting & Social Change. 73 (7), pp.761-777.

Giesecke, Susanne (2005). Futur – The German Research Dialogue  
EFMN Foresight Brief No. 1.

Giesecke, Susanne (2012) : From Transport Forecasting to “Mobility Science”. EFP Brief No.220.

Johann, Dirk (2012a) : Priority Setting for Research on Information Society Technologies - FISTERA Follow up...  
EFP Brief No. 221

Johann, Dirk (2012b) : Embedding Foresight in the Colombian Innovation System. EFP Brief No. 218.

Johann, Dirk and Elisabetta Marinelli (2012) Delphi-based Foresight for a Strategic Research Agenda on the Future of European Manufacturing. EFP Brief No. 228 (forthcoming).

Junck, Robert and Norbert R. Müllert: Zukunftswerkstätten (1981). Mit Phantasie gegen Routine und Resignation. Goldmann, Hamburg .

Kahn, Herman Thinking about the unthinkable in the 1980s (1984). New York: Simon and Schuster.

Popper, R., L. Georghiou, M. Keenan, I. Miles et al. (2010), Evaluating Foresight – Fully-fledged Evaluation of the Colombian Technology Foresight Programme (CTFP), Colombia: Universidad del Valle.

Smith, Jack and Ron Johnston et al. (2012): Measuring Foresight Impacts. Unpublished research paper. Telfer School of Management, University of Ottawa and TFCI Canada Inc.

# The Value of FLA for Strategic Policy Making

ANNELIEKE VAN DER GIESSEN \*, ELISABETTA MARINELLI \*\*

\* TNO Netherlands Organisation for Applied Scientific Research

\*\* European Commission, Joint Research Centre, Institute for Prospective Technological Studies

## Abstract

The EFP (European Foresight Platform) is a Coordination and Support Action funded under the European Commission FP7 programme. Its goal is to support forward looking decision making and to consolidate the knowledge base on foresight and forward looking activities (FLA) in Europe and internationally. This paper describes how forward looking activities can support strategic policy making. We will first review the literature and then focus specifically on the EFP activities.

---

## 1 Value of FLA for Strategic Policy Making: What Does the Literature Say?

Over the past 20 years, foresight practices have evolved in parallel with a shift in policy making towards a more open model. As Havas et al. (2010) explain in more detail, policy making is evolving into a more strategic decision making model. It increasingly emphasises longer-term perspectives, recognises the complexity of innovation processes, stresses networking, interaction and the participation of stakeholders, focuses on policy learning, and builds on distributed intelligence. Strategic foresight practices reflect these evolving principles of policy making. Strategic foresight supports a more transparent and informed decision making process, improves political responsiveness and facilitates policy development and implementation. It does so through a systematic approach characterised by involving a wide range of stakeholders, collecting future intelligence built on complementary knowledge and expertise, discussing alternative policy options while adopting a long-term perspective aimed at generating shared long-term visions and seeking to mobilise joint actions (see for example Havas et al., 2010; Habegger, 2010; Gavigan, 2001). Hence, strategic foresight includes both content- and process-related perspectives.

Basically, strategic foresight provides three basic functions to policy making (see for ex-

ample Havas et al., 2010; Da Costa et al, 2008; Eriksson and Weber, 2008): policy informing, policy advisory and policy facilitating.

- a) *Policy informing* refers to generating and supplying codified information and anticipatory knowledge or 'intelligence' regarding the dynamics of change, future challenges, risks and opportunities, strengths and weaknesses, and new ideas and transmitting them to policy makers as inputs into policy conceptualisation and design. Including a high variety of stakeholders and facilitating processes for collaborative and creative thinking, learning and interpretation are essential elements of this function. Embedding the participation of stakeholders and society in general supports governance by increasing the transparency and legitimacy of the policy making process. Informing policy is often an important motivation for policy makers to initiate foresight activities. Its outcomes are traditionally included in reports with more direct policy recommendations, such as priority lists and action plans, and more indirect hints for policy makers, such as scenarios, roadmaps, overviews of critical technologies and visions of desirable futures.
- b) *Policy advisory*, also called strategic policy counselling, concerns interpreting the anticipatory knowledge gener-

ated in the foresight activity against the background of the strategies of policy making entities and translating this anticipatory intelligence into new policy concepts. This more downstream intervention needs to be organised jointly with the policy makers in charge of the policy fields concerned.

- c) *Policy facilitating* relates to the function of foresight as ‘transition management’. The foresight exercise facilitates collective learning processes through the provision of learning interfaces and by creating linkages, interfaces, knowledge flows and networks between a wide variety of stakeholders. These collective learning processes can support developing a shared understanding of the current situation, the important issues at stake, the future challenges, the changing context and even desirable future visions. In this way, foresight facilitates policy implementation due to a better responsiveness of the actors to policy dynamics; they will make better-informed changes and will be ready to better accept and encourage changes. This function addresses the increasing complexity of the policy, strategy development and governance systems.<sup>1</sup>

While foresight exercises are often initiated for reasons of content, such as raising awareness, gaining a better understanding, setting the agenda, designing new policies, and testing and evaluating policies, the added value of strategic foresight to policy making is often conceived by policy makers to be process-related, such as gaining support for policies and ideas, developing a common ground of understanding, tearing down mental barriers and stimulating multidisciplinary and interdepartmental dialogues (Rijkens-Klomp, 2012). Combining the three main functions of strategic foresight with a time horizon, we can identify potential types of impact of strategic foresight on policy making. Havas et al. (2010: 95) de-

veloped the following classification framework for these potential impacts:

| Function  | Time horizon | Impact  |
|-----------|--------------|---|
| Informing | Immediate    | <ul style="list-style-type: none"> <li>• Increased recognition of a topic area</li> <li>• Individual learning: awareness of science, technology and innovation options among players, fostering of debate</li> <li>• Context and views of other stakeholders become clearer</li> <li>• Foresight skills are developed in a wider circle</li> <li>• New network options through dialogues in new combinations of experts and stakeholders, shared understanding (knowledge network)</li> </ul> |
|           | Intermediate | <ul style="list-style-type: none"> <li>• Establishment and continuation of common understanding</li> </ul>  |
|           | Ultimate     | <ul style="list-style-type: none"> <li>• Integration of capable new actors and their views and inputs into the community involved in shaping an area of concern</li> </ul>  |

<sup>1</sup> Another function that foresight might have for policy making is *symbolic*. Foresight is then used to provide justification for a policy that has already been decided. This function basically hinders the functions of policy informing and policy advisory, but it is important to take this perspective into account when designing a foresight exercise.

|                     |              |   |
|---------------------|--------------|---|
| <b>Advisory</b>     | Immediate    | <ul style="list-style-type: none"> <li>• Making hidden agendas and objectives explicit</li> <li>• Taking effective action</li> </ul>  |
|                     | Intermediate | <ul style="list-style-type: none"> <li>• Devising recommendations and identifying options for action</li> <li>• Activating and supporting fast policy-learning and policy-unlearning processes</li> <li>• Identifying hidden obstacles to the introduction of more informed, transparent and open participatory processes of governance</li> </ul>    |
|                     | Ultimate     | <ul style="list-style-type: none"> <li>• Influence on (research/ policy) agendas of actors, both public and private (as reflected, for instance, in strategies and policy programmes)</li> <li>• Formulation and implementation of new policies</li> <li>• Incorporation of forward looking elements in organisations' internal procedures</li> </ul> |
| <b>Facilitating</b> | Immediate    | <ul style="list-style-type: none"> <li>• Initiation of collective learning processes</li> <li>• Articulation of common visions of the future, establishment of longer-term perspectives</li> <li>• Awareness of systemic character of change process</li> </ul>   |
|                     | Intermediate | <ul style="list-style-type: none"> <li>• Formation of action networks</li> <li>• Creation of follow-up activities</li> <li>• Development of new projects</li> </ul>   |
|                     | Ultimate     | <ul style="list-style-type: none"> <li>• Adoption of foresight results in the research and teaching agenda of organisations as well as in various disciplinary matters</li> <li>• Increase in the coherence of policies</li> <li>• Cultural changes towards longer-term and systemic thinking</li> </ul>  |

Although these types of impacts can potentially be realised, it is not evident at all that the insights from strategic foresight are integrated in the policy making process. Van der Steen and

Van Twist (2012) even claim that, although plenty of foresight studies are being organised and more and probably better knowledge about the future is available, this anticipatory intelligence is hardly used in policy making. "Or it is used primarily to support choices made for other reasons and/or based on other knowledge" (ibid.: page?). There is a shared understanding that there is a serious bottleneck in the connection between the world of foresight and the world of policy making. Several scholars have analysed and discussed in more detail conditions that support or hinder the successful integration of foresight results into the policy making process (see for example Hava et al., 2010; DaCosta et al., 2008, Rijkens-Klomp, 2012; Van der Steen and Van Twist, 2012). There is a shared notion that foresight outcomes can only be taken on board by policy makers if they fit the policy making process in terms of timing, cultural compatibility and usability. Moreover, there is much agreement that this bottleneck is not on the account of policy makers. They do not choose to neglect future-oriented intelligence, but they find it very difficult to apply it to their daily practice of policy making. The relation between foresight and public policy is a disconnected relation and needs to be made and put in place (Van der Steen and Van Twist, 2012). This connection cannot be accomplished by 'forcing' results through the bottleneck by pushing more anticipatory knowledge and producing oversimplified and schematic information and messages that undermine their significance for well-grounded policy making (DaCosta et al., 2008). Hence, there is a need to bridge the gap between both worlds, to develop foresight as a special interface, as a connective foresight or foresight 'that fits' the different political and organisational cues (Van der Steen and Van Twist, 2012) and is adaptive to the needs in the different stages of the policy making process (Eriksson and Weber, 2008).

Knowing what to do to build the connection or special interface between foresight and policy making asks for a better understanding of the conditions or the dimensions that contribute to the actual effectiveness of foresight for policy. The following points are particularly relevant:

- **Engagement of new actors** beyond the established and known actors in the field is needed to overcome traditional sectoral or disciplinary barriers.

Bringing these new actors together and building networks of various players forces novel linkages and increases the recognition of the foresight topic (Havas et al, 2010).

- **Absorptive capacities** on the side of policy makers seem to be a precondition for using foresight results. It is the nature of foresight knowledge that it complicates things instead of providing simpler solutions. Foresight knowledge focuses on plausibility claims instead of predictability claims, adopts an action-oriented perspective, is subject to continuous orientation, pursues a multi-disciplinary approach, is often incomplete, and is more oriented towards exploration and defining issues than towards problem-solving (Von Schomberg et al, 2005). Nevertheless, policy makers need clarity, solutions and certainty, and there is only limited tolerance for uncertainty and ambiguity (Rijkens-Klomp, 2012; Van der Steen and Van Twist, 2012).
- Related to this is the extent to which strategic thinking and foresight insights can be **embedded and secured in the different strategic levels of an organisation**. Policy makers struggle with implementing strategic and future-oriented thinking, especially because of the often broad scope of foresight exercises and the broad issues resulting from these exercises. Although the ambition to work and address these issues in an integrated, multidisciplinary and cross-departmental way, the existing departmentalised government structures make it difficult to realise this goal in practice. It simply falls outside of anyone's decision making competence (Rijkens-Klomp, 2012; Havas et al., 2010). As Rijkens-Klomp (2012) analyses, this is very much related to **organisational culture**, which is strongly focused on the short-term and day-to-day business.
- Another relevant dimension concerns **leadership and confidence**. A successful integration of foresight results also depends on which of the key politicians/policy makers are involved. Close involvement of key politicians

with acknowledged leadership enhances the absorption of foresight results by the organisation. Nevertheless, too much political closeness can be perceived as partisan politics, endanger the intellectual independence of the foresight exercise and entail the risk of foresight results not being taken seriously (Havas et al., 2010). Hence, it is essential that foresight is based on the best available evidence and analytical rigor, otherwise its credibility and trustworthiness will be challenged, undermining the confidence in the foresight officials within the organisation. This will hinder the absorption and implementation of foresight results (Rijkens-Klomp, 2012). Another risk arising from close personal involvement of internal advocates of future analysis is that as soon as they leave the organisation the organisational support for foresight will diminish (Rijkens-Klomp, 2012).

- Finally, the **timing** and **time horizon** is a very important dimension as well. A time horizon reaching beyond the immediate concerns of policy decisions encourages thinking outside the box and creativity, but the immediate impact on decision making may be limited (Havas et al., 2010). To the extent possible, future analyses should take into account, or match, the rhythm of strategic policy processes (Rijkens-Klomp, 2012).

Considering these dimensions the question then appears how foresight exercises can take this into account and 'play the institutional rules' and 'connect' to the logic of policy makers and their organisational context. According to Van der Steen and Van Twist (2012), foresight practitioners can organise this connection by either designing the study so that it answers a specific demand or designing strategies for presentation and landing of the results. Da Costa et al. (2008) describe some *guidelines*: in order to design foresight studies that are in line with the policy making process, in terms of timing, cultural compatibility and usability, a *thorough analysis of the political context* is needed, combined with a *good understanding of the boundaries* to acting upon the future. Foresight exercises should focus on the as-

pects that can indeed be changed instead of addressing the whole socio-economic framework. The *involvement of policy makers in the design and in the process* of a foresight exercise promotes the mutual understanding of the needs, possibilities, limits and conditions of the foresight activity, and this will support embracing and internalising the results of the foresight. Nevertheless, an active involvement of policy makers could also hinder the foresight exercise because they can use it to defend their vested interests, or they may find it difficult to contribute on their own behalf since other participants might engage in lobbying, or the room for manoeuvre could be limited because of internal discussions. Another guideline proposed by Da Costa et al. (2008) concerns *adding a policy definition phase*, i.e. a phase where the results are translated into specific policy options and actions, preferably in a protected 'space' where policy makers can discuss taking into account the relationships between different departments and institutions. Nevertheless, it is not always possible or desirable to engage in policy implementation as it often takes more time for the organisation to absorb the results. In such cases, foresight results can be presented as a *reservoir of knowledge and options* that policy makers can use when the time is ripe (for example, because of the outcome of elections). With regard to presenting the foresight results, foresight practitioners should think of *smart communication strategies* (Da Costa et al., 2008), using up-to-date communication tools that allow for interactive coupling of qualitative and quantitative information, multimedia approaches, online open communities, creative networks, etc. whilst ensuring relevance, usability and good communication timing.

## 2 What is Done in EFP to Support Policy Making with FLA?

EFP did not initiate, organise or perform foresight exercises. The aim of EFP in the Seventh Framework Programme was to consolidate and reinforce the supportive framework developed in the Sixth European Framework to ensure systematic use and optimum benefit of foresight expertise and to identify and mobilise all relevant actors to enable EU-wide network and capacity building. EFP does not only pro-

vide a central access point to foresight knowledge but also addresses the need to interconnect information on other existing networks and to enhance the exchange of practices and experiences among practitioners and users. Special attention is paid to the identification and documentation of the impacts foresight has on decision making. Moreover, EFP not only collects evidence from exercises conducted elsewhere, it also aims at providing input to foresight processes conducted at the European or member states level, with the emphasis being put on exploiting the richness of the secondary foresight information collected and the breadth of methodological experiences.

In summary, the objectives of the European Foresight Network are to

- a) identify and map new foresight initiatives and the most important forward looking studies throughout the world;
- b) inform foresight and forward looking practitioners and policy makers on foresight initiatives, on impacts achieved, and on lessons learnt, using different established formats (mapping, policy briefs, access to reports, website, etc.);
- c) connect established foresight and forward looking networks and key organisations (at macro level) to learn more about effective foresight implementations;
- d) maintain, consolidate and reinforce the network of foresight and forward looking practitioners, users and policy makers in Europe and beyond (at micro level);
- e) facilitate the wider and deeper use of foresight by enhancing learning and mutual exchange on current and past exercises, by advancing and disseminating latest methodological experiences, and by integrating the EFMN database and the FOR-LEARN Online Foresight Guide into one single electronic platform;
- f) provide support to European and national level policy in addressing and preparing strategic action on major challenges with which Europe is faced.

## 2.1 The European and National Policy Workshops

The main contribution of the EFP to policy makers occurs through the foresight workshops and the policy lessons derived from them.

During the three years the EFP programme was running, a total of four<sup>2</sup> European-level workshops were organised by the EFP under the lead of EFP on specific issues of major interest to EU policy clients. In addition, several national workshops were conducted on issues similar to the ones at the centre of the respective European workshops. Through these activities, the EFP has transferred the knowledge available in the network to policy users. The lessons learnt from the workshops were synthesised in policy briefings to maximise the outreach of the insights gained.

Two types of workshops can be differentiated as workshops can be organised applying a horizontal or a more vertical approach:

- Crosscutting theme(s) as a type of workshop dealing with themes addressing different policy fields, economic sectors and scientific fields to identify new societal challenges and corresponding proactive responses. Crosscutting workshops are organised by inviting a balanced set of policy makers and FLA experts with different methodological expertise (both quantitative and qualitative approaches).
- Monothematic policy workshops represent a type of workshop with a focus on a specific policy field or sharply defined issues at the crossroads of two or more policy fields. Their objective is to identify specific challenges and proactive policy responses. Any of the (sub-) topics could also be combined to discuss crosscutting challenges.

The major goal of the EFP policy workshops was to translate foresight activities into support for policy making. In the workshops, specific topics relevant to policy makers were discussed as well as strategies how to tackle them. The workshops were organised to cross-fertilise ideas by ongoing forward looking ac-

tivities, to use the knowledge base and the community network for workshop preparation, and to offer a guideline for good practice.

The underlying objectives of the policy workshops were

- to provide support to European, national and regional level policy in preparing strategic responses to the major challenges Europe is facing to ensure that results of foresight and forward looking studies are better understood and used by policy-makers;
- to serve as an interface between EFP, on the one hand, and policy and decision makers in Europe, on the other, to inform about the EFP and its expert network and to create a better understanding on how to improve the platform to better address the information needs of potential clients;
- to serve as a testing environment for the development of targeted processes to exploit the full potential of the EFP for policy making.

In addition to the generic goals mentioned above, the EFP policy workshops additionally focused on achieving more specific (partly overlapping) goals, such as the following:

- Informative dissemination of relevant recent foresight studies among potentially interested audiences in general and important stakeholders in particular
- Exchange of views and insights between policy makers and participants from various disciplines, such as experts from different fields, but also, for instance, with business/SME representatives from different economic sectors and branches
- High level exploration of new emerging topics with a long-term focus (and their impact on, e.g., new legislation)
- Participatory involvement of policy makers in the execution of (a part of) a foresight exercise or trajectory, e.g. scenario building
- Provision of input for agenda setting by assessing relevant issues (and policy alternatives)
- Validation of (draft) results of a foresight exercise with relevant stakeholders and/or peer reviews, actively seeking feedback

---

<sup>2</sup> A fifth one will be organised in autumn 2012

- Preparation of decision making to provide choices between different (policy) alternatives and to support impact assessment
- “Crisis” and problem solving by assessing policy alternatives in regard to how to solve problem X

At the start of EFP, six different types of workshop approaches were prepared: (1) foresight learning workshop, (2) scenario workshop, (3) weak signals / emerging issues workshop, (4) backcasting (and strategy) workshop, (5) strategy assessment and policy making workshop and (6) feasibility assessment workshop. Not all workshop approaches have been used (e.g., the foresight learning and backcasting approach). The workshops brought together foresight practitioners and scholars, researchers active in the thematic area addressed by the workshop, industry representatives and policy makers.

The *European and National Workshops for Urban Europe*<sup>3</sup> contributed to the preparation of the Joint Programme Initiative – Urban Europe by providing input in the pre-foresight phase. The JPI Urban Europe plans foresight activities with a time horizon of 2050+ that aim at developing a long-term strategic research agenda. For the pre-foresight phase, foresights on urban issues and studies supporting forward looking activities were reviewed to support the formulation of foresight topics and provide an overview of challenges, trends and drivers addressed in recent foresight activities with a time horizon exceeding 30 years. The workshop focused on missing perspectives in the foresights screened to identify the main challenges ahead that need to be included in the JPI Urban Europe foresight. The workshops revealed that the perception of threats and drivers of change has evolved remarkably in recent years. This is crucial as the acceleration and magnitude of change processes have become a challenge in their own right that poses compelling policy questions. For instance, policy makers now have to deal with threats that cannot be addressed by traditional risk assessment methods, thus hampering the

capability to ensure and manage long-term investments.

*The European Workshop on Active and Healthy Aging and the National Workshop on Technology and Services in the Wake of Demographic Change*<sup>4</sup> intended to contribute to Europe's Innovation Union strategy by tackling the challenge of 'Active and Healthy Ageing' within the pilot European Innovation Partnership (pEIP). The pEIP was set up to promote the development of innovative products and services that will help older people stay healthy, active and independent for a longer time. The partnership shall also help keep Europe's social and healthcare systems effective and sustainable while encouraging competitive markets as a means of spurring innovation. The EFP workshop facilitated creative brainstorming with the goal of (a) generating ideas and options in science, technology and innovation to tackle the ageing challenge, (b) assessing the feasibility and desirability of such ideas and options, (c) identifying the factors enabling and hindering them, (d) preparing proposals for policy making in the short, medium and long term, and (e) spelling out the implications for future STI policies at EU and MS levels. The results of such brainstorming were to serve as inputs for the pEIP roadmap. The workshop made it clear that both economic, institutional and behavioural aspects need to be tackled to face the challenge of ageing. The workshops pointed out that demographic change questions the very structure of our society and calls for a careful re-design of the way we live our lives. As getting old healthy already starts at early age, societal institutions such as health insurance and the social security system need to be structured accordingly. Furthermore, the division of the life model into three distinct phases (education, work and retirement) has to be overcome since in Western Europe people are ageing at better health than 30 years ago. The three phases, in other words, need to be structurally interwoven, which would modify the nature of both health and education policy.

---

1. A full description of the workshop activities is available at: <http://www.foresight-platform.eu/3042/events/what-research-efforts-are-needed-to-make-european-cities-fit-for-the-grand-challenges-of-the-future/>

---

2. More information on the workshop is available at <http://www.foresight-platform.eu/1177/events/efp-european-policy-workshop-on-%e2%80%98active-and-healthy-ageing-%e2%80%93-a-long-term-view%e2%80%99/>.

The *European Workshop on Surprising and Emerging Futures*<sup>5</sup> focused especially on those issues and surprises that could shape the European Research Area (ERA). Specifically, the workshop objectives were (a) to discuss and prioritise the most important emerging issues and surprises for Europe, (b) to identify policy requirements and research questions to address these emerging issues and surprises, and (c) to discuss in more detail how the European and national approaches for early warning could operate and collaborate and how national and European governments can manage emerging issues. The workshop pointed out that given the nature of surprises and the high uncertainty of wild cards and weak signals ( i.e. the ‘unknown unknowns’), policy can never be fully prepared for and fine-tuned towards surprising developments. As a consequence, it is critical that policy makers focus on building capacity and capabilities, strengthening the resilience of the system, finding ways to integrate the notion of the *unknown unknowns* into policy making.

The fourth *European Workshop Smart Mobility 2050*, was organised to discuss in more detail a selection of future visions on smart mobility and transportation in a long-term perspective. The focus of this discussion was on the consequences of these visions on the lives of individuals and on European society in 2050. The overall aim was to translate these far-horizon visions into more detailed implications and requirements for policy making in the field of mobility and transport. The EFP workshop explicitly focused on behavioural aspects of future mobility since past foresight exercises failed to thoroughly discuss the potential changes in behaviour and the transformation of social arrangements related to mobility and transport that come with, for example, the ageing of society or diversification of individual behaviour. The workshop confirmed that behavioural and social challenges will be the main levers for future mobility and that these aspects demand much more policy attention. The workshop produced several recommendations for policy makers to take into account.

For each workshop, a background paper was prepared identifying the main issues analysed and assessed in previous foresight exercises and including the results of the previous workshop discussions. The paper was distributed among national and European policy makers, foresight practitioners, industry representatives and researchers active in the specific theme of the workshop.

Across the workshops, participants agreed that the EFP events offer not only a common knowledge base to all stakeholders but also a multitude of relevant perspectives with new insights, which provide the stimulus for new conceptual and practical connections of ideas while allowing to identify critical policy gaps and develop new options for the governance of technology. The crucial output of the workshops is, however, the networks (of people and ideas) that are developed in the process.

## 2.2 Online Foresight Guide, Policy Briefs and Mapping Exercise

The knowledge base underpinning the workshops is constituted by the *online foresight guide*, the *repository of briefs* and the *mapping exercise* available on the EFP website.

The **Online Foresight Guide** provides clear and easy-to-access information, with illustrative real case examples gathered either in the predecessor projects EFMN and FOR-LEARN or currently within EFP or from other sources. The guide has a tripartite structure, as it caters for three different types of audiences: policy makers, practitioners and newcomers. For policy makers, in particular, it describes the six key functions of foresight and FLA:

- *Informing policy* by supplying anticipatory “intelligence” on the dynamics of change, future challenges and options as an input to policy conceptualisation and design.
- *Embedding participation* in policy making by facilitating the participation of different stakeholders in the policy making process, thereby improving its transparency and legitimacy.
- *Supporting policy definition* by jointly translating outcomes from the collective process into specific options for policy definition and implementation.

---

3. A full description of the workshop activities and exercises are available at <http://www.foresight-platform.eu/7746/eventreport/efp-european-policy-workshop-policy-options-for-surprising-and-emerging-futures-in-europe/>

- *Facilitating policy implementation* by building and supporting networks of stakeholders with a common awareness of the current situation, of the challenges to come and of desired visions of the future.
- *Reconfiguring the policy system* in a way that makes it more apt to address long-term challenges.
- *Symbolically* indicating to the public that policy is based on evidence and developed through transparent processes.

The EFP supports action-oriented and participative ways of addressing strategic policy challenges also by providing several case studies published in the form of *briefs*. The preparation of foresight briefs roughly follows the practice established in the predecessor programme EFMN. The briefs are produced in collaboration with individuals, entities and networks that operate in the foresight and FLA area and are made publicly available on the EFP website (<http://www.foresight-platform.eu/briefs-resources/>).

Finally, the EFP continues the *mapping efforts* started in the FP6 project EFMN (European Foresight Monitoring Network), extending it in two ways: firstly, it takes into account more types of forward looking activities, including forecasting studies and technology and impact assessment; secondly, it maps many more dimensions than its predecessor: whilst EFMN focused on foresight practices and players, the EFP also offers information about the outcomes of FLA.

### 3 Experiences with the EFP Approach

The EFP experience shows that to ensure that FLA have an actual effect, two simultaneous processes need to be in place. On the one hand, foresight and FLA processes and outcomes need to be designed to fit the existing policy structures; on the other, one needs to ensure that the policy body to which the FLA is addressed has the absorptive capacity to integrate FLA knowledge and outputs into the decision making process. However, whilst FLA need to fit and accommodate pre-existing policy structures, it is also true that they are only relevant if they have some innovative potential

and if they dare to call into question precisely those structures. In other words, there is a tension inherent in FLA, and practitioners have a fine balance to strike.

This means that FLA practitioners must have a clear understanding of the target policy beneficiary and must plan and implement their exercise accordingly. For instance, it must never be assumed that “policy makers” are an homogeneous body, as they vary in their functions and responsibilities. Practitioners need to be clearly aware of the fact that *policy makers* are not necessarily *decision makers* and that FLA provide input for the *policy making process* and not for the *policy makers themselves*.

As well as a deep knowledge of the policy system, it is critical that FLA develop a clear communication strategy, which involves always establishing the objectives with the client at the very beginning, finding a common language and maintaining an appealing and clear website. Furthermore, experience with transferring foresight results into policy making shows that the best way to achieve impact is through a few clear and converging messages.

## Sources and References

Da Costa, O., Philine Warnke, Cristiano Cagnin & Fabiana Scapolo (2008) The impact of foresight on policy-making: insights from the FORLEARN mutual learning process, *Technology Analysis & Strategic Management*, 20:3, 369-387

Eriksson, E.A. and K.M. Weber (2008) Adaptive Foresight: Navigating the complex landscape of policy strategies, *Technological Forecasting & Social Change*, 75, 462–482  
FORLEARN Guide (there seems to be information missing here)

Gavigan, J P, F Scapolo, M Keenan, I Miles, F Farhi, D Lecoq, M Capriati, and T di Bartolomeo (2001) FOREN Guide – Foresight for Regional Development Network— A Practical Guide to Regional Foresight. Foresight for Regional Development Network.

Habegger, B. (2010) Strategic foresight in public policy: Reviewing the experiences of the UK, Singapore, and the Netherlands, *Futures* 42, 49–58

Havas, A., Doris Schartinger and Matthias Weber (2010) The impact of foresight on innovation policy-making: recent experiences and future perspectives, *Research Evaluation*, 19(2), pages 91–104

Rijkens – Klomp, N. (2012) Barriers and levers to future exploration in practice experiences in policy-making, *Futures*, <doi>doi:10.1016/j.futures.2012.03.005</doi>

Schomberg, R. von, Ângela Guimarães Pereira and Silvio Funtowicz (2005) *Deliberating Foresight Knowledge for Policy and Foresight Knowledge Assessment Luxembourg: Office for Official Publications of the European Communities*, European Commission, EUR 21957

Steen, M. van der, M.J.W. van Twist (2012) Beyond Use: Evaluating Foresight that Fits, *Futures*  
doi:10.1016/j.futures.2012.03.009

# Reach and Impact of Forward Looking Activities (FLA) Mapping: Towards a Fully-Fledged Futures Mapping Environment

RAFAEL POPPER\*, EFFIE AMANATIDOU\*, THOMAS A. TEICHLER\*\*

\*Manchester Institute of Innovation Research (MloIR), Manchester, UK

\*\*Technopolis Group, Frankfurt, Germany

## Abstract

The mapping of forward looking activities (FLA) has evolved from the first mapping approaches introduced in the EUROFORE project to a much improved and sophisticated conceptual framework that was developed in one of the latest projects dedicated to this topic, the European Foresight Platform (EFP). This paper presents the developments in FLA mapping as these have been applied in the EFP project, including a presentation of the empirical outcomes from mapping 21 FLA cases under the EFP. Although the electronic EFP Mapping Environment has provided interesting first results, further and more sophisticated output can be produced in the future. The paper discusses the opportunities and challenges in mapping FLA in detail together with the key lessons from current and previous mapping experiences.

## 1 Introduction

For over a decade, the European Commission (EC) has systematically supported the mapping of FLA in an effort to monitor and analyse these activities in Europe and across the world. The first in a series of analyses was the EUROFORE Project<sup>1</sup>, which ran in 2002–03 and examined some 100 'foresight studies'. This pilot was instrumental in the elaboration of basic templates and indicators to better understand foresight practices.

Based on the lessons gained in EUROFORE, from 2004 to 2008 the EC-funded European Foresight Monitoring Network (EFMN)<sup>2</sup> looked at over 2,000 foresight studies. Against this background, the European Foresight Platform (EFP) a) broadened the scope to map the main

practices, players and outcomes of four types of forward looking activities (FLA): foresight, forecasting, horizon scanning and impact/technology assessment studies<sup>3</sup>; and b) provided a comprehensive Web-based tool that forms the basis of a potentially unlimited future mapping effort.

This paper describes the conceptual and methodological framework used in mapping FLA<sup>4</sup>. The main objective of this publication is to share with interested parties (i.e., sponsors, practitioners and users of FLA) the methodology, indicators and procedures used in FLA mapping.

At the same time, it presents the results from the first FLA cases mapped under the EFP and also draws conclusions about the opportunities, challenges and key lessons from this and previous mapping experiences. More particularly, the paper seeks to

<sup>1</sup> The EUROFORE Project was led by MloIR at the University of Manchester (UK) in collaboration with IPTS (Spain), FhG-ISI (Germany), VDI (Germany), Futuribles (France), VTT (Finland), Fondazione Rosselli (Italy), AIT (Austria), VITO (Belgium), TNO (Netherlands) and Tubitak (Turkey). MloIR and IPTS were responsible for the mapping activities.

<sup>2</sup> The EFMN Project was led by TNO (Netherlands) in collaboration with VDI (Germany), AIT (Austria) and MloIR (formerly PREST, UK). MloIR and TNO were responsible for the mapping activities. For more information see the EFMN Mapping Report ([http://ec.europa.eu/research/social-sciences/pdf/efmn-mapping-foresight\\_en.pdf](http://ec.europa.eu/research/social-sciences/pdf/efmn-mapping-foresight_en.pdf))

<sup>3</sup> For a definition of these activities, see Popper and Teichler, 2011.

<sup>4</sup> The mapping work package in EFP is led by the Manchester Institute of Innovation Research (<https://research.mbs.ac.uk/innovation/>) at the University of Manchester, supported by the technology development activities led by Futures Diamond in Czech Republic ([www.futuresdiamond.com](http://www.futuresdiamond.com)).

- (1) contribute to the methodological debate about mapping forward looking activities by defining and applying new indicators, concepts, mapping approaches and tools;
- (2) introduce the logic and structure of a Web-based tool for mapping FLA;
- (3) present the results of the first EFP mapping efforts; and
- (4) discuss the opportunities and challenges as well as the significant potential of mapping FLA.

## 2 FLA Mapping

### 2.1 The SMART process

The conceptual basis for mapping forward looking activities is represented in the SMART Futures Jigsaw (Popper, 2011).<sup>5</sup> It contains three main areas (practices, players and outcomes) that include 36 elements related to the different phases of forward looking activities (FLA): **s**caping, **m**obilising, **a**nticipating, **r**ecommending and **t**ransforming.

### 2.2 Mapping FLA practices

The mapping of FLA practices is associated with the 'scoping futures' phase and involves seven elements:

- aims and objectives,
- rationales and background,
- context and domain coverage,
- methodology and work plan,
- territorial scope,
- time horizon(s),
- funding and duration.

The aims and objectives are amongst the most important elements of FLA practices. They determine the overall scope of the activity, the type of players and the required outcomes. The rationales offer a set of justifications for the project, which might be connected to certain background conditions that reflect the wider environment of the FLA. The context and domain coverage set the boundaries of FLA. They also offer a clear picture of the potential areas and sectors in which outcomes are expected to be influential and applicable.

The Futures Diamond (Popper, 2008) is used as a practical framework to assess the use and contributions of 44 methods. Mapping the work plan involves the activities or work packages (WP), WP leaders, resources, deliverables and milestones. The territorial scope ranges from subnational projects (e.g., federal region, city region etc.), national exercises, to supranational studies (cross-national issues or issues that refer to whole regions like Europe, Asia, etc.). The time horizon indicates how long the FLA wishes to look into the future, whereas the funding and duration reflect the resources that are available in terms of time and money.

### 2.3 Mapping FLA players

The mapping of FLA players is related to the 'mobilising futures' phase and concerns the mapping of the following elements:

- sponsors and champions
- research and support teams
- methodology and domain experts
- cooperation and networking
- scale of participation
- target groups
- public relations (PR) and marketing

Sponsors are individuals or organisations that provide financial support to FLA, whereas the champions are influential individuals who are capable of mobilising key stakeholders, maintaining momentum and building political support and commitment for the project. The mapping of research and support teams reflects the fact that FLA are often carried out as a project by a team or consortium that exists only temporarily and is made up of different members (i.e., organisations and individuals). Methodology and domain experts cover the management and scientific requirements of the project and complement the team. The mapping of collaboration and networking highlights the importance of taking other FLA work into account when conducting a study. FLA cooperation patterns are identified by territorial scope, country and organisation. In addition, three other aspects of cooperation are identified: joint knowledge

<sup>5</sup> See Figure 1 on p. 4. Further information on the SMART futures framework and IT tools supporting FLA mapping can be found at <http://rafaelpopper.wordpress.com/futures/>

production, information and infrastructure sharing and networking.

Target groups are types of stakeholders that FLA aim to inform or shape. The mapping of the participation scale reflects the importance of the active involvement of the various stakeholders from initiation through all the stages of the activities. Public relations can be one of the most effective ways to create awareness about FLA, mobilise key stakeholders and communicate the benefits of a study. Marketing refers to stakeholder engagement activities that are undertaken before, during and after the lifetime of a project.

## 2.4 Mapping FLA outcomes

The monitoring, analysis and positioning of outcomes plays a central role in FLA mapping and is associated with the ART phases of futures research (i.e., anticipating, recommending and transforming futures).

The **anticipating futures** phase relates to what we often call the 'formal outputs' of FLA, which include:

- visions, scenarios and forecasts: 'forward looking images' that describe a particular state at a certain point in time in the future
- critical and key technologies: technologies with significant potential in terms of capacity and impact and/or technologies that are important drivers of a trend, megatrend or a wild card in a particular scenario
- TEEPSE<sup>6</sup> drivers, trends and megatrends: drivers are forces of change; trends are measureable developments that indicate clear and relatively steady changes; megatrends are developments that result from the interconnection of several trends and therefore provide 'less uncertain' hints about the future
- SWOT and grand challenges: grand challenges 'are of sufficient scale and scope to capture the public and political imagination, create widespread interest among scientific and business

communities and NGOs and inspire younger people'<sup>7</sup>

- wild cards and weak signals (WIWE): wild cards are surprising and unexpected events with low 'perceived probability' of occurrence but with very high impact; weak signals are past or current developments/issues with ambiguous interpretations of their origin, meaning and/or implications
- pathways and roadmaps
- models and frameworks

The **recommending futures** phase refers to the various sorts of recommendations that FLA can produce, including:

- policies and actions
- initiatives and actors
- appropriation and dissemination of findings
- investments and training
- alliances and synergies
- (FHS) research

Although FLA might be oriented towards the long-term future, they propose recommendations for action for the present or near term in light of what could or should happen later. 'Policy options' refers to any proposed actions to be undertaken by an organisation or person. Recommendations might also refer to future investment propositions for either tangible or intangible assets. Suggestions for alliances and synergies between actors might also be made following recommendations to produce new or share existing knowledge. Last but not least, except for proposals of action on the subject of a FLA, an outcome can also refer to additional research activities.

Finally, the **transforming futures** phase involves six elements:

- capacities and skills
- strategies and priorities
- paradigms and current visions
- socio-economic and STI systems
- behaviour, attitudes and lifestyles
- knowledge-based products and services

<sup>6</sup> Technology, economy, ecology, politics, society and ethics

<sup>7</sup> ERA EXPERT GROUP (2008) Challenging Europe's Research: ERA Rationales for the European Research Area. Brussels.

FLA can have a significant impact on the resources and management capacities of FLA sponsors, practitioners and users by identifying new priorities (i.e., a list of important topics, issues, areas, technologies, etc.) and/or confirming the relevance of existing priorities. As a result, new strategies are often defined to support the implementation of recommendations associated with these priorities.

The anticipation and recommendation of alternative futures together with the interdisciplinary nature of FLA can lead to the revision of underlying assumptions, concepts and practices. The ultimate purpose of FLA is to transform socio-economic as well as science, technology and innovation (STI)

systems. These transformations are often linked to the rationales of FLA, such as the need to orient policy and strategy development or the need to engage key stakeholders and decision shapers among others. By generating new scenarios, visions and the strategies to achieve them, FLA both directly and indirectly shape our behaviours, attitudes and lifestyles. The nature of research and 'formal outputs' of FLA are key elements that contribute to the transformation of current and future knowledge bases. Some results of FLA have an impact on knowledge-based products (e.g., books, research papers, white papers, case studies, databases, reports, etc.) as well as knowledge-based services (e.g., research consultancy, risk management, software and technology development, procurement advice, etc.)

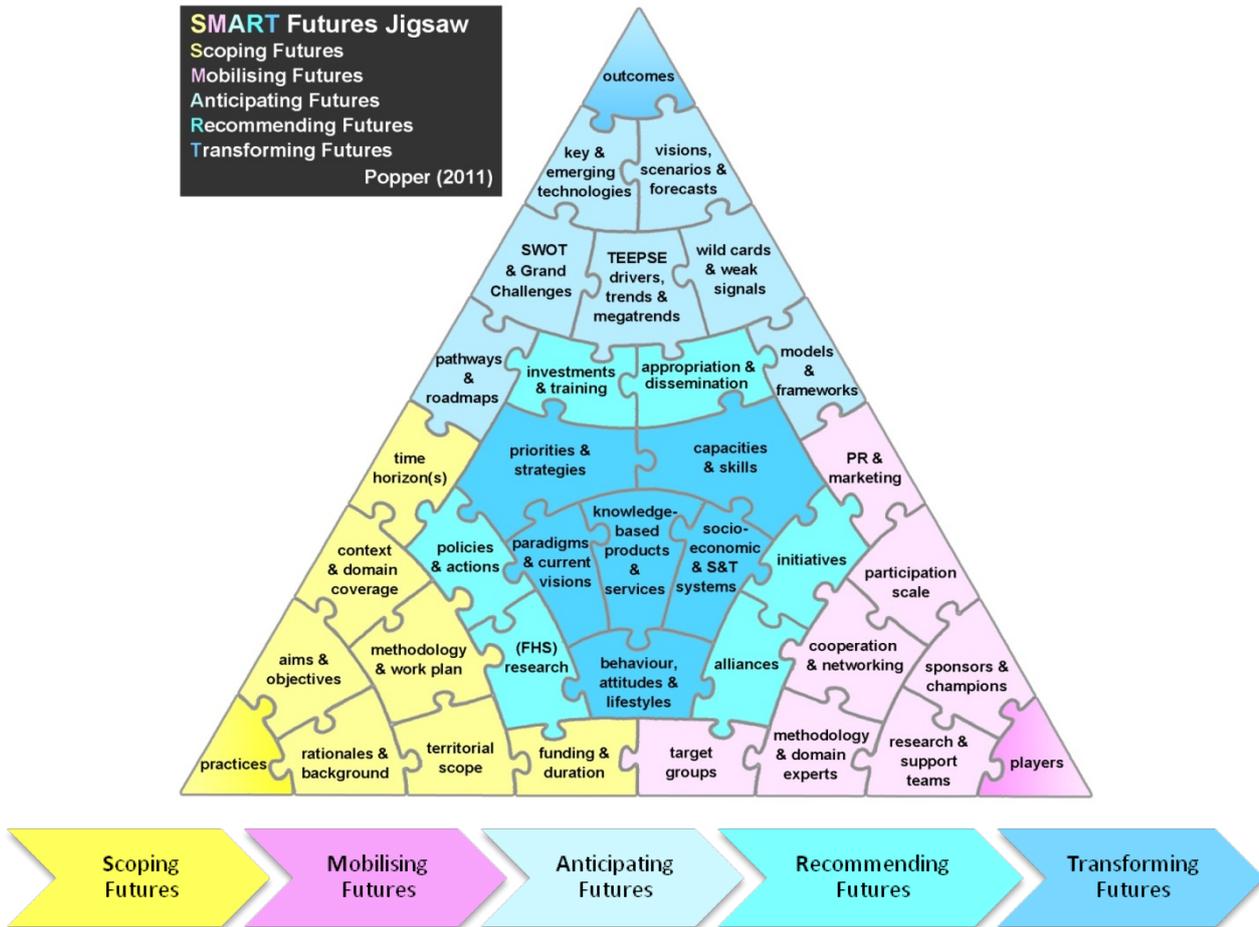


Figure 1. The SMART Futures Jigsaw

### 3 First FLA Mapping Results<sup>8</sup>

During the first stage of the EFP mapping task, twenty-one FLA cases were mapped. The FLA were selected to have a) a thematic focus (three areas are covered: SSH<sup>9</sup>, health and security) and b) a broad geographical reference (apart from EU-originating FLA, the sample includes cases from India, two from Latin America and one on Japan).

The analysis identified similarities and differences between the various cases and tried to cluster them on the basis of indications of certain commonalities.

#### 3.1 Results on practices

The first EFP Mapping Report (Popper and Teichler, 2011) noted that FLA were becoming 'multi-scope' or 'multipurpose' and that this was not merely an observation about European FLA but also concerned those of other regions around the world (especially in Latin America). The preliminary findings based on the mapping of the first 21 FLA reinforce this conclusion (see Amanatidou et al., 2012). The various cases cover the whole spectrum of reported aims and rationales, although most indicate that their primary aims are "to transform strategies and priorities" as well as "paradigms and current visions".

The FLA under the SSH theme present specific features in terms of aims and rationales that can be grouped into three main categories:

- FLA with a major methodological orientation. These FLA aim to develop new approaches and methodologies either for including society in the deliberations and decision making when planning for the

future (as in TECHNOLIFE and CIVISTI) or for informing policy makers (e.g., by applying new approaches like horizon scanning, as in SESTI).

- FLA with a more grand-challenge-driven approach that cover major issues facing modern societies, such as economic crises, energy shortages, environmental issues, health and governance (e.g., MEDPRO, AUGUR and FARHORIZON). These FLA primarily aim to inform future policies in several domains and generally at the EU level.
- FLA that focus on national specificities — first by exploring the main drivers, strengths and weaknesses and then attempting to guide developments in all policy fields by calling on every stakeholder to unite under a shared vision (as in Vision 2020 for India) or simply for the sake of research and innovation policy (such as in FinnSight 2015).

On the other hand, health- or security-related FLA can be considered to belong to a theme-specific group of FLA. They present similar aims and rationales to those of the SSH projects.

This might be partly attributed to the fact that there is only a small number of FLA under each theme group. On the other hand, it might illustrate certain specificities of the themes addressed. Although they confirm the overall results in terms of the main FLA aims, the secondary and tertiary aims indicate a focus on capacities and skills or more end-product-oriented aims in the case of health, or an ambition towards common activities and shared ways of doing things in the case of security.

Given the multi-scope approach common to FLA, multiple rationales were recorded that range from "analysis of the future potential of STI", to "promoting network building", to "priority setting for STI", "supporting methodology and capacity building" or "generating shared visions". The nationally-focused FLA present a more holistic approach; several rationales are relevant in their cases. On the other hand, FLA that could be considered to have a more global challenge-driven approach also indicate a more

<sup>8</sup> This section draws heavily on the Second EFP Annual Mapping Report (Amanatidou et al, 2012). At the time of writing, the mapping of additional cases is ongoing and further analyses will be published in the Third Annual Mapping Report and an academic publication by the authors (forthcoming).

<sup>9</sup> The SSH theme is broadly defined in the EC Seventh Framework Programme as addressing various aspects of social research such as global knowledge, growth, employment and competitiveness; social cohesion, and social, cultural and educational challenges; major trends in society and their implications; sustainability, environmental challenges, demographic change, migration and integration, ageing, quality of life, and global interdependence; and poverty, crime and conflict. In this regard, FLA in this group refer to broader issues of European societies and socio-economic development

'exploratory' orientation that is reflected in their rationales for identifying changes, impact or emerging issues. This is understandable within the framework of trying to define what global challenges are and trying to identify their features and impacts. Other than those, there are the FLA with a specific methodological purpose that highlight additional rationales that reflect their special targets such as to engage society or link science and policy.

Such a differentiation does not appear within the health- or security-related FLA. Whereas "orienting policy and strategy development" is the most common rationale, the two other FLA groups reflect the specificities of the theme they are addressing. For instance, health-related FLA highlight the importance of recognising the drivers and impact of changes and forecasting events in the area of health. The rationales relevant to the security-related FLA indicate the importance of engaging stakeholders in this newly formed EU policy area under shared visions or scenarios for European security.

The SSH-related FLA cover multiple domains at the same time and have different territorial scopes. In this regard, they present different degrees of relevance to the EU. Such a differentiation does not appear in the other two FLA groups. However, they are indicative of the multidisciplinary of the area of health and the importance of the ICT sector as both a driver of development and a source of new challenges in the area of security.

### 3.2 Results on players

All mapped FLA projects are primarily targeted at the policy world either at the national or European level, with the research and business communities close behind.

Across the various themes, the SSH-related FLA include both groups of stakeholders' engagement. On the one hand, the majority refer to FLA that deploy methods that allow for high engagement of participants (e.g., expert or citizen panels, interviews, surveys, polling/voting or scenario workshops). On the other hand, there are the FLA that are carried out mainly by academics and theme experts with the policy makers as their primary audience. In these cases, the methods that are

employed draw more on expertise and experience (e.g., literature reviews, case studies, essay/scenario writing, Delphi surveys and modelling) and less on interactions.

The health- or security-related FLA seem to follow the latter pattern. The methods applied draw mostly on expertise and experience, and engage mainly academics and theme experts with the policy community as the main audience. The role of NGOs in health-related FLA is rather marginally increased compared to cases in the other fields, whereas the absence of the corporate sector in the security FLA is remarkable. Further mapping and analysis will help clarify these patterns.

As for public relations and marketing, the tendency seems to be the use of a wide range of means across the different FLA groups irrespective of their specific focus, scope or type. The 'word of mouth' and 'off-line' means<sup>10</sup> seem to be most commonly used. Blogs and online forums are also used, especially if the FLA tries to reach the wider society. With regard to the offline means, the production of policy briefs seems to be rising alongside newsletters and flyers.

### 3.3 Results on outcomes

The outcomes of FLA are strongly dependent on the aims, rationales and specific focus of each FLA. As a result, a comparison of the outcomes of the different FLA makes better sense if it refers to the type the outcomes rather than the content. Another way to analyse outcomes is to examine their relation to the specific rationales and scope of the FLA.

#### 3.3.1 Anticipating futures

SSH FLA are illustrative of all the different types of 'anticipation' outcomes. Drivers and trends can be either generic or region- or theme-specific. Scenarios and visions can be either holistic at the macro-level or theme-specific. In terms of generating specific output, frameworks and models mainly come from

<sup>10</sup> 'Word of mouth' means presenting the project at events/conferences organised by others; attending events/conferences organised by others; organising events/conferences; personal briefings; lobbying. Off-line means newsletters; flyers/leaflets; policy/research briefs; media articles/interviews; television/radio/press promotion.

those FLA with a methodological orientation, but they do also characterise some of the grand-challenge-oriented FLA. The nationally focused FLA produce a whole range of output (from drivers and trends, to SWOT, scenarios and visions to key technologies and policy roadmaps).

The nationally focused FLA could be compared to the theme-specific FLA (in health and security) in terms of the variety of output but also their specificity of content. Trends and drivers, scenarios and visions were case-specific. It is also characteristic that models and frameworks are a common output in health- as well as security-related FLA.

Additionally, given that a specific issue is studied in detail instead of a number of issues studied in a 'horizontal' manner as in the SSH cases, the output covers the whole range of output types, thus leading to a significant level of specificity in recommendations.

#### Example 1: Outputs of health-related FLA

**DIID** produced a vision of future detection, identification and monitoring systems.

**MENTAL CAPITAL** produced three scenarios: 'rock, scissors and paper' where mental capital is looked at from a 'whole life' perspective; 'metaverse 2021' where mental capital is looked at from the 'youth' perspective; and 'gerontopolis' where mental capital is looked at from the 'perspective of the elderly'.

**OBESITY** produced four scenarios based on how it is tackled: 'individual responsibility first, anticipate and prepare for challenges', 'social responsibility first, anticipate and prepare for challenges', 'social responsibility first, react to and mitigate challenges' and 'individual responsibility first, react to and mitigate challenges'.

In the case of security-related FLA, the 'anticipation' of outcomes mainly concerns the anticipation of future states of affairs as expressed in scenarios, for example, rather than the identification of future key technologies, drivers, challenges etc. The result is hardly surprising given the aforementioned objectives and rationales that emphasise the transformation of existing paradigms and the engagement of stakeholders and decision shapers.

However, they stand in contrast to more traditional security FLA that originate in the defence sector (e.g., ministries of defence, defence think tanks), which might focus on specific technologies and identify key drivers for the development of a particular country.

It is also worth noting that almost all projects contain a sophisticated model that refers to conceptual or causal relationships, thus making an important conceptual contribution to the scholarly debate in the security field, albeit with a concrete link to practical problems. Hence, the texts are a particularly fruitful source of information for further refinement and debate.

**Example 2: Output of ‘Technology Vision 2020 for INDIA’ (an SSH-related FLA)**

This national FLA has identified several trends. On the basis of these trends and the strengths of the country, it was able to develop a wide range of visions, key technologies and policy roadmaps. Examples of each type of output are presented below.

Trends: A growing population, a growing economy that is leading to more consumption and changes in lifestyle and eating habits.

India vision 2020: “Transforming the nation into a developed country, five areas in combination have been identified based on India's core competence, natural resources and talented manpower for integrated action to double the GDP growth rate and realize the Vision of Developed India. These are: Agriculture and food processing with a target of doubling the present production of food and agricultural products by 2020; Infrastructure with reliable and quality electric power including solar farming for all parts of the country; Education and Healthcare: to provide social security and eradication of illiteracy and health for all; Information and Communication Technology:

this is one of the core competencies and wealth generator for India; and Critical technologies and strategic industries witnessing the growth in nuclear technology, space technology and defence technology”.

Source: Technology Vision 2020 for India (<http://www.mappingforesight.eu/initiative/23>).

Key technologies were identified in key areas such as biotechnology, space technology, agro-food technologies, materials, engineering industries, ICT in services and strategic industries for India.

Policy roadmaps were also devised with specific aims (i.e., to ensure stability in wheat and rice production, to utilise postharvest technologies and agro-food processing, to guide human resource development, to develop testing, certification and calibration services, to improve security services and provide quality electric power to all).

**Example 3: Output of a security-related FLA**

The following figure presents a model for the analysis of risks of a generic referent object.



Figure 2. Model for risk analysis. Source: FORESEC Project.

### 3.3.2 *Recommending futures*

Based on a previous analysis (Popper and Teichler, 2011), the most common category of recommendations refers to policies and actions. This is also verified by the first FLA mapped under the EFP. Almost all cases result in policy recommendations and even specific actions to be taken by institutions either on a national or international scale depending on the territorial scope and the sponsor organisation of each FLA.

Additionally, the recommendations in the theme-related FLA (health and security) also provide some suggestions that refer to specific initiatives, dissemination or training and further research. As already mentioned, this is natural due to the depth that comes from studying one particular theme instead of spreading the research across various areas as in the case of SSH-related FLA.

Overall, this first stage of mapping<sup>11</sup> allowed an 'intelligent reading' that enabled the identification of certain commonalities and differences of FLA based on specific indicators. It also allowed a detailed examination of the FLA features and their combination, which led to some interesting results. This qualitative discussion entails a number of hypotheses about the nature and orientation of forward looking activities that can be refined and corroborated (or rejected) by the results of further mapping. In total, this approach can lead to a very complete, clear and comprehensive picture of the universe of forward looking activities.

## 4 Opportunities, Challenges, Key Lessons, and the Potential of FLA Mapping

### 4.1 Opportunities and challenges

There are significant benefits in FLA mapping. First, FLA mapping helps to identify individuals and organisations that belong to one or more building block(s) of the FLA 'family', thereby allowing one to recognise key FLA players.

Secondly, the mapping of the application of methods can lead to a richer understanding of their pros and cons.

Thirdly, there seems to be a growing recognition among public, private, academic and civil society actors of the importance of conducting futures research at local, national and international levels. This has increased the demand for the quality and quantity of FLA, thus forcing "subdomains" such as foresight and horizon scanning (FHS) to evolve in ways that practices are borrowed from each other and, as a result, previous boundaries and differences have become less clear.

Finally, the scope of FLA mapping is so large that results from systematic and continuous mapping thereof could potentially be used to virtually shape any phase of the policy cycle (formulation, implementation and evaluation) in any region, country, sector or thematic area.

Nevertheless, there are also challenges in FLA mapping. First, the boundaries between the FLA components (i.e., foresight, forecasting, horizon scanning, strategic management, impact assessment) are rather fuzzy. Broadening the scope of the mapping to include all of themes is extremely demanding, not only in terms of resources but also regarding the need for more inclusive and robust mapping platforms (including frameworks, indicators and infrastructures).<sup>12</sup>

Given the large variety of FLA types, the universe of potential FLA case studies to map immediately jumps to tens or hundreds of thousands. This leads to two major questions: How should the FLA cases be selected? And how many cases can be fully mapped within the life of a project like EFP? It is not easy to answer these questions, but an informed guess suggests that Web-based crowdsourcing should drive both the type and quantity of cases mapped.

FLA activities are distinct enough so that their practices, players and outcomes cannot be properly mapped with the same set of indicators used in previous mapping foresight

<sup>11</sup> Results on the Transforming Futures elements are not provided due to lack of relevant information in the mapped FLA.

<sup>12</sup> The EFP mapping included foresight, forecasting, horizon scanning and impact assessment studies.

efforts. This means that further research is needed to develop a more comprehensive set of FLA indicators.

Certain challenges also emerged when mapping specific elements. For example, finding comprehensive information about the scale of participation has been among the most challenging tasks. In addition, the mapping of outcomes is the most demanding yet possibly the most rewarding task of such mapping activities. It is demanding because the mapping of outcomes cannot be completed based on desk research and documentary analysis alone. It often requires one or more stakeholder interviews and open participatory processes that could lead to divergent views and controversial attribution debates.

Another challenge is the use of terminology. Although there is a more or less shared understanding of the terminology used in FLA, there are cases in which the term 'scenarios', for example, is used to articulate specific 'visions' or to document the different development paths of quantitative indicators. 'Trends' are sometimes interchanged with 'drivers', whereas there is little reference to 'megatrends' or 'grand challenges' as such in the FLA documents.

At this point, two other issues have to be noted, as highlighted in the First Annual Mapping Report (Popper and Teichler, 2011). The first concerns the existence of different levels of sophistication in the mapping of FLA outcomes and results, because these depend on whether the mapped FLA are still ongoing or completed studies. Secondly, the time gap between the mapping and the completion of the mapped project is another factor that influences the precision of the mapping work. The more time that has passed, the weaker the memories of the interviewees and the greater the inability to find relevant documents and evidence.

## 4.2 Key lessons<sup>13</sup>

Key lessons for improvement refer to five main aspects: the interfaces and applications that support mapping activities, the interactivity of the

mapping activities, the indicators used, the intensity of mapping activities and their impact.

There is a need for more user-friendly, interoperable and dynamic interfaces and applications for the data input, output and analysis associated with the mapping activities. Simply put, mapping processes need better ways of gathering, retrieving and processing large amounts of information. The second lesson relates to the need to add interactivity to the mapping process. By interactivity we mean a move from the simple publishing of mapping results to the participatory co-production of mapping-related knowledge. The third lesson concerns the requirement to include more mapping indicators. Although previous mapping activities have mainly focused on understanding FLA practices with a few indicators looking at players, EFP mapping will further advance the mapping of these two dimensions and, at the same time, promote the mapping of FLA outcomes.

The fourth lesson relates to the intensity of the actual mapping work. In other words, the time and resources needed for basic, advanced and fully-fledged<sup>14</sup> mapping of FLA. EFP mapping is a rewarding yet resource-intensive activity that should normally involve several of the following methods: Web scanning (i.e., identifying relevant documents), documentary analysis (e.g., reviewing final/interim reports and related publications), stakeholder interviews/surveys and occasionally mapping workshops (i.e., interactive sessions to discuss particular indicators, especially those related to the last two phases of FLA, namely, recommending futures and transforming futures).

Finally, the fifth lesson concerns the types of impact that mapping could have in both the policy and the FLA communities. Three different types of impact might emerge from the application of, the research on and the inspiration gained from the knowledge produced by mapping FLA.

<sup>14</sup> 'Basic' mapping refers to the first level of the EFMN mapping (for more information see [http://www foresight-network.eu/index.php?option=com\\_content&task=view&id=16&Itemid=](http://www foresight-network.eu/index.php?option=com_content&task=view&id=16&Itemid=)).

'Advanced' mapping includes 21 dimensions covering practices, players and outcomes. 'Fully-fledged' mapping is the most comprehensive mapping type covering all EFP mapping dimensions.

<sup>13</sup> Based on the EUROFORE (2003–04) and EFMN (2005–09) projects.

In relation to the application of knowledge, the impact could be direct (i.e., when decision makers apply the knowledge with regard to a particular issue) or indirect (i.e., shaping the culture and acceptance of FLA by the media or think tanks) (Johnston and Cagnin, 2011). Based on the mapping data, decision makers could then assess their own FLA policy needs and priorities and, for example, shift their attention and resources to areas – that is, domains or regions – where there have not been many FLA projects.

In addition, FLA mapping could have an impact on the research of the academic community by providing its members with data about past FLA for their research work. Researchers could analyse past activities, identify patterns, gaps and methodological weakness. Through their analysis they could improve the tools for forward looking activities and raise the awareness of FLA more generally. So far two peer-reviewed academic papers have been published, both of which were celebrated by the academic community.<sup>15</sup>

A third type of impact refers to the practice of forward looking activities within the FLA community. Through the EPP Mapping Environment, practitioners will be able to draw on the methodology and approach of similar projects; they will be able to consult with peer practitioners and to network with stakeholders who have been involved in similar FLA. The mapping environment will thus provide a tool to actually plan, conduct and control ongoing forward looking activities.

Overall, the need and value of mapping FLA has been acknowledged by the policy and research communities. This is also reflected in the implementation and support by the European Commission of similar mapping activities in recently launched projects, such as VERA<sup>16</sup>.

### 4.3 Potential of FLA mapping

The Mapping Environment (available at <http://oracle.iknowfutures.eu> or [www.mappingforesight.eu](http://www.mappingforesight.eu)) is the first

comprehensive structural library of forward looking activities in the world. Although the main purpose of the mapping is to build a systematic and more comprehensive repository of FLA knowledge, this is not an end in itself. At this stage, we can see five different uses for the mapped data:

- **Benchmark** along all dimensions of the SMART Futures Jigsaw: Building a collection of data on the jigsaw ensures a form of standardisation, which in turn allows for comparison and meaningful cross-case analysis along the different dimensions and criteria.
- **Provide input** for an evaluation of FLA: Although the mapping provides neither a concept of evaluation nor standards for judging the quality of a FLA, it is envisioned to provide the data necessary to run such analysis.
- **Optimise research agendas:** On the basis of an analysis of the mapped projects, it will be possible to draw conclusions for optimising research agendas. This is of interest to FLA practitioners and policy makers alike. Whereas the former might want to identify a niche for their research strategy, the latter might be more interested in gaps they could address with their policy tools.
- **Empower FLA project management:** FLA practitioners can use the Mapping Environment and in particular the jigsaw as a project management tool. The jigsaw dimensions can serve as a reference template for mapping existing FLA as well as a guide for planning future FLA projects. Moreover, FLA practitioners will be able to easily identify methodological experts, contact project leaders or look for partners who might be interested in contributing to the intended FLA.
- **Exploit outcomes** of completed FLA for policy making: FLA mapping allows the possibility to provide informed answers to questions such as, 'What policy recommendations have been made by horizon scanning projects in the energy area?' or 'What further research topics have been recommended by forecasting projects on demographic developments?'. Thus it provides support to policy and decision shaping processes.

<sup>15</sup> The two papers are Keenan, M. & Popper, R. (2008) Comparing foresight "style" in six world regions. *Foresight*, 10, 16 - 38 and Popper, R. (2008) How are foresight methods selected? *Foresight*, 10, 62-89. The two papers received the "Outstanding" and "Highly Commended" Awards at the 2009 Emerald Literati Network Awards for Excellence and were among the top fifteen papers downloaded from the *foresight* journal in 2008 and 2009.

<sup>16</sup> <http://eravisions.eu/>

## 5 Conclusions

FLA mapping has evolved from the initial approaches and practices applied in the EUROFORE (2002-03) and EFMN (2004-08) projects to more informed and sophisticated conceptual frameworks, processes and tools developed by the EFP project. Undoubtedly, the breadth and depth of the EFP mapping activities are substantially larger in scope and more extensive than the previous mapping efforts. On the one hand, the mapping covers a wider range of FLA, in addition to foresight also horizon scanning and impact assessment projects. On the other hand, it uses a comprehensive Web-based tool of 33 elements in three complementary dimensions (i.e., *practices*, *players* and *outcomes*, which are based on the SMART Futures Jigsaw).

A substantial amount of data has been generated in the FLA cases mapped so far and more data is currently being gathered.<sup>17</sup> The analysis of the first round of mapping 21 cases presents some interesting results. For example, FLA practices differ across the FLA classified under the SSH theme. The specific features of these FLA (aims and rationales) seem to support the identification of three FLA groups: 1) those that are methodologically oriented, 2) the grand-challenge-driven FLA and 3) the nationally focused FLA. The health- and security-related FLA could be considered to belong to a fourth group: theme-specific FLA that highlight aims and rationales that are case-specific depending on the specificities of the theme addressed.

FLA players vary less across the three theme FLA. The primary target group is the policy world at either the national or European level, with the research and business communities close behind. The SSH-related FLA group includes FLA with high and medium stakeholder engagement. The health- or security-related FLA

seem to be more of the latter type. As for publicity, there seems to be a trend of using a wide variety of PR and marketing means across the different FLA groups irrespective of their specific focus, scope or type.

The SSH FLA are illustrative of all the different types of the FLA outcomes with generic or theme-specific drivers and trends, scenarios and visions. Although the production of scenarios is most common in all types of FLA, the nationally focused FLA seem to produce the widest range of outcomes, whereas the methodologically oriented and the grand-challenge-driven ones are those that produce frameworks and models. The nationally focused FLA could be compared to the theme-specific FLA (in health and security) in terms of the variety of the output but also the specificity of their content. Models and frameworks are also a common output in the case of health- and security-related FLA. In addition, most FLA lead to policy recommendations that correspond to their primary target audience (the policy community) and territorial scope (the national, EU or international level).

The future potential of larger-scale and targeted mapping of FLA outcomes is significant. Of course, it is also important to continue mapping practices – to improve the way we conduct and evaluate FLA and their actors; to identify key stakeholders, institutions and individuals with whom to establish possible collaborations; but also to have a map of players who are actively shaping our images of the future. The FLA mapping work is inherently linked to the strategic information needs of a wide range of stakeholders including government, business, research and education actors at local, national and international levels. Given the complexities and great uncertainties that face future policy making, the continuation and further improvement of similar activities is imperative.

<sup>17</sup> A project target is to map and analyse 50 FLA cases in total. However, with the long-term FLA mapping objectives in mind (i.e. post-EFP mapping), it is planned to launch a bottom-up strategy that will enable the FLA community to map additional cases using a Web-based crowdsourcing approach. This is why the mapping system is being developed independently of the EFP project but carefully aligned with the needs of the so-called EFP Mapping Environment and that of other FLA at international and national levels, such as the EC funded project on Visions for the European Research Area (VERA) and the horizon scanning platform of the Centre for Workforce Intelligence (CfWI) in the UK.

## Sources and References

Amanatidou, E., Popper, R. and Teichler, T. (2012), 2nd EFP Annual Mapping Report: Towards a Fully-Fledged Futures Mapping: Preliminary Results of Mapping 21 FLA, University of Manchester.

Popper, P. (2011) "Wild Cards and Weak Signals Informing and Shaping Research and Innovation Policy", paper presented at the 'Fourth International Seville Conference on Future-Oriented Technology Analysis (FTA): FTA and Grand Societal Challenges – Shaping and Driving Structural and Systemic Transformations', Seville, 12-13 May 2011

Popper, R. (2008), Foresight Methodology, in Georghiou, L., Cassingena H., J., Keenan, M., Miles, I., and Popper, R., The Handbook of Technology Foresight: Concepts and Practice, Edward Elgar, Cheltenham, pp. 44–88.

Popper, R. and Teichler, T. (2011), 1st EFP Annual Mapping Report: Practical Guide to Mapping Foresight and Forward-Looking Practices, Players and Outcomes, Report prepared for the European Foresight Platform (EFP), University of Manchester.

Johnston, R. and Cagnin, C. (2011) The influence of future-oriented technology analysis: Addressing the Cassandra challenge, Futures, 43, pp. 313–16.

## Appendix 1. Mapped cases for the Second Annual Mapping Report

| Project Title   | Acronym             | Specific Program./Theme | Coord. Country | Type of FLA              |
|---|---------------------|-------------------------|----------------|--------------------------|
| 1. Challenges for Europe in the world of 2025   | AUGUR               | SSH                     | FR             | foresight                |
| 2. Citizen visions on science, technology and innovation  | CIVISTI             | SSH                     | DK             | foresight                |
| 3. Prospective analysis for the Mediterranean region  | MEDPRO              | SSH                     | BE             | foresight                |
| 4. Scanning for emerging science and technology issues  | SESTI               | SSH                     | NL             | horizon scanning         |
| 5. Use of foresight to align research with longer-term policy needs in Europe   | FARHORIZON          | SSH                     | UK             | foresight                |
| 6. Finnish national joint foresight Exercise 2015   | FinnSight 2015      | SSH                     | FI             | foresight                |
| 7. Technology Vision 2020   |                     | SSH                     | IN             | foresight                |
| 8. A transdisciplinary approach to the emerging challenges of novel technologies: Life, world and imaginaries in foresight and ethics | TECHNOLIFE          | CAPA-SiS                | NO             | foresight                |
| 9. Foresight for our future society   |                     | SSH                     | FI, JP         | foresight                |
| 10. Colombia innovation and competitiveness strategy  |                     | SSH                     | CO             | forward strategy looking |
| 11. Chile innovation and competitiveness agenda   |                     | SSH                     | CL             | forward strategy looking |
| 12. Privacy awareness through security branding   | PATS                | SECURITY                | DE             | technological assessment |
| 13. Europe's evolving security: drivers, trends and scenarios   | FORESEC             | SECURITY                | FI             | foresight                |
| 14. The future impact of security and defence policies on the European research area  | SANDERA             | SECURITY                | UK             | foresight                |
| 15. Foresight of evolving security threats posed by emerging technologies   | FESTOS              | SECURITY                | IL             | horizon scanning         |
| 16. Changing multilateralism  | EU-GRASP            | SECURITY                |                | foresight                |
| 17. The detection and identification of infectious diseases   | Infectious Diseases | HEALTH                  | UK             | foresight                |
| 18. Tackling obesity: Future choices  | Obesity             | HEALTH                  | UK             | foresight                |
| 19. Mental capital and well-being   |                     | HEALTH                  | UK             | foresight                |
| 20. Developing the framework for an epidemic forecast infrastructure  | EPI-WORK            | HEALTH                  | IT             | foresight                |
| 21. Harmonizing, integrating, vitalizing research on HIV/AIDS   | HIVERA              | HEALTH                  | FR             | ERA-NET                  |

# FLA as a Means of Participation in Modern Democratic Decision Making

SUSANNE GIESECKE\*

\* AIT Austrian Institute of Technology, 1220 Vienna, Donau-City Straße 1, Austria

## Abstract

The age of “reflexive modernity” (Beck) describes the transition from a science-based society trusting the knowledge of scientific experts to a “post-modern” society where the blessings of science and technology are questioned and where experts’ opinions are challenged by other experts’ opinion. At the same time, new emerging technologies are becoming more and more complex, and civil society is demanding to participate in the shaping of the future. Several approaches mostly dedicated to already existing technologies, such as technology assessment, have gained currency during the past three decades. Foresight (FS) takes a different approach. It gives us a chance to ask, What technologies do we want, and how can we shape them in the most feasible and preferable way? In this paper, we want to discuss 1. what the actual participatory input of FS is, and 2. what the actual impact of this approach is with regard to policy-making. Both are questions all participatory approaches especially in the field of science and technology have to deal with. This paper will make the point that although the democratic and participatory aspects of FS are generally overrated, FS nonetheless has some noteworthy potential for the inclusion of wider civil society if certain conditions are met. Some of these conditions are linked to the institutional arrangements of a FS context. In order to differentiate FS initiatives more precisely, we introduce and discuss the legitimacy of input, throughput and output factors and address the question of how the impact can be assessed.

---

## 1 Foresight as an Instrument of Political Participation

Political priority setting and strategic decisionmaking that affect a wide set of societal stakeholders often require unconventional approaches. To consider a broad spectrum of new knowledge and make use of very different perspectives in order to find the most feasible and socially sound option, policy-makers today turn more and more to foresight (FS) as an instrument for long-term planning and a means of setting the stage for innovations in a variety of political arenas: in research and development, in societal, organisational, economic or environmental contexts (see Georghiou 2008). The benefit of foresight is seen in the shared goals and visions among a group of participating actors from different sectors, the development of networks, and the combination of relevant information on current trends and future developments with actor-based information and attitudes. Many foresight practitioners value the possibility granted by foresight exercises to bring topics to the political agenda that

need to be discussed not behind closed doors but with broad public involvement. In light of the discussion on post-democracy (Crouch 2004), where a growing gap in policy-making between the political-economic elite and a silent, apathetic civil society is lamented, we want to debate where foresight stands and where the democratic elements of foresight can be found to strengthen the role of civil society in policy-making.

Over the past 40 to 50 years, there have been different understandings and approaches to foresight. Some scholars speak of “the three generations”, others even of “five generations”. However, even though it cannot be denied that there are different generations of foresight in terms of the goals, methods and political instrumentation, these generations should not be seen as strictly consecutive approaches but rather as overlapping, reflexive, sometimes simultaneous ones.

Current use of FS predominantly represents a departure from the emphasis on expert-based advice and the belief in the feasibility of long-

term forecasting and planning stated in early phases of foresight. In foresight processes today, the future is not to be predicted but to be socially constructed. Present-day FS is a process-oriented network approach involving intense interactive periods of open reflection, consultation and discussion, leading to the joint refining of future visions and the common ownership of strategies (Georghiou and Keenan 2004). Foresight has generated great interest at the EU policy level in recent years, especially in designing the European Research Area (ERA). The European Commission consults foresight experts on a regular basis not only to identify future needs and “Grand Challenges” but also to design policies for coping with them. The High Level Expert Group (EU HLEG) has defined foresight as: “a systematic, participatory, future intelligence gathering and medium- to long-term vision-building process aimed at present-day decisions and mobilizing joint actions” (HLEG-Report 2002). It is possible that the extent to which foresight is used to inspire public debates and in policy-making can tell us something about the health of the political system, where critical future issues are not simply left to elites who confuse liberalism with democracy (Crouch 2004: 3).

## 2 Today’s Understanding of Foresight

In common discourse and even in scientific literature, there are several misperceptions about the use and functions of foresight today. One of these misperceptions is that foresight attempts to predict future developments (Ruud van der Helm, 2007). This is surely not the case. In fact, one cannot even say that foresight is necessarily about anticipating the future. Rather it is about alternative futures, i.e. identifying and considering possible policy options, alternative views and a plurality of choices. Another misperception is that FS outcomes have to represent a consensus. This is not necessarily the case either. Instead, FS should give minorities the option to speak out publicly and to be heard. There can be controversial discussion on topics and diverging scenarios of future developments. In fact, creativity can evolve when different or even contradictory perspectives are given voices. FS outputs can benefit considerably from such creativity.

There has also been some discussion on the benefit or burden of participation as part of FS. For most FS practitioners today, participatory elements are central elements of modern FS. However, there are some elements amongst many others that are not participatory. Some FS activities involve the participation of experts, civil society representatives, NGOs etc. These formats usually receive more public attention than others that rely more on the classical methods of qualitative social science, for example expert interviews, semi-quantitative methods such as Delphi surveys, as well as quantitative methods, including modelling and simulation.

Discussion on participation and FS is often confused with technology assessment (TA), especially when new and emerging technologies are concerned. Although elements of TA can be integrated in FS instruments and methods and vice versa, the two approaches often rest on different assumptions and pursue different objectives while participatory elements play different roles in both.

This combination of approaches, instruments and methodologies helps FS activists to make use of collective knowledge. In Habermasian terminology, we might say that FS creates a public space where actors can be organised within an abstract framework of the long term (Helm 2007: 4).

## 3 Participatory Aspects of Foresight

Gathering and condensing collective knowledge and creating an awareness of alternative futures, which represent different paths of dealing with future societal challenges at various levels and in different contexts, is without question a valuable asset of the FS approach. If foresight is used to prepare public policy decision making, however, it has to take a firm stand as to what is adopted from the US model of “liberal democracy”. Democratic legitimation of the preparation of political decision making can be maintained only if the output is justified in terms of reasons acceptable to those affected by it (Hansson et al. 2009: 1744). FS can be regarded as a deliberative arena to ensure that the process meets this requirement, which is in the public interest, not

only in the self-interest of (whom? policymakers?).

In discussing the democratic legitimation of FS and its output in preparing political decision making, we are confronted with ambivalent arguments. Reasons for FS and also for integrating participatory instruments in FS are generally of three kinds: symbolic, instrumental or conceptual. Symbolic foresight activities will usually not generate new ideas or surprising outputs but are used by their owners to communicate new political strategies or to emphasise the quality of a certain relation between policy makers and other stakeholders, say the public. The instrumental function of a FS exercise treats the results as a kind of policy advice and turns them into action. Expert participation is often a prerequisite of foresights with an instrumental focus. The conceptual function of FS is the most common one. Here, output does not directly translate into policy action one to one. Rather, the FS *process* is just as important as the results, sometimes even more so.

A high level of participation generally does not mean that a FS activity or its outputs have greater legitimacy compared to a FS process with a low level of participatory involvement. A high level of participation does not automatically boost the importance of a FS (though it did in the case of the World Water FS in the late 1990s). Other criteria are, of course, the amount and the quality of information (participants are expected to come up with “new” knowledge and “new” information) and the process of selecting participants by organisers.<sup>1</sup>

The increased number of FS activities in Europe and beyond that we have witnessed over the past 20 years symbolises a social phenomenon that other scholars have described as “network governance”. Broadly speaking, the growing number and importance of networks marks the shift from government to governance. In this respect, FS can be regarded as a new form of “deliberative governance”.

<sup>1</sup> Organisers of FS should not create false illusions for themselves or participants, such as that the “future can be managed or shaped through collective action” or that this “collective action has to be actively organized and facilitated” (Helm 2007: 5).

## 4 Foresight as a New Form of Deliberative Governance?

The reasons for network governance in various societal spheres that we have been witnessing over the past 15 to 20 years are rooted in the crisis of government. It reflects the increasing complexity and fragmentation of modern-day society and, at the political level, the widespread distribution of power and resources going hand in hand with the decreasing coordinating capacity of the public sector. Policy failure, structures and institutions marked by eroding legitimacy, the inadequacies in dealing with emerging challenges and opportunities have set the scene for a move toward broader societal coordination. In this context, features applying to network governance in general apply also to foresight as a new mode of societal coordination in particular: Non-hierarchical relationships between participants signify network governance as well as the blurring of distinctions between different spheres of society. Informality and self-regulation become strategies to counter the cumbersome and time-consuming tendencies of coordination through formal institutions.

No network governance is entirely free of hierarchy. However, as Scharpf (1994: ?) notes, network governance operates in the shadow of hierarchy. Even though network governance lacks centrist authority, as do foresight activities, this format aims at creating linkages between atomised actors, who are locked into forms of traditional governance revolving around the coordination mechanisms hierarchy (Hanssen et al. 2009: 1740).

Scholars and practitioners of FS have seldom discussed the democratic legitimacy of FS. This is a substantial shortcoming because governments are the key sponsors of FS exercises and policy recommendations are the most common form of output – a fact that the semi-quantitative analysis of more than 2000 FS exercises mapped in the European Foresight Monitoring Network (EFMN) has clearly shown.<sup>2</sup> Future research is needed to evaluate the potential FS has to counter-balance eco-

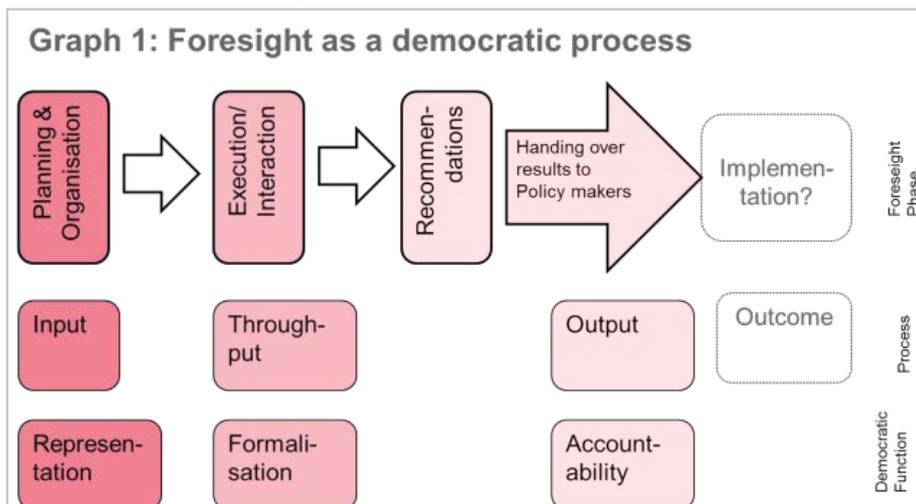
<sup>2</sup> URL: [www.efmn.info](http://www.efmn.info)

conomic lobby groups capturing politics. At the same token, we have to ask whether FS itself is in danger of becoming a vehicle of such lobby interests by contributing to the non-transparency of elite-building networking the political and the economic realm.

This article tries to fill the gap, thereby identifying some of the dilemmas related to the democratic legitimacy of FS. Some of the open issues of FS are its inclusiveness concerning participants, organisers and programme owners, insufficient transparency of processes to outsiders (e.g. concerning the choice of instruments), the accountability of results, the representativeness of stakeholder groups and FS outputs.

## 5 Legitimacy by Representation, Formalisation and Accountability

The critical point is not whether participation is possible or not, or useful or not; rather, the key issue is whether participation matters. “Does participation make a difference”? To approach this question, we have to be aware that FS usually is characterised by different phases. For a better overview, we will distinguish three main phases of FS (see graph 1):



1. The planning and organisation
2. The execution and actual activity of FS, characterised by a high degree of interaction
3. The handing over of policy recommendations (either to the owners/sponsors of the FS initiative or to the policy ac-

tors responsible for the policy arena addressed by the FS)

Let us look at the three phases in more detail:

1. Planning and organisation is usually a process between the client and the organisation executing the FS exercise. It is a process behind closed doors, even though public procurement procedures in most democratic countries demand a formal tender procedure. In some cases, where funding is provided by private sources or by the executing organisation itself, the situation is a bit different. Here, the process is even much less transparent, but its impact will also affect public policy making to a lesser degree or even not at all. There can be various reasons for public administrations to commission a FS. In some cases, a ministry wants to assess new emerging technologies for funding priorities and looks for a broader input of knowledge than just from the usual lobby groups. In other cases, a government wants to know what societal challenges are lying ahead. What FS instruments are used to accomplish the objectives and to what degree participatory approaches are considered is negotiated between

client and executing organisation. Various variables influence decision making – time horizon and financial budget being only two of them. In any case, decisions made in the planning phase will heavily affect the output and also the outcome and impact of the entire FS exercise.

2. The core of the FS exercise happens in phase two. Here, qualitative and quantitative instruments are combined. A high degree of interaction takes place: within the executing consortium, between the executing organisation(s) and the client, and between those two and third parties. The third parties can be experts questioned in

interviews, stakeholders taking part in scenario workshops, in world cafés, open space conferences or any other interactive format. This is also the place where various kinds of knowledge resources are tapped, e.g. official documents, “grey” literature, scientific articles, the Internet, conference proceedings, bibliometric material, etc. This kind of information is processed in a qualitative or quantitative way, and several recursive cycles might take place to feed the knowledge into processing arrangements where they are filtered to the point of producing unique results with a relevant focus.

3. At the end of a FS process, policy recommendations or something similar will be formulated. They are handed over to the policy makers responsible for the policy arena addressed in the FS exercise, e.g. transport or mobility. Often, the policy makers or their institution are the clients of the FS process. In this stage, the question arises whether policy makers take the outcome, the policy recommendations, into account. And if so, what do they do with them? Are the recommendations implemented in one way or another? Is anybody from the FS process involved in the implementation? Or do the recommendations serve as a pool of information to the policy makers? Or do they disappear in some drawer without ever having any impact?

Unfortunately, little research has been done so far to assess the impact of FS outcomes and FS policy recommendations. As Keenan (2006) points out, the outcome of a FS cannot be measured easily or by common evaluation criteria.

Another critical point is also when policy recommendations are formulated. As discussed above, some participants and also some scholars studying FS from the meta-perspective think that the output has to be consensual. However, this is usually neither possible nor desirable, especially when the issue is a controversial one. Pushing toward a consensus will inevitably lead some partici-

pants to feel marginalised and to not identify with the outcome. More modern FS approaches do not necessarily seek consensus. What is more important concerning the process and the outcome is 1. Order so: to give adequate voice to a plurality of views and 2. to design several policy options, e.g. for a variety of scenarios as to how the future could or should evolve. This implies that the minority votes are heard and acknowledged.

For heuristic reasons, we correlated the three phases recapitulated above with three dimensions (grounds) of legitimacy: *representation*, *formalisation* and *accountability* and explored them further with regard to the democratic legitimacy of FS exercises from a theoretical perspective. *Representation* can best be conceived as a ground of legitimacy on the input side of a FS exercise, in phase one, which involves the planning and organisation. *Formalisation* takes place most notably in the second phase (execution of FS) and can be classified as the grounds of legitimacy on the throughput side. *Accountability*, finally, is the dimension closely related to the liability of political decision making and, in a FS exercise, becomes relevant in phase three when policy recommendations are formulated and handed over to decision makers. Here the question arises of what part of society is represented in these policy formulations and who will benefit from their implementation? These are the grounds of legitimation on the output side of a FS process.

### 5.1 Input – representation

The selection of a FS topic, the choice of a specific organiser and the like involve decisions for certain options and against alternatives as indicated above. Decisions of this kind determine how the course of the FS is going to be charted, just as the selection of methodologies and participants will have a strong effect on the course and output of the exercise. We will return to this point shortly. First, we want to stress the importance of the client’s commitment to the FS. Empirical evidence underscores that it is of utmost importance for the success of a FS exercise that the status and ownership have to be clear and transparent to the participants – and all others involved – from the very beginning. Ownership is perceived as symbolic, and if the owner does not

really become involved, all others, participants as well as organisers, will question the relevance of the exercise.

Now let us turn to the selection of participants. The need to choose participants as part of the planning and organisation of a FS opens the door to much criticism since most any selection can hardly claim to be fully representative of society and in most cases not even of the group of people affected by the topic chosen. When certain stakeholders, experts or other “representatives” of society are invited to a FS, we face the dilemma of including some while excluding others. As Tichy pointed out, FS has a problem related to the narrow inclusion of top experts only, thereby generating over-optimism, overestimation etc. in the discussions and the output. Even though most FS exercises today are not limited to the inclusion of top experts only, the dilemma of excluding other parts of society cannot be solved. The discussion of any issue will always involve a larger segment of society than represented by the network practically involved. One way out would be the focus on “relevant stakeholders”. We do not quite agree with Helms who states: “The paradox in this situation is that the outcomes of the project depend largely on the actors involved whereas the control that a project-initiator has on the selection and, more importantly, on the involvement of the actors is extremely small” (Helm 2007: 7). This does not necessarily have to be the case. Our experience is that the organisers exert substantial influence through pre-selection. Furthermore, organisers have considerable power when summing up the results of the FS exercises for policy recommendations and even earlier in the process when moderating the discussions. Organisers are by no means “neutral”. They have a distinct background, and many want to convey specific messages with their FS exercises as well. Moreover, participants will be disappointed if their findings are not fairly represented in the policy recommendations. So it is up to the organisers to decide how the balance is kept.

We also have to accept the fact that FS exercises are seldom open to all. In some cases, those affected are included rather than others, but in some cases not even those. Often, more powerful players are included at the expenses of small, less resourceful groups. And powerful

actors are more likely to shape and determine policy outputs. There is also the danger of partisan participation where participants are more committed to defending their own interests and not the interests of the larger groups they are supposed to represent.

One way out of the representation dilemma is legitimation by formal procedure. We will turn to this aspect in more detail when discussing the grounds of legitimation on the throughput side. On the input side, formal procedures may play a role as well in so far as the selection criteria have to be made transparent to the general public. Further, the criteria on which the decisions are made – be it selection decisions or any others – have to be accepted and made in accordance with general formal procedures guaranteeing democratic equality and accountability (Hanssen et al. 2009).

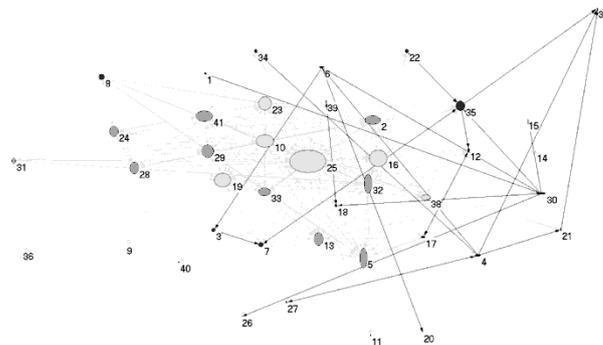
## 5.2 Throughput – formalisation of procedures

The legitimation of the actual execution of each FS exercise is based on the formalisation of procedures, even more so than on the input side. The tools belonging to these formal procedures are the building blocks that constitute the methods. The latter are themselves embedded in a process design with a certain contextual setting that may be part of an organisational tradition (the Shell scenarios are a case in point). There is a wide range of methods available for FS of which a certain set is chosen to meet the specific purposes and objectives of each FS. As mentioned before, not all methods are of a participatory nature. Especially at the beginning of many FS activities, a lot of desk research and expert interviews are involved, and these methods are almost exclusively in the hand of the organisers, sometimes influenced by the owner/sponsors. The degree and quality of participation is also quite different from method to method. A Delphi survey, for example, takes place in a large expert community but does not involve the general public or representatives of civil society. It is also an anonymous process and does not further the exchange of knowledge among participants. Methods such as scenario building, focus groups, world cafés, open space conferences and any others that rely on the involvement of a critical mass of participants are not only output- but also process-oriented.

With regard to the legitimization grounds on the throughput side, FS makes decision making procedures more transparent (Haus 2005), at least in terms of the topics discussed and the discussion formats. It serves as an arena where tacit knowledge of individuals is converted to explicit group knowledge (Polanyi, 1966) – ensuring exchange of important knowledge among the participants. And even more important from the organisational development perspective, stakeholders carry the newly acquired knowledge back to their home organisation and thereby diffuse it. Ideally, this will cause mid-term to long-term changes within the organisation.

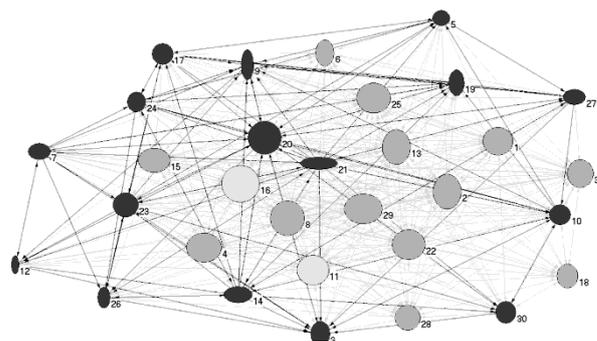
In this sense, participative formats of FS is a means of deliberation: the **knowledge** needed for long-term policy making in complex societies is widely distributed among a broad spectrum of actors, stakeholders, civil society etc.; and broad knowledge is required – from experts as well as from so called lay people – if the consequences of a policy affect many people. Some experts of FS think that “[t]he interactive participatory dimension to foresight methods (...) seems to be appropriate. In order to notice features that are neglected and to formulate new ideas, participants must be forced to challenge their usual way of thinking, seeing the world from other perspectives” (Hanssen et al. 2009: 1743).

The Freight Vision FS<sup>3</sup> sponsored by the European Commission under FP7 is a case in point. It was commissioned in order to assess the future of freight transport in Europe and the need for research, technology and innovation. During a period of 18 months, several strong participatory elements were introduced, focusing on the long-term challenges of the next 40 years. The participatory elements of this FS exercise initiated a process of codifying formerly tacit knowledge and of mutual knowledge exchange. The participants from different stakeholder groups further had the chance to adopt new perspectives different from their usual working environments. Elements of the FS process inspired a network of participants based on cooperative relations where hierarchy is almost completely absent and relation-



**Graph 2: The example of Freight Vision (2008-2010)**  
Social network before Forum 1

ships eventually turned out to be fairly evenly distributed (see below, after the fourth forum; Holste et al. 2010). The two pictures (graph 2 and 3) show the network of personal relationships among the participants. They depict the results of a personalised questionnaire passed out to each person before and after each of the four forums, which constituted a major element of the Freight Vision Foresight. The first forum took place in March 2009 and the last one in January 2010. Stakeholders (from various companies, research organisations, intermediate organisations etc.) are represented in black; all other project partners are marked in grey. Position in the picture and distances to each other are determined by the participant's relationships. Two participants are positioned closer to one another if their relationship is stronger.



**Graph 3: Social network after Forum 4**

The shape of a node is determined by the number of inward vs. outward vectors (here: connections marked by an arrow) and by the total number of ties. So-called networkers or network connectors have more outward than inward vectors (vertical ellipse); for “authorities” it is the contrary (horizontal ellipse). The calculations were made using the PAJEK software (Holste et al. 2010).

<sup>3</sup> URL: [www.freightvision.eu/](http://www.freightvision.eu/)

At the same token, FS is seen as a process to enhance communication between actors within a system while providing means of coordinating and generating commitment to action. Some scholars ascribe FS the function of enhancing mutual understanding and trust between actors by creating common visions for future policy making. The idealised vision is that such prerequisites will facilitate the process of implementing new policies. Closely connected to this ideal is the notion that stakeholders from civil society and the economic sphere are given the opportunity to influence these processes and thereby get the chance to develop social capital (at least for one theme, one region) and participatory policy making approaches (Irvin & Stansbury, 2004). With an eye to empirical evidence, however, we must note that such effects are not only very difficult to measure, not least due to a lack of suitable indicators, but there have also been few attempts to do so in the FS community. We have to be careful not to over-idealise the deliberative potential of FS. In reality, some of these features associated with foresight might be detected in hindsight but at the same time, there is also a diffuse “white noise”, drowning out many of the individual voices that were hardly heard before a FS exercise and will continue to have no effect ever after.

This raises the question of what makes a policy recommendation developed in a FS exercise feasible for implementation. One rule that can be drawn from empirical experience is that at least one scenario created in an exercise is perceived as something that is grounded in current reality and is achievable under current conditions, political and otherwise. At the same time, however, visionary documents are needed, as opposed to conventional consultant reports, in order to move beyond the common mindset and as an added value that cannot be achieved by other methods.

Notwithstanding the beneficial functions associated with foresight, e.g. knowledge generation and diffusion, mutual learning and transparency, there are also some critical aspects calling into question the legitimacy of its role in preparing political decision making. While it is often difficult to distinguish experts from stakeholders, there is also the aspect that the views of the so-called experts might be overvalued in

foresight while the insights of non-experts risk being insufficiently communicated or not being heard at all (Hanssen et al. 2009). Against this background, there is also the danger that the opinions of experts or of a majority among the participants form a dominant mainstream discourse, thus overruling or marginalising minority opinions. Just as experts sometimes do, other “classes” of participants might also have a more impressive habitus, greater social status or more social capital to bring to the group process and thereby influence the course and the outcome of the exercise whether they represent a majority or not. In this respect, the undue impact of such personalities or subgroups might lead to “cognitive closure” and thus to the exclusion of particular points of view. As Georghiou and Keenan (2006) have pointed out, some of those factors might demotivate participants and hamper the quality of the process.

Another dilemma with participation in FS is the occasionally increased dependence on participants, e.g. their willingness/motivation to come to the events, their hidden agendas, background, knowledge/expertise, their social and communicative skills, their social and cultural capital, and other idiosyncrasies (Helms 2007). All these aspects considered, participatory processes can be regarded as contingent on and vulnerable to influences that cannot always be organised and controlled.

Organisers of FS exercises often find themselves in the precarious role of having to motivate participants who are often sceptical of methods they are not (very) familiar with. FS is still a “peripheral” job, and the only experts of FS are usually those people organising it. So for the others, this is a learning experience and not much previous knowledge or commitment can be expected from them. The organisers have to manage an illusion, as Helms points out: “One has to show enough ambition to involve (to inspire), but not too much as to disappoint [...] Nowadays, much emphasis is put on the ambition of (mutual, shared or social) learning, which tries to move away from illusionary ideas that through participation one would be able to exert more direct influence on the ways decisions are taken” (Helm 2007: 8).

Despite these arguments, we see ample evidence that FS offers opportunities for substantial communication with civil society that goes beyond the usual signals sent out by political spin doctors, election campaigners and short-sighted media repeating slogans that do not invite the public to engage in a bilateral dialogue but rather distract public attention from important political issues instead. Such shallow communication tends to ignite fake debates, often blaming the political foe or the political elite as a whole for societal problems. These signals are geared toward addressing a passive, silent and sometimes even apathetic society, making it very easy for the liberal economic elite to increase their influence on policy makers without any opposition or protest from civil society or the media (Crouch 2004: 20). In this situation, foresight bears the potential to encourage higher quality public debate as it opens the floor for public participation organised from both, top down as well as bottom up.

### 5.3 Output – accountability

FS attracts theoretical and practical interest from scholars, policy makers, other stakeholders and members of civil society in general because it is a tool of strategic intelligence and thus promises to be important political decision making and policy implementation. More than in the other two phases, the output phase of each FS exercise makes a lasting impression on participants and the interested public whether or not the FS gains any political relevance in the end. Against the background of the previous sections and the discussion of representation and formalisation of FS procedures, we can summarise that FS serves as an arena to exchange knowledge and discuss different viewpoints, to give representatives of many different societal groups (even though not all) room to express their opinions and to stimulate mutual learning. It thus represents an arena to come to better and more informed decisions in responding to the wants and needs (Scharpf 1999) expressed by the participants.

The flip side of the coin, however, is that the results of FS are not only hard to measure and difficult to communicate; in most cases they are not directly visible either. The results might have indirect effects on follow-up policies and decision making. Especially in very large exer-

cises it is unlikely that individual participants will find their ideas reflected in the results unless a serious consensus is reached (Helm 2007). This is why most FS leave the impression that the policy recommendations are hardly ever implemented. The final output of a FS exercise might lack a direct link to any actual changes. Accordingly, the accountability of the FS output and hence the entire FS process in many cases is ambivalent.

With regard to democratic legitimacy, the arguments presented so far give the impression that the output and outcome of FS exercises face at least two dilemmas.

1. From empirical evidence we can conclude that FS output is typically fed into the administrative process rather than into the policy process or parliamentary process. It is thus processed in the administrative apparatus of the political system as the branch of the polity that plays a dominant role in preparing the bills that eventually reach the parliamentary floor. Instead of directly affecting policy making, FS results are administered and diluted in the process. Parliamentary decision makers, who are the legal and legitimate representatives of civil society, may never see or have an opportunity to consider the results.
2. Yet even if the results of a FS exercise are fed into political decision making and there is a direct link to actual change, the question arises whose decisions and interests are represented, and what views and preferences are excluded?
- 3.

According to the theory of deliberative democracy, democratic legitimacy does not only consist of representation, authority and accountability. Questions of legitimacy also extend to the arenas and other structures for exchanging knowledge, discussing a broad spectrum of different opinions on pressing issues, including organised as well as non-organised interests, for learning and for making all these processes transparent. Deliberative structures, such as FS, allow for consensual decision making but also for the acknowledgement of minority opinions. They give room for the public discussion of expert opinions on future challenges and

their confrontation with laypeople's perceptions. In this sense, such participative formats serve as an addition to representative democracy. Enhanced legitimation is achieved through the quality of the political process (Hennen et al. 2004). Even though such deliberative processes may not reach the level of a "discourse free of coercion" (*herrschaftsfreier Diskurs*, Habermas 1968), the results of a FS exercise ideally include the plurality of opinions, channelled into factual, realistic and socially robust knowledge of an informed public, which are handed over to and acknowledged in further political decision making. It is not the consensus that makes these outcomes more legitimate, rather the fairness and openness of the FS process. The democratic function lies in enhancing and widening the spectrum of values and visions considered in political decision making. Thus decision makers are being informed of the broad spectrum of perspectives on a certain thematic complex and the values of the people affected by these issues – or even representatives of social subgroups, by expert opinions and interactions of many different stakeholders. Thus the linkage of democratically formed decision making and a (semi-)public discourse is strengthened. Similar to some approaches of technology assessment, the participatory aspects are considered especially in the execution phase of the FS process rather than in the decision making or implementation phase of the later policy.

Even though participative and deliberative formats such as FS are not designed to have legally binding outcomes or effects on political decision making, the results should nevertheless evoke some "resonance" among decision makers if political changes are to occur (Hennen et al. 2004). In this respect, FS is an important part of democratic political culture. The fact that most FS exercises are organised top down rather than bottom up is not necessarily at the expense of democratic quality. Grass-roots movements and other bottom-up forms of political participation are always necessary and precious signs of civil society political engagement. They tackle other issues than most FS exercises and often have a much narrower focus. They are not in competition with FS or with any other form of contemporary political engagement. Rather, they all are expressions of living democracy. Formats that are organised more top down usually do not face the

same budget constraints as bottom-up initiatives do. This is also an important fact in regard to the accountability of a FS exercise as the programme owner has to justify the expenses and the outcome of the exercise in face of an evaluating public body. This supports the notion of the resonance of the FS activity.

Participative and deliberative formats, however, cannot bear the burden of creating consensus on policies responding to future challenges. Nor can they reduce the burden of effective political decision making in the face of increasingly complex structures and the destruction of traditional boundaries. Instead, they can help broaden the spectrum of political decision making and promote the acknowledgement of multiple visions and thereby open new paths for alternative policy options. FS is thus less an arena for the immediate preparation of political decision making processes but rather for the stimulation of a public and transparent discourse about future policy options. Participatory formats do not necessarily need to be directly integrated into the political decision making process to have an impact. In order to gain political relevance, the process of the FS has to be formalised, transparent and open, executed by skilled and independent organisations, and commissioned by visible and committed sponsors/programme owners. Last but not least, the societal and political relevance of FS is dependent on the acknowledgement of such formats by decision makers and the noticeable resonance they evoke in the (political) decision making system. FS have to be taken seriously by that system.

## 6 Conclusion

In this article, we have discussed today's understanding of foresight, especially participatory foresight, as an arena for exchanging existing, often tacit knowledge and for generating new knowledge. It is a relatively heterarchic arena where stakeholders with different backgrounds come together to discuss and explore the challenges lying ahead in a certain case for action. We have seen that the demand for participation has grown as a result of people feeling that their voice is not sufficiently heard. As the discussion in this paper has shown, the participatory aspects concern mostly the se-

cond part of a three-phase FS design. The conceptual first phase is handled by client and organiser while the final, third phase, when outputs are to be implemented, is generally not participative but up to the client, sometimes accompanied by the organisers in a follow-up activity. We should not equate participation with representation. In a broader understanding of deliberative democracy, participatory FS can be defined as an arena where socially robust knowledge (Nowotny 2003) is produced. The foresight format offers the chance for lay-people to be accepted on par with other stakeholders. They are all asked to bring their expertise of everyday life to the process, to bring specific and general perceptions from both every day and highly specialised experience to the discussion, including their values, interests and preferences. These are prerequisites for an acceptable and socially robust path (Hennen et al. 2004). In an arena of exchange between the general public, scientific, administrative and other experts, disciplinary knowledge has to face evaluation and reflection by a broad spectrum of stakeholders.

When judging whether this expectation is sufficiently fulfilled, we have to consider that foresight is still an experiment, characterised by a search for an institutional response to the crisis of legitimate political decision making, the crisis of government and the crisis of representation. On the same account, FS is a response to a search for new forms and formats of dialogue between science, policy-making and the public in representative liberal western democracies. To assess the effects of foresight more precisely and to support the implementation of some of the FS recommendations stemming from participant interaction, a critical mass of foresight follow-ups is needed since the most difficult aspect of FS to assess is the accountability of the process and even more so of the results.

This paper has argued the case that FS has the potential to function as a means of facing politics head-on instead of dodging critical issues that can be expected to determine and influence our future. In this respect, FS can in fact provide room for articulation to address even complicated and technologically sophisticated issues and help overcome public muteness and ignorance. The debates handled in

FS formats can help avoid that critical issues are simply left to policy makers behind closed doors where they more easily can be captured by liberal economic elites. Further, FS can help overcome the self-referential modus operandi of the political world by contributing to more-transparency in the debate of critical future issues.

## Sources and References

- Crouch, Colin (2004): *Post-Democracy*. Cambridge, UK: Polity Press.
- Georghiou, Luke and Michael Keenan (2006): Evaluation of national foresight activities. Assessing Rational, Process and Impacts. In: *Technological Forecasting & Social Change*. 73 (7), pp.761-777.
- Habermas, Jürgen (1968): "Erkenntnis und Interesse", in J. Habermas: *Technik und Wissenschaft als 'Ideologie'*. Frankfurt a. M. pp. 146-168
- Hanssen, Gro Sandkjaer, Tom Johnstad and Jan Erling Klausen (2009): *Regional Foresight, Modes of Governance and Democracy*. In: *European Planning Studies*. Vol 17., no. 12, Dec. 2009, pp. 1733-1745)
- Haus, Micheal., Hubert Heinelt and Murry Stewart (2005): *Urban Governance and Democracy. Leadership and Community Involvement*. London: Routledge.
- Helm, Ruud van der (2007): Ten insolvable dilemmas of participation and why foresight has to deal with them. In: *foresight*. Vol. 9, no. 3, 2007, pp. 3-17
- Hennen, Leonhard, Thomas Petermann and Constanze Scherz. (2004): *Partizipative Verfahren der Technikfolgen-Abschätzung und parlamentarische Politikberatung. Neue Formen der Kommunikation zwischen Wissenschaft, Politik und Öffentlichkeit. Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag. Working paper no. 96, Berlin, October 2004*
- HLEG (High Level Expert Group) Report (2002): *Thinking, debating and shaping the future: Foresight for Europe*. [ftp://ftp.cordis.europa.eu/pub/foresight/docs/for\\_hleg\\_final\\_report\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/foresight/docs/for_hleg_final_report_en.pdf)
- Holste, Dirk, Klaus Kubeczko, Doris Schartinger, Stephan Helmreich and Dorisch Wilhelmer (2010): *A complementary architecture to build foresight*. Paper at the XXI ISPIM Conference, Bilbao, Spain: 6-9 June 2010.
- Nowotny, Helga (2003): *Dilemma of Expertise. Democratising expertise and socially robust knowledge*. *Science and Public Policy*, Vol. 30, no. 3, June 2003, pp. 151–156,
- Polanyi, Michael (1966): *The Tacit Dimension*. New York: Anchor Day Brooks
- Popper, Rafael (2008): *How are Foresight Methods Selected?*, in: *Foresight*, 10 (6), pp. 62-89
- Scharpf, Fritz (1999): *Governing in Europe: Effective and Democratic?* Oxford: Oxford University Press.
- Irvin, Renée and John Stansbury (2004): *Citizen participation in decision making: Is it worth the effort?* *Public Administration Review*. 64 (1), pp. 55-65.
- Tichy, Gerhard (2004): *The over-optimism among experts in assessment and foresight*. In: *Technology Forecasting & Social Change* 71 (4), pp. 341-36

# Grand Challenges and Foresight in EFP

## Healthy Ageing – Urban Europe – Smart Mobility

BAS VAN SCHOONHOVEN\*

\* TNO Netherlands Organization for Applied Scientific Research, Delft, the Netherlands

### Abstract

The EFP project team helped organise a series of national and European-level workshops around different foresight topics: healthy ageing, urban Europe and smart mobility. These topics are closely related to the Grand Challenges facing Europe. Central to these challenges are the demographic change in age distribution, globalisation and the increasing competition that it brings, and environmental changes. A major research topic that surfaces as a solution in every topic discussion is information and communication technology (ICT). The promise of ICTs to solve many challenges is high but may not come out as expected. Moreover, if ICTs do live up to expectations, governments should closely monitor the ever-stronger dependency of society on ICT infrastructure. Finally, the risk of exclusion of social groups and the importance of accessibility are important concerns throughout all discussions.

---

## 1 Introduction

The Coordination and Support Action “EFP European Foresight Platform – supporting forward looking decision making” aims at consolidating the information and knowledge base on foresight in Europe and internationally. The ultimate purpose of EFP is to better exploit foresight as a resource to support policy-making. One way in which EFP has done this is by organising a series of national and European-level policy workshops in which foresight experts, domain experts and policy makers have a structured discussion around a relevant topic. The workshops were organised around the topics of healthy ageing, urban Europe and smart mobility.

In this paper, we discuss the insights gained in these workshops in a wider perspective and relate the challenges identified to each other. We attempt to do this in a way that makes the EFP outcomes more easily accessible to policy makers and other interested parties. Some of these challenges overlap, in regard to either the issues that the challenge faces us with or the policy measures that might be taken to meet them. This means that different areas of policy making need to cooperate to achieve optimal results. By discussing the challenges identified during the EFP project in this man-

ner, we hope to provide insights benefitting such cooperation.

The paper is organised in two main sections: a brief description of the main topics discussed in the EFP papers and workshops (chapter 2), and the identification of grand challenges and research topics to tackle these challenges (chapter 3). In the final chapter, we draw conclusions based on these two main sections.

## 2 Grand Challenges

In 2008, the European Research Area Expert Group from the Directorate-General for Research of the European Commission released a report on the rationales of the European research programmes. The key concept underlying the research programmes that was introduced in this report was that of “Grand Challenges”. The value of research, and the justification for the expenses and resources required to pursue it, ultimately lies in contributing to Europe’s economic, social and environmental goals. The Expert Group argued that the central means to achieve this is by defining a series of Grand Challenges, which demand research but also require action to ensure that

innovations and developments find their way into the market and public services.<sup>1</sup>

Grand Challenges are a broad concept, as challenges may be defined as economic, social or scientific goals. The Challenges should be of “sufficient scale and scope to capture the public and political imagination, create widespread interest among scientific and business communities and NGOs and inspire younger people.”<sup>2</sup>

The aims of many forward looking activities are similar to those of the ERA Group and their advice to identify the Grand Challenges facing Europe. Often a foresight exercise results in recommendations for research topics and policy action to tackle a major future challenge similar to the Grand Challenges although possibly smaller in scale.

## 2.1 Topics in EFP

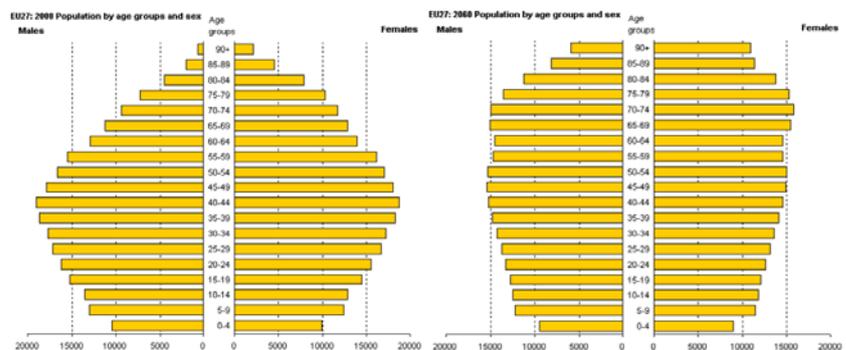
During the European Foresight Platform (EFP) project, many forward looking activities were identified and described in foresight briefs.<sup>3</sup> In addition, the EFP project team organised a series of national and European-level workshops around different foresight topics: healthy ageing, urban Europe and smart mobility.<sup>4</sup> Not coincidentally, these topics relate to the Grand Challenges facing Europe, caused by large demographic changes, urbanisation and changing demands for mobility.

During the workshops, many valuable insights in these Grand Challenges were gathered. These insights were also published in several discussion papers specific to each workshop. We will now briefly discuss the outcome of each workshop discussion and the related desk research activities, and then go on to

identify the challenges, research topics and policy advice that were given.

### 2.1.1 Healthy Ageing

Healthy ageing is the challenge of reducing the number of unhealthy life years<sup>5</sup> (independent of one’s life expectancy), or in other words living free of health problems for as long as possible.<sup>6</sup> This is becoming a major challenge because of two main factors: a demographic shift in the age distribution of the population and a related rise in health care costs for the elderly. This demographic shift is only just beginning, as one can see by comparing the age distributions of 2008 and a projection in



2060 illustrated in the chart below (Fig. 1):

Fig. 1: 2008 and projected 2060 population of EU27 by age<sup>7</sup>

The urgency of the consequences of this demographic shift become more palpable if we take a closer look at the part of health care costs that is spent on the health of the elderly, shown in Figure 2 below:

<sup>1</sup> European Commission – ERA Expert Group, 2008, Challenging Europe’s Research: Rationales for the European Research Area, accessible online: [http://ec.europa.eu/research/era/pdf/eq7-era-rationales-final-report\\_en.pdf](http://ec.europa.eu/research/era/pdf/eq7-era-rationales-final-report_en.pdf)

<sup>2</sup> European Commission – ERA Expert Group, 2008

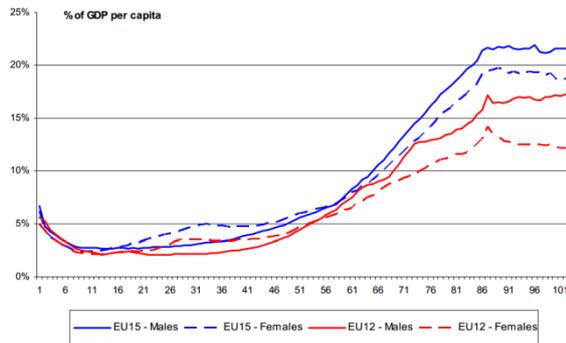
<sup>3</sup> These briefs are publicly accessible online on the EFP website: <http://www.foresight-platform.eu/briefs-resources/>

<sup>4</sup> EFP publications, including papers on the topics discussed here, can be downloaded from the EFP website: <http://www.foresight-platform.eu/community/publication-sources/>

<sup>5</sup> This is also referred to as “compression of morbidity” (Fries, 2005), reducing the number of years with age-related illness or disability (e.g. from 6 years with disease, illness or disability to 3 years).

<sup>6</sup> Crimmins/Beltrán-Sánchez, 2010 (<http://psychsocgerontology.oxfordjournals.org/content/early/2010/12/06/geronb.gba088.full>)

<sup>7</sup> Source: European Commission, 2010, Economic Papers, 417 July 2010, accessible online at : [http://ec.europa.eu/economy\\_finance/publications/economic\\_paper/2010/pdf/ecp417\\_en.pdf](http://ec.europa.eu/economy_finance/publications/economic_paper/2010/pdf/ecp417_en.pdf)



**Fig. 2: Health care expenses by age for EU15 and EU12 (2009)**<sup>8</sup>

If we combine these two developments, we can see how the high spending in health care costs for the elderly can be expected to become much higher, even prohibitively so, once the projected demographic shift will have become a reality in 2060. A solution to this challenge is required to ensure the sustainability of social security systems and pensions while also improving the quality of life.

Healthy ageing – increasing the number of life years spent in (relative) health and reducing the number of years in which extensive medical care is required – may offer a solution to the challenges posed in two ways: (1) by reducing the health care expenses for the elderly and (2) by allowing the elderly to be productive members of society for a longer time and in this way helping to share the burden of those who require extensive medical care.<sup>9</sup>

### 2.1.2 Urban Europe

The great majority of European citizens live in urban areas, and the percentage is increasing further. This is not just a European development; it is visible worldwide, as we can see in the Figure 3 below:

Urbanisation brings with it many challenges, related to mobility (e.g. congestion, we also discuss this in the smart mobility topic section below), climate change mitigation, dealing with calamities (heat waves, flooding, etc.), resource scarcity (energy, water), globalisation, demographic changes, migration, and safety and security. These challenges relate strongly to the other Grand Challenges described in this publication, e.g. those relating to healthy ageing and smart mobility.

A EFP policy workshop was organised to assist the Joint Programming Initiative – Urban Europe (JPI-UE) in the preparation of forward looking activities. These activities play a major role in providing substantial new insights into urban requirements and developments, in developing urban scenarios and in contributing to a long-term research agenda.<sup>10</sup> The challenges identified during this workshop relate mostly to globalisation and increasing competition of global regions and world cities for motors of growth. Fast growing megacities in BRIC countries are offering increasing competition to Europe. In this context the challenge is, how can cities benefit from cooperation and competition in a global environment? What kind of strategic policy instruments can be utilised to this end?<sup>11</sup>

<sup>8</sup> Source: European Commission, 2010, Economic Papers, 417 July 2010

<sup>9</sup> Read more on this challenge in other EFP publications: Leis, 2011: EFP-Policy-Reflection – Active and Healthy Ageing - A Long-term View, and Leis & Gijbbers, 2011: Active and Healthy Ageing – A Long-term View up to 2050, online at: <http://www.foresight-platform.eu/community/publication-sources/>

<sup>10</sup> Read more on this challenge in other EFP publications: Kubiczko, 2012, EFP Policy Brief – Urban Europe National Workshop and Kubiczko, 2011, EFP Policy Reflection – Screening Urban Foresight, online at: <http://www.foresight-platform.eu/community/publication-sources/>. Publications specific to the workshop are accessible at: <http://www.foresight-platform.eu/3042/featured/what-research-efforts-are-needed-to-make-european-cities-fit-for-the-grand-challenges-of-the-future/>

<sup>11</sup> Kubiczko, 2012, EFP Policy Brief – Urban Europe National Workshop and Kubiczko, 2011

## 2.2 Smart Mobility

Mobility and transport are fundamental and vital to economies and societies at large. For Europe, efficient and sustainable transportation and mobility are essential to participate in the world economy and sustain growth and prosperity.

Transport and mobility have grown substantially over the past decades, facilitated by relatively low fuel prices, improving infrastructures and a lack of curtailing environmental constraints.

Nevertheless, it is widely acknowledged that transport and mobility can no longer grow on the same path and at the same pace without serious environmental, social and economic consequences. As stated by the European Commission in the Transport 2050 Whitepaper<sup>12</sup> (Roadmap to a Single European Transport Area), European mobility and transportation are facing a number of severe challenges:

- CO<sub>2</sub> emissions from transport are still growing – despite more energy-efficient vehicles – while mobility and transport demands are further increasing as well.
- Transport is extremely dependent upon fossil fuels while crude oil will become more scarce and expensive.
- Rising levels of congestion with growing mobility and transport demands.
- The European transport industries are facing growing competition from other world regions where transport modernisation and infrastructure investment programmes are being developed and innovation in transport technologies is taking place.

The concept of “smart mobility” indicated the direction in which solutions were examined in the EFP workshop. Smart mobility implies making transport systems more intelligent, more flexible and adept by using ICT, in particular the opportunities that advanced ICT systems offer. Advanced ICT allows, for example, to manage complex transportation systems in

<sup>12</sup> European Commission, 2011, Transport 2050 Whitepaper, accessible online at: [http://ec.europa.eu/transport/strategies/2011\\_white\\_paper\\_en.htm](http://ec.europa.eu/transport/strategies/2011_white_paper_en.htm)

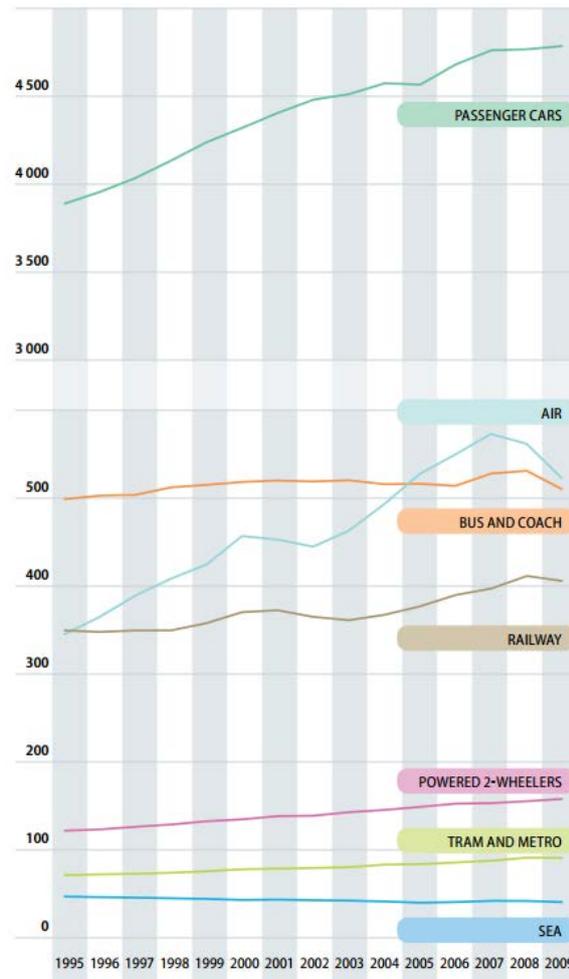


Figure 3: EU27 performance by mode of transport 1995-2009 (Source: EC Statistical Pocketbook 2011, EU transport in figures)

a cooperative way. So-called cooperative systems are defined as systems with dynamic feedback loops among operators and users to constantly optimise the system functions. These systems do not only allow to command and control operations, but also to monitor, intervene and even support self-regulation and systems learning. Advanced ICT in mobility and transportation supports decision making (smart choices) on how to travel or ship, including the option not to do so but to organise planned activities in other ways instead.<sup>13</sup>

Mobility is a topic that is interrelated with many others. This is demonstrated in the four future

<sup>13</sup> This description is based on the one provided in the EFP workshop background paper. Read more on this challenge in other EFP publications: Schoonhoven, B., Seibt, C., van der Giessen, A., van Oort, S., van Vliet, H., 2012, Smart Mobility 2050: Human Centered Vision and Long-term Horizon, accessible online at: <http://www.foresight-platform.eu/events/event-reports/>

“sketches” used in the Smart Mobility workshop to look at the topic from four different perspectives. These sketches are “The Smart and Seamless Connected Traveller”, “Smart Mobility in Urban Environments”, “Virtual Mobility”, and “Mobility & Healthy Living”. The relations to urban Europe and healthy ageing are immediately obvious (in fact, the discussion on Mobility & Healthy Living focused on mobility of the elderly). However, the Smart and Seamless Connected Traveller and the Virtual Mobility sketches also involved urbanisation and health-related challenges and solutions.

### 3 Challenges and Solutions

Even though the three topics have a very different focus (health, urban living, mobility), there is a clear overlap. First of all, the challenges identified in the different topic discussions are not exclusive to one topic but play a role in one or both of the other topics as well.

The most significant challenge that is present in all three topics is that of the **demographic change** in age distribution. This is the central challenge for healthy ageing, and healthy ageing solutions attempt to find ways to tackle the direct consequences of the demographic change by helping people stay active and productive for longer. However, both in urban Europe and smart mobility, the demographic shift is a central feature in the changes that are discussed: the need to provide for the special needs of the elderly in urban environments and the need to provide for their mobility needs.

A second challenge that returns repeatedly is **globalisation** and the increasing competition it brings. For urban Europe, globalisation poses challenges to the competitiveness of large cities as centres of innovation and economic growth. In smart mobility, globalisation challenges the European transport industries to come up with an answer to rising competitors across the globe. While in the context of urbanisation and mobility, globalisation is mainly a source of new challenges to European society, it may offer solutions for healthy ageing and the demographic shift involved. The main idea behind this is that across the globe there may be more than enough young people to staff the workforce required to even the balance be-

tween retired elderly and the working populations. However, such a solution is not without its own difficulties since it poses new challenges for the successful integration of immigrants in a society where this idea increasingly meets opposition.

Finally, **environmental challenges** in the form of the unsustainable consumption of fossil fuels, water and other resources and the related unsustainable emission levels of CO<sub>2</sub> are clearly present in the urban Europe and smart mobility topic discussions. Transportation is extremely dependent on the consumption of fossil fuels, and CO<sub>2</sub> emissions from transport are still rising. Similarly, cities require massive amounts of energy, water and other resources to function, and to ensure a sustainable supply of them proves to be a major future challenge. Urban Europe also poses a challenge to some cities to handle the consequences of the environmental changes by preparing for rising water levels and increasing instability of the climate, for instance. In healthy ageing, the environmental challenge only plays a minor role in that, according to some, healthy ageing implies that mobility should be increasingly man-powered, which benefits both health and the environment.

#### 3.1 Research Topics

For each of the challenges described, a host of different solutions were proposed in discussions during the EFP project. Many of these solutions depend on scientific and technological developments.

A major research topic that surfaces in every topic discussion as a horizontal enabler is **information and communication technologies** (ICTs). For example, for demographic change there is a promise of e-health, telemedicine and assistive technology infrastructures to improve the autonomy of the elderly. The smart mobility solutions to the mobility challenges are “smart” in the sense that they involve the use of ICTs to optimise travel planning, automate vehicles, or provide alternatives to physical mobility. For urban Europe, ICT plays a key role in the basic infrastructures on which the operation of cities increasingly depends while it promises to improve city planning, support social cohesion, and serve as a

motor for innovation and economic growth. The expectations are especially high when it comes to solutions provided by developments in the large-scale and intelligent processing of (sensor) data (also known as “big data”), the possibilities for ICTs to connect people through new communication and remote presence technologies, and the possibilities that networking devices (be it vehicles or implanted chips) offer.

More specific to the health topic, research for specific age-related diseases (most notably dementia), regenerative medicine, but also research that could lead to a better understanding of the ageing process itself (to possibly reduce some of the degenerating processes) are recommended research topics that focus more directly on combating the effects of ageing.

A demand for innovations for the efficiency, safety, environmental impact, and accessibility of transportation infrastructures are also a recurring theme, both in the smart mobility, urban Europe, and healthy ageing topic areas. For example, infrastructure may be designed to stimulate healthy mobility (e.g. walkways, cycle paths).

## 4 Conclusions for Policy

In the discussions during the EFP project, numerous suggestions for policy measures (apart from suggestions for research) were made. For example, one suggestion was to create a separate ministry that deals with the social, economic, scientific, technological, legal and ethical issues around ageing. Other suggestions were to establish closer cooperation between the policy areas of transportation and health (especially when it comes to enabling and promoting “healthier” forms of mobility) or to pursue institutional changes related to both urban planning and health care, such as integrative care: an integration of homes and hospitals and new forms of community living designed for the needs of elderly.

However, we discuss three recurring themes in the measures proposed by the participants of foresight workshops: the promise of ICT, risks of exclusion and regionalisation as a solution.

### The promise of ICT

A recurring direction for solutions to every Grand Challenge identified and discussed during the EFP project was information and communication technology. The focus on ICTs may have been influenced here to a certain extent by the choice of topics. However, there is no question that ICTs are highly disruptive technologies, which are profoundly changing our society. There is further little question that ICTs hold the promise to provide a wide range of solutions, many even unimagined at this time.

Two important things need to be considered as a result of this framing of ICTs as a core part of many solutions. The first is that ICTs may not (fully) deliver on this promise. Several ICT-related technological developments, including big data, the use of sensor data, and networking technologies, are at the height of their hype cycle. This means that it is likely that some, or even many, of the commonly held expectations with regard to these developments are too high.

A second note is that insofar as the promise of ICT holds and it does indeed provide an array of solutions, this brings with it a radically increased dependency on the reliability and security of ICT infrastructure and, because of this, new vulnerabilities to the continuous functioning of society. It is more important than ever for policy makers to pay close attention to trends in ICT from the perspective of the dependency of society on these developments. Is it possible to guarantee the security and reliability of core ICT infrastructures at sufficiently high levels compared to the degree of dependency on them? Are there ways of improving the security and reliability of such infrastructures or otherwise means of avoiding the dependency?

### Exclusion and accessibility

Another issue that was consistently raised throughout most discussions was the risk of exclusion of certain groups from the developments identified and the related importance of ensuring these same groups access to possible solutions. With regard to the demographic shift, it is important, however, to keep examining assumptions about what these groups can and cannot do. For example, the main aim of

healthy ageing is to change precisely this: what older people can do. Also, a broadly held assumption that the elderly are somehow incompatible with the use of ICTs may be true, but may also turn out to be true only for the specific generations of elderly who grew up without ICTs and not for the later generations that did.

### **Regionalisation versus globalisation**

Finally, a less central but also repeatedly raised solution to the challenges identified is a movement towards regionalisation: making production, mobility, facilities for citizens, etc. regional, distributed and relatively independent in nature, rather than following a trend towards globalisation, interdependency and centralisation. Regionalisation may involve a wide range of different areas, spanning from virtual meetings rather than physical ones (including many medical consultations) to revolutionary ideas in city planning, such as growing food inside cities, e.g. in “farm skyscrapers”.

Regionalisation would imply a reduced demand for transportation and mobility and hence be part of a solution to some urbanisation, environmental and mobility challenges. Participants in the EFP workshops indicated that this development towards regionalisation should be viewed in concert with other possible developments, such as a transition from unsustainable “consumerism” to more sustainable consumption patterns, which are based on, amongst other things, more regionalised production and consumption. Governance activities in this area include local capacity building (hence reducing the dependence on remote capacities), creating localised economic opportunities, and even considering the possibility of allowing a certain level of protectionism of local or regional production.

# FLA Anticipate Sustainable Development Challenges for Better Policy Support

VICENTE CARABIAS<sup>\*</sup>, CRISTIANO CAGNIN<sup>\*\*</sup>, KAREL HAEGEMAN<sup>\*\*\*</sup>, TOTTI KÖNNÖLÄ<sup>\*\*\*\*</sup>

<sup>\*</sup> ZHAW Zurich University of Applied Sciences, Institute of Sustainable Development, Switzerland, cahu@zhaw.ch

<sup>\*\*</sup> CGEE Center for Strategic Studies and Management in Science, Technology & Innovation, Brazil, cristianocagnin@gmail.com

<sup>\*\*\*</sup> JRC-IPTS Institute for Prospective Technological Studies, European Commission\*, Karel-Herman.HAEGEMAN@ec.europa.eu

<sup>\*\*\*\*</sup> Impetu Solutions, Madrid, Spain, totti.konnola@impetusolutions.com

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission or of its services.

## Abstract

This chapter explores current and forthcoming sustainable development challenges. By comparing the EU Sustainable Development Strategy (European Council, 2006), its related monitoring reports and the "Facing the future: time for the EU to meet global challenges" report (Boden et al., 2010), we can conclude that many future-oriented issues that have been identified thus far cover topics that are well reflected in sustainability indicator systems. Such comparisons can help policy making in terms of developing a better understanding of unsustainable trends and the respective needs for correction or prevention. Our findings also suggest that data collection could be enhanced to better monitor emerging issues that are currently not well covered by indicator systems. Today's sustainability indicator systems offer information on past and present states but provide limited support for understanding future developments. Combining sustainability monitoring with forward looking activities (FLA) could therefore enhance policy support in developing more adaptive and anticipatory approaches to better orient societal change towards sustainable development.

## 1 Introduction

Over the last few decades, the concept of sustainability has been high on the political agenda and in the business world. Forward looking activities (FLA) and sustainable development have been interlinked since the beginning of the 1970s, when the concept of sustainable development was first coined and supported by FLA (e.g., Meadows (1972) and various Interfuturs reports (1978)). All these efforts culminated in the Brundtland report, in which sustainable development was introduced as a necessity to safeguard the interests of future generations (United Nations, 1987). Recently, Destatte (2010) stated that anticipatory intelligence could be a major tool in tackling sustainability as well as one of the best methods for preparing sustainable strategies and policies. Könnölä et al. (2011) noted that FLA are often conducted to anticipate major societal future challenges and provide support to current decision making.

In the study "Facing the future: time for the EU to meet global challenges" (Boden et al., 2010<sup>1</sup>), future issues and challenges for Europe and the world were identified. These are closely linked to the sustainable development indicators (SDIs) or to challenges mentioned in the EU Sustainable Development Strategy (SDS; European Council, 2006). However, the few gaps detected between these studies offer, together, a more comprehensive view of the likely challenges ahead. These are worth considering for a better alignment of policy design and implementation in order to enable the EU to maintain a continuous improvement in the quality of life for both current and future generations.

Both studies tackle similar fields of policy making but approach these fields from different perspectives when it comes to sustainability.

<sup>1</sup> JRC-IPTS prepared the study for the Bureau of European Policy Advisors (BEPA) of the European Commission.

The SDS is built upon a set of measurable indicators (SDI) that support the advance towards sustainable development on the basis of issues that can currently be monitored. However, these issues are considered in a fragmented way. Indicators that could be taken more or less independently are instead linked to specific policy fields.

The JRC-IPTS study considers not only issues that can be measured today (i.e., trends) but also brings into the scope of policy making those future issues (i.e., weak signals and wild cards) that are not yet factors in policy design but could be anticipated by tackling them today. Here, the main benefit is to show that different but interlinked policy fields ought to be aligned to enable policy to tackle current and future challenges (Könnölä et al., 2012).

Given the interplay of tendencies in economic decline, social instability and environmental depletion, any transition towards sustainable development faces a challenging task (Wiek et al., 2006; Rotmans et al., 2000). This chapter advocates that anticipatory intelligence is required to successfully cope with such complex challenges. This can be done through the application of a variety of FLA methods such as scenario development, content and consistency analysis, (Delphi) expert surveys, trend and structural analysis, impact analysis and brainstorming. These and other methods have proven to be valuable. Application of such methods can lead to a limited spectrum of plausible future system states, with the ability to successively integrate new insights at each stage (system analysis, future projection, consistency analysis), for instance.

Therefore, FLA that interact around a wide set of individual opinions, which might or might not be based on quantitative evidence, support the definition of adaptive strategies or policies. Hence, results cannot be expected overnight and the use of FLA cannot be a one-off exercise. It requires an ongoing and inclusive approach, one in which more attention is given to a process that should be in continual adaptation so that it remains sensitive to socio-economic changes along the way. By this means, futures research has a formal connection to the strategic planning process (Cagnin et al., 2008) and provides a framework

for thoughtful discussion about moving toward sustainable development (Floyd and Zubevich, 2009).

Following a description of the methodologies and factors employed in both the SDS and the JRC-IPTS studies, a comparison between them is undertaken in this chapter. This comparison identifies common and complementary elements that offer a more robust support to policy making. Furthermore, the need to anticipate and adapt to future challenges is articulated and linked to the current monitoring of existing indicators. This effectively enables science and policy making to be in a stronger position to anticipate and address forthcoming societal challenges, and thus to correct or prevent unsustainable trends. Finally, a few policy recommendations are outlined to support policy design and implementation in the service of sustainable development.

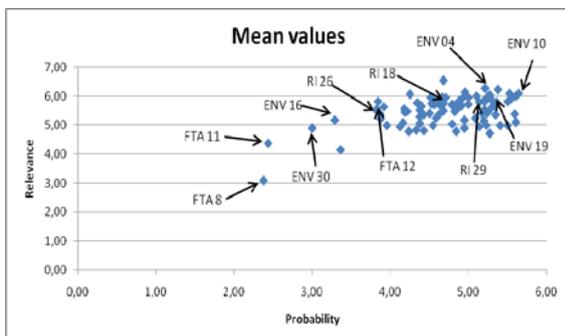
## 2 Methodology

Sustainable development is a fundamental and overarching objective of the European Union, enshrined in the Treaty<sup>2</sup>. The EU Sustainable Development Strategy (SDS; European Council, 2006) sets out a coherent approach to how the EU will more effectively live up to its longstanding commitment to meet the challenges of sustainable development. It reaffirms the overall aim of achieving continuous improvement in the quality of life and well-being for present and future generations (European Commission, 2009). The Eurostat monitoring report, which is based on the EU set of sustainable development indicators (SDIs), provides an objective and statistical snapshot of the progress towards the goals and objectives of the EU Sustainable Development Strategy. It is published every two years and is intended to contribute to the biennial review of the implementation of the strategy by the European Council.

In an FLA study for the Bureau of European Policy Advisors (BEPA), Boden et al. (2010) identified a high number of issues that might shape the future of the EU and the world by 2025. These issues were distilled from an

<sup>2</sup> The Treaty is a binding agreement between EU member states and includes the setting of EU objectives.

extensive analytical review of more than 120 forward looking studies in six relevant policy areas: 1. demography, migration and health; 2. economy, trade and financial flows; 3. environment, energy, climate change and agriculture; 4. research, innovation and (e)-education; 5. (e)-governance and (e)-social cohesion; and 6. defence and security. Through an online survey, almost 400 issues were identified. These were complemented by issues from the FTA (2008) conference survey that aimed to identify trends, weak signals, persistent problems and wild cards, among others. The set of compiled issues was subsequently assessed by around 270 third-party experts according to three criteria: novelty, the probability of occurrence by 2025 and their policy relevance at the EU level (cf. Fig. 1 in which selected issues are positioned according to their probability and relevance ratings). Multi-criteria quantitative analysis (robust portfolio modelling) was used to prioritise the resulting issues (Brummer et al., 2008). The results of the literature review and the online assessment served as the basis for a further examination of the state of the world in 2025. This took place during a workshop with 19 international experts either in futures planning or in the specific policy fields considered in the study, and with 22 representatives from several Directorates General of the European Commission. Issues were clustered in an interdisciplinary way to describe novel crosscutting challenges that were considered to be relevant at the EU level and that required the alignment of policy measures.



**Figure 1. Issues highlighted by the mean-oriented analysis. ENV10 represents the possible impact of the energy transition on global economic development, for instance, and ENV04 represents climate impact. © JRC-IPTS**

Hence, the main objectives of the expert workshop were to organise the findings of the literature review and the analysis of the online

survey into clear overarching challenges and to prioritise the challenges that need to be tackled by the EU in order to secure a better future for all. At the end of the workshop, the challenges were jointly translated into policy recommendations.

As a wide variety of challenges related to the future of the world in 2025 emerged, three criteria were used to prioritise and select the most important ones to be tackled at the EU level:

- Urgency: Does the challenge provoke a likely impact that requires urgent action at the EU level?
- Tractability: Can solutions to challenges be identified and implemented, and does the EU have the institutional capacity to act upon this challenge?
- Impact: Are the actions to be taken by the EU expected to have a significant global positive effect?

This resulted in the identification of three main all-encompassing challenges as described in section 4. For the purposes of this chapter, those future-oriented challenges and the identified issues were subsequently compared with the main challenges for the EU listed in the SDS as well as with the corresponding SDIs. As a result of this comparison, the elements that complement each other in support of policy making were identified. In addition, evaluating the SDIs and the future issues that are similar to those identified in Boden et al. (2010) allows one to anticipate the point at which unsustainable trends need to be corrected. It also enables the identification of those currently favourable trends that might be at risk of deviating from a sustainable development path in the future.

In the following sections, after presenting the main challenges for the EU that are listed in the SDS and the corresponding SDIs, they will be compared to some of the results of the JRC-IPTS study. This comparison will reveal common elements that can provide clues about both their likely future development and how these studies complement each other.

### 3 Challenges within the EU Sustainable Development Strategy

The SDS deals with economic, environmental and social issues in an integrated way and lists the following seven key challenges: climate change and clean energy; sustainable transport; sustainable consumption and production; conservation and management of natural resources; public health; social inclusion, demography and migration; and global poverty.

The SDS also outlines crosscutting policies that contribute to the knowledge society, namely, education and training, and research and development. It advocates the use of economic instruments in implementing the strategy while calling for integrated financing mechanisms. It proposes actions towards communication and stakeholder involvement.

Moreover, the SDS requires the Commission to develop indicators at the appropriate level of detail to monitor progress toward meeting each particular challenge. A first set of Sustainable Development Indicators was adopted by the Commission in 2005 and continues to be reviewed by Eurostat every two years to adjust them to the SDS. They are presented in ten topic areas (cf. fig. 2) and used to monitor the EU SDS.

#### 3.1 Measuring progress towards sustainable development

An evaluation of progress since 2000 that is based on the headline indicators presents a rather mixed picture (European Commission, 2011). No headline indicator shows clearly unfavourable changes – which suggests that the European Union has made some progress along the path towards sustainable development. However, when looking at the additional indicators within the individual topic areas of the EU SDI set, a number of clearly unfavourable changes persist, and the overall picture might be less positive than the impression given by looking at the headline indicators in isolation. In looking at the 11 headline indicators in Figure 2, it is apparent that progress has been mixed. There have been favourable developments in reducing the number of people at risk of poverty or social

exclusion as well as in reducing the emissions of greenhouse gases and the consumption of renewable energy. However, there have been clearly unfavourable changes in the production of wealth from the use of natural resources, the employment of older workers, breaking the strong link between the energy consumed by transport and economic growth, the overexploitation of fish stocks and official development aid.

| SDI theme                              | Headline indicator                              | EU-27 evaluation of change |
|--|---|----------------------------|
| Socioeconomic development              | Real GDP per capita                             |                            |
| Sustainable consumption and production | Resource productivity                           |                            |
| Social inclusion                       | Risk of poverty or social exclusion (*)         |                            |
| Demographic changes                    | Employment rate of older workers                |                            |
| Public health                          | Life expectancy and healthy life years (**)     |                            |
| Climate change and energy              | Greenhouse gas emissions                        |                            |
|  | Consumption of renewables (***)                 |                            |
| Sustainable transport                  | Energy consumption of transport relative to GDP |                            |
| Natural resources                      | Abundance of common birds (****)                |                            |
|  | Conservation of fish stocks                     |                            |
| Global partnership                     | Official Development Assistance                 |                            |
| Good governance                        | [No headline indicator]                         | :                          |

(\*) From 2005.  
 (\*\*) From 2002.  
 (\*\*\*) From 2006.  
 (\*\*\*\*) EU aggregate based on 10 Member States.

Figure 2. Evaluation of changes (since 2000) © 2011 Eurostat

Moreover, given that nearly half of the headline indicators are moving in a moderately unfavourable direction (Figure 2), it cannot yet be concluded that the EU is on the path to sustainable development. Nevertheless, it should be borne in mind that the current situation has been complicated by the influence of the recent economic and financial crisis, the impact of which reaches far beyond the economy (European Commission, 2011b).

In mid-2011, when the 2011 monitoring report of the EU SDS was being finalised, the EU economy was still only showing slow growth. The impact of these events has been affecting many of the issues covered by the indicators presented in this report (European Commission, 2011).

#### 3.2 Integrating sustainable development policy priorities

The overall aim of the SDS (European Council, 2006) is to 'achieve continuous improvement of quality of life both for current and for future generations, through the creation of sustainable communities able to manage and use resources efficiently and to tap the ecological and social innovation potential of the

economy, ensuring prosperity, environmental protection and social cohesion.’ It also further specifies that ‘to that end it promotes a dynamic economy with full employment and a high level of education, health protection, social and territorial cohesion and environmental protection in a peaceful and secure world, respecting cultural diversity.’ The strategy therefore points to the different elements that influence human well-being, and the key challenges reflect these main components and associated threats. But these priorities cannot be considered separately since there are many inter-linkages between them, as illustrated in each of the topic overviews in the SDS monitoring report. These inter-linkages need to be taken into account to exploit the synergies between the different policy instruments that are used to implement EU policy and minimise trade-offs. The renewed strategy indeed recognises that one of the main challenges to sustainable development is the non-integrated approach to policy making.

Moreover, Botterhuis et al. (2010) note that indicators as signals of change should not be seen as independent short-term factors. Instead, there is a need to place them in a long-term perspective, thus allowing for a more valid interpretation of the signals involved.

## 4 SDS and Anticipatory Intelligence

Research is needed, and is underway, for a better understanding of the inter-linkages between the different issues that are relevant to sustainable development and in particular those which exist between the different priorities of the sustainable development strategy (SDS). In this respect, the JRC-IPTS study, which is presented in the following section, adds value by unlocking some of the inter-linkages between different policy fields that could be considered in alignment to help policy address effective measures that can enable a progressive leap (Cagnin, 2005) towards sustainability.

### 4.1 Facing the future: global challenges affecting the EU

The study "Facing the future: time for the EU to meet global challenges" carried out by the

JRC-IPTS (Boden et al., 2010) provides a broad picture of the main global challenges, existing and emerging trends and how the EU could position itself to take an active role in shaping a response to them.

The benefit of this perspective is that these are all crosscutting challenges comprising several interesting issues that span different policy fields. It shows the realms in which the EU could be taking an active policy role to shape a positive global response. This is critical to ensure that its current citizens and future generations can enjoy the benefits of a world with sustainable economic growth and an improved quality of life for all.

To shape proper policy responses that address all the pressing current global challenges, especially the areas in which these can be divorced from one another, is clearly a demanding task. Moreover, the focus should be not only on the challenges that societies face today but to enable the anticipation of possible future critical challenges that can be effectively addressed before they occur, thus transforming them into opportunities rather than another pressing problem. The latter poses a further challenge to the ability of institutions to provide solutions in due time. Some form of FLA process is essential for assessing which areas are the most promising (Dearing, 1999) when formulating a response to the challenges of sustainable development.

Based on the criteria of urgency, tractability and impact (cf. section 2), three challenges with a global scope were prioritised. Their multiple dimensions and the inter-linkages between related policy fields are articulated in the sections below (Boden et al., 2010). The assessment of the type of EU actions needed to address these global challenges follows in a summarised form in section 4.1.4 (Boden et al., 2010).

#### 4.1.1 *Changing the current ways in which essential natural resources are used*

This global challenge relates to the human overexploitation of basic natural resources that are essential for societies to function and evolve in a sustainable manner. Current conditions and patterns of behaviour need to change, and policy actions that support the

shift towards sustainable ways of living should be fostered and strengthened. Long-term sustainability is key to ensuring not only economic growth but also a better quality of life for current and future generations. This depends on the intelligent use, conservation and renewal of natural resources and ecological systems.

#### **4.1.2 *The need to anticipate and adapt to societal changes***

For the EU to fully become a knowledge society there is a need to anticipate and adapt to political, cultural, demographic and economic transformations. Business, demography and societies as a whole are generally changing at a much higher rate than public institutions and their related decision making processes. Legal frameworks, social security systems, education and healthcare models have difficulties keeping up with the pace of these transformations. This hampers innovation and economic growth and puts great pressure on natural resources and the ability of institutions to cope with societal transformations.

#### **4.1.3 *More effective and transparent governance for the EU and the world***

This challenge comprises the need for the EU to create more transparent and accountable governance structures and processes that can adapt to and anticipate the future, and to use this capacity to do likewise at global level. This is important to address global and common challenges and to spread democracy and transparency all over the world.

#### **4.1.4 *Policy actions needed to enable sustainability***

In general terms, to advance policy design and implementation, it is critical to build a global balance between cooperation and competition, to strengthen multi-actor partnerships and global agreements on the basis of dialogue, shared values and common regulations. Likewise, it is essential to enable international institutions that equally represent all nations to be vigilant and to enforce widely accepted juridical approaches. Furthermore, policies in different fields should be aligned to successfully address the aforementioned three challenges. For example, policies for energy,

climate, food, water and transport are very much interdependent.

Developments such as a cultural shift from individual to collective values, accounting for biodiversity or ecological flows and stocks instead of using GDP as a measure for policy design and growth, increasing governments' transparency and accountability, and empowering citizens through new ways of learning, interacting and communicating, which can be supported by ICTs (e.g., to construct a more networked world and ubiquitous healthcare), are insufficiently addressed in current policy and decision making processes.

Furthermore, a harmonised approach toward supporting the growth of developing economies and fostering their capacity for self-sustainability in addition to welcoming high-skilled immigration to the EU would be beneficial to economic and social development as well as a more intelligent global use of natural resources.

## **4.2 Comparing the outcomes**

The resulting issues (existing and emerging trends as well as wild cards) and crosscutting challenges of the JRC-IPTS study (Boden et al., 2010) can be compared to the main challenges for the EU listed in the SDS (European Council, 2006) and the corresponding headline SDIs. This exercise is carried out to identify similar elements and how they can complement each other in offering more robust support to policy making.

There is a direct relationship between the SDS challenges and those covered by the JRC-IPTS study.

The first four challenges within the SDS — namely, conservation and management of natural resources, climate change and clean energy, sustainable transport and sustainable consumption and production — are covered by the global challenge within the JRC-IPTS study that is summarised above in section 4.1.1, titled 'Changing the current ways in which essential natural resources are used'. The most well-known of these challenges are climate change, water scarcity, decline in geographical distribution, energy shortage and lack of food. Economic growth has largely

relied on the overexploitation of essential natural resources and hence ultimately caused the disruption of natural cycles. Techno-institutional lock-in (i.e., path dependencies in the use of existing resources and building capabilities as well as the respective inertia for change in physical infrastructures and institutions) might be an important factor that compounds and intensifies the human impact on nature since it creates barriers to sustainable alternatives to existing processes and infrastructures as well as behaviours.

The next two challenges within SDS — namely, social inclusion, demography and migration and public health — are addressed within the global challenge in the JRC-IPTS study summarised in section 4.1.2, titled 'The need to anticipate and adapt to societal changes'. The multiple dimensions of those challenges include rising employment rates, ageing societies, increased migration, changing social security systems and healthcare models, education and ICT innovations, new converging technologies and a shift in global economic power.

The final challenge within SDS, namely, global poverty, is addressed in the global challenge within the JRC-IPTS study that is summarised in section 4.1.3, titled 'More effective and transparent governance for the EU and the world'. The multiple dimensions of that challenge are the need for interlinked and aligned policy responses, migrations caused by pandemics and poverty, an increasing shift towards empowerment in governance and pressures on democracy.

However, the defence and security issues covered in the JRC-IPTS study are neither addressed within the SDS nor by the SDIs. Although the 2009 review of the SDS emphasises the strengthening of the international dimension of sustainable development and the intensifying efforts to combat global poverty (European Commission, 2009c), it still does not introduce defence and security issues. At the very least, the SDS does call for the inclusion of sustainable development concerns in all EU external policies, even in the Common Foreign and Security Policy. Moreover, on the basis of the JRC-IPTS study it would also be important to

identify the need to consider issues such as new, sophisticated forms of terrorism (e.g., bioterrorism, cybercrime, etc.) and the protection of critical infrastructures, among other things, together with those issues that are directly related to sustainable development (i.e., social, environmental and economic).

Globalisation has brought new opportunities. High growth in the developing world, led by China, has lifted millions out of poverty. But globalisation has also made threats more complex and interconnected. The arteries of our society, such as information systems and energy supplies, are increasingly vulnerable. Global warming and environmental degradation are altering the face of our planet. Moreover, globalisation is accelerating shifts in power and is exposing differences in values (European Council, 2008). Recent financial turmoil has shaken developed and developing economies alike.

By drawing on a unique range of instruments, the EU already contributes to a more secure world. The EU has worked to build human security by reducing poverty and inequality, promoting good governance and human rights, assisting development and addressing the root causes of conflict and insecurity. The EU remains the biggest donor to countries in need. Long-term engagement is required for lasting stabilisation (European Council, 2008). All this EU engagement is indeed very much related to sustainable development: the means to build human security are considered worthwhile enough to be mentioned in the SDS.

Finally, a deeper look at the issues identified within the JRC-IPTS study (2010) reveals the following coverage of the headline SDIs itemised in Table 1 and alerts policy makers to the areas in which they must intervene to prevent unsustainable trends or the areas in which they should continue to support sustainable developments.

It is not surprising that the issues shaping the future that have been identified in the JRC-IPTS study are very closely related to the headline SDIs. In addition, the global challenges that humanity will face in the future cover many aspects of the SDS challenges.

However, beyond those issues that fall under the defence and security aspects of the JRC-IPTS study, the elements that could be considered for inclusion in the following SDS are: 1) the specific policy fields that must be aligned to tackle specific challenges and enable a progressive leap towards

sustainability and 2) the use of participatory forward looking techniques as an inherent part of policy making to build a common understanding of current situations and to translate these into common visions of the future of the world to be jointly pursued.

| Headline SDI                     | Corresponding issues within the JRC-IPTS study  |
|----------------------------------|---|
| GDP per capita                   | Global economic shocks; continued economic growth of Asian countries, with China and India likely to account for 50% of the world GDP by 2060   |
| Greenhouse gas emissions         | Climate disruption; increasing EU-27 energy related CO <sub>2</sub> emissions   |
| Consumption of renewables        | The rising importance of decentralised power generation, with both large industrial power plants and fuel cells installed in private homes working in interconnected grids that will form the backbone of the European power generation sector; energy transition having possible impacts on the world's economic development |
| Energy consumption of transport  | Hybrid vehicles being widely available and in use on a global scale by 2020; the crossing of "tipping" points (i.e., the points at which environmental impacts would be irreversible) towards the middle of the 21st century  |
| Resource productivity            | Increasing global application of ICTs to reduce energy consumption  |
| Common birds                     | Rapid global decline in biodiversity and loss of ecosystems   |
| Fish catches                     | Global decline of marine and freshwater fish availability due to persistent overfishing or overexploitation of aquatic systems as well as climate change and contamination  |
| Healthy life years               | Equal access to healthcare will see increasing support among the EU citizens; costs of healthcare are rising in the Western world   |
| Risk of poverty                  | The gap between rich and poor will increase globally  |
| Employment rate of older workers | Employment rates at the age of 60 continue to grow in the EU-27   |
| Official development assistance  | Increasing power of Europe as a global player actively engaged in dealing with global challenges as well as in defining and governing global rules that serve as models for new forms of governance for many developing states  |

**Table 1. Coverage of the headline SDIs by selected issues identified in the JRC-IPTS study © 2009 JRC-IPTS**

### 4.3 Implications for SDS and anticipation

Comparing the main results of the JRC-IPTS study and the SDS has revealed a close correspondence between them. This highlights the way in which the first could complement the latter in supporting policy design towards a more sustainable future.

As long as it is possible to anticipate the causes of any economic, social or environmental crisis, society is in a position to address them beforehand — either to deal with the likely consequences or even to transform them into opportunities. However, if the causes are not fully recognised, crises are inevitable. Emerging shortages of food, water and other resources on account of demographic trends and human activity will have far-reaching economic and social consequences. They will become multilevel global challenges.

Governments and companies usually react to changes by trying to adapt rather than being able to manage them properly, let alone being able to anticipate and welcome such change. Multiple factors influence the ways in which the future unfolds, and existing institutions have not yet been able to develop a fully systemic view of current and possible future situations that will prepare them to shape the future properly. There is an intrinsic need to position the EU within adaptive and dynamic global institutions to achieve global governance structures that are capable of addressing global and common challenges.

The current economic crisis has already shown that the notion that the free market will guide humanity in an optimal direction is a failure. While the free market is a good means for cultivating innovation, without regulation market forces will lead to further (over)exploitation of existing resources and an increase in the gap between rich and poor, with the consequences already described above. Moreover, the free market is unable or unwilling to fully anticipate future damage caused by climate change and other socio-ecological crises. The model of unconditional economic growth must be reconsidered by moving towards a more sustainable one that takes into consideration its current limitations

(financial and trade crisis, climate change, etc.) and the need for urgent political decisions.

Policy alignment and political will are necessary to allow full transparency and social participation and thus to change the ways in which individuals and organisations behave. EU policies could embrace the multicultural and social diversity of EU citizens as a competitive advantage and move away from the traditional compartmentalisation of different policy fields towards alignment based on dialogue and new ways of communicating and interacting with different stakeholders.

It is also important to develop the necessary means to establish global partnerships between industry, government and society, with international institutions that enable the necessary framework conditions and juridical power to ensure that the above partnerships are developed and that industry plays a positive role within global societies.

In this context, to consider undertaking forward looking initiatives such as EU and worldwide foresight studies on global challenges at regular intervals is critical to building a common understanding of current situations and to translating it into common visions of the world's future to be jointly pursued. In a decision making world, foresight does not appear naturally as the preferred method for sustainable development (Destatte, 2010). This is not surprising, because so far sustainable development is only being monitored (from the past to the present) to assess performance and decide on additional measures. FLA could anticipate the need for action and change the course of existing action, thus contributing to an ongoing renewal of the approach to sustainable development by emphasising its systemic and holistic aspects.

## 5 Conclusions

The foresight approach employed in the JRC-IPTS study contributes to policy making by supporting a continuous and shared approach in order to understand the present in all its complexity, to look at different future possibilities and to shape a joint direction to follow that considers different stakeholders' points of view. Coupling this with a periodic

evaluation of what has or has not been achieved (e.g., by means of sustainability indicators) enables policy to correct deviations and to continually adapt and reshape policies to address impending situations. Such an approach, which would be linked to other forward looking techniques and would tap into evidence-based research and quantitative elements, would help policy making to become more adaptive and able to anticipate and address changes along the path towards sustainable development.

Finally, to enable a clearer understanding of the possible routes toward tackling the challenges highlighted in this chapter, scenarios could be developed (as in Rotmans et al., 2000) to shape strategic agendas, decisions and policies, and at the same time to encourage stakeholders to take ownership of results so that they can be fully implemented. In addition, a periodic assessment of these scenarios would allow to update and adapt them in light of the latest world developments and to support trend-based, anticipatory intelligence that is able to guide sustainable development (Carabias-Hütter et al., 2005). Combining emerging future issues with sustainability indicators that monitor past and current situations would allow for a more comprehensive gauge and evaluation of sustainable development.

## Sources and References

- Boden M, Cagnin C, Carabias V, Haegeman K, Könnölä T. (2010) Facing the future: time for the EU to meet global challenges, EUR 24364 EN, Publications Office of the European Union, Luxembourg.
- Botterhuis L, van der Duin P, de Ruijter P, van Wijck P. (2010) Monitoring the future. Building an early warning system for the Dutch Ministry of Justice, *Futures* 42, pp. 454-465.
- Brummer V, Könnölä T, Salo A. (2008) Foresight within ERA-NETs: Experiences from the preparation of an international research program, *Technological Forecasting & Social Change* 75, pp. 483-495, DOI:10.1016/j.techfore.2008.02.005.
- Cagnin C. (2005) An Information Architecture to Enable Business Sustainability, PhD Thesis, University of Manchester.
- Cagnin C, Keenan M, Johnston R, Scapolo F, Barré R. (2008) *Future-Oriented Technology Analysis – Strategic Intelligence for an Innovative Economy*, Springer: Berlin.
- Carabias-Hütter V, Kümin D, von Allmen M. (2005) Aggregating Indicators for a Sustainable Regional Development: the Checklist for Self-Declaration and the Swiss Regional-Dashboard, In *Visualising and Presenting Indicator Systems*, International Conference, BFS: Neuchatel.
- Dearing A. (1999) Have we the foresight for sustainable development? *Foresight* 1, 2, pp. 131-142.
- Destatte P. (2010) Foresight: A major tool in tackling sustainable development, *Technological Forecasting & Social Change* 77, pp. 1575-1587.
- European Commission (2009) Indicators for monitoring the EU Sustainable Development Strategy, Eurostat: Luxembourg, <http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/introduction> [02.10.09].
- European Commission (2009b) Sustainable development in the European Union – 2009 monitoring report of the EU sustainable development strategy, Office for Official Publications of the European Communities: Luxembourg.
- European Commission (2009c) Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development, COM(2009) 400 final, 24.7.2009, European Commission: Brussels.
- European Commission (2011) Sustainable development in the European Union, 2011 Monitoring report of the EU Sustainable Development Strategy, Eurostat: Luxembourg, [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-31-11-224/EN/KS-31-11-224-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-31-11-224/EN/KS-31-11-224-EN.PDF) [01.08.12].
- European Commission (2011b) Is the EU on a Sustainable Development Path? Highlights of the 2011 Monitoring Report of the EU SDS, Eurostat: Luxembourg.
- European Council (2006) Review of the EU Sustainable Development Strategy (EU SDS) – Renewed Strategy, DOC 10917/06, European Council: Brussels.
- European Council (2008) Report on the Implementation of the European Security Strategy – Providing Security in a Changing World, DOC S407/08, European Council: Brussels.
- Floyd J, Zubevich K. (2009) Linking foresight and sustainability: An integral approach. *Futures* (article in press). DOI: 10.1016/j.futures.2009.08.001.
- FTA (2008) Survey of Big Picture Trends, Drivers and Discontinuities Looking Forward to 2025. FTA Stands for Future-Oriented Technology Analysis, [http://forera.jrc.ec.europa.eu/fta\\_2008/survey.html](http://forera.jrc.ec.europa.eu/fta_2008/survey.html) [02.10.09].
- Interfuturs (1978) Research project on the future development of advanced industrialised societies in harmony with that of developing countries. Final reports. OECD: Paris.
- Könnölä T, Scapolo F, Mu R, Desruelle P. (2011). Foresight Tackling Societal Challenges: Impacts and Implications on Policy-Making, *Futures* 43, pp. 252-264.
- Könnölä T, Salo A, Cagnin C, Carabias V, Viikkumaa E. (2012) Facing the Future: Scanning, Synthesizing and Sense-Making in Horizon Scanning, *Science and Public Policy* 39, pp. 222-231
- Meadows D.L. (1972) *Limits to Growth*, Earth Island Ltd: London.
- Rotmans J, van Asselt M, Anastasi C, Greeuw S, Mellors J, Peters S, Rothman D, Rijkens N. (2000) *Visions for a sustainable Europe*, *Futures* 32, pp. 809-831.
- United Nations (1987) Report of the World Commission on Environment and Development – Our Common Future, United Nations: Geneva.
- Wiek A, Binder C, Scholz RW. (2006) Functions of scenarios in transition processes. *Futures* 38, pp. 740–766.

# FLA Orienting Innovation Systems towards Grand Challenges and Increased Governance

CRISTIANO CAGNIN\*

\* CGEE Center for Strategic Studies and Management in Science, Technology & Innovation, Brazil, cristianocagnin@gmail.com

The views expressed are purely those of the author and may not in any circumstances be regarded as stating an official position of the European Commission or CGEE.

## Abstract

This chapter explores issues that the FLA community ought to consider to orient innovation systems towards grand challenges and increased governance. It does so by outlining the contributions FLA might make to orienting innovation processes towards grand challenges and to foster more participative and inclusive decision making. This chapter brings together extracts from three different papers: Cagnin et al. (2011), Cagnin et al. (2012) and Cagnin and Loveridge (2012). Together these address some of the epistemic and ontological assumptions that underlie much of current FLA practice. This is done on the basis of a systems-of-innovation approach and a reflection on the potential impacts of FLA activities in governance, as well as the need to use models that emphasise the creative aspects of living systems.

---

## 1 Introduction

Currently, there is a great deal of discussion about how science, technology and innovation (STI) systems might be reoriented to better address several grand challenges that affect both contemporary societies and the future of human civilisation itself.

The issues covered by the term 'grand challenges' naturally lend themselves to a global outlook, are grand in scope and scale, and are generally made up of 'wicked problems' (Rittel and Weber, 1973) that are difficult or even impossible to solve by single agencies or through rational planning approaches. The articulation of such grand challenges is hardly novel. The novelty in fact lies in the increasing attention given to such issues in formulating new missions for STI policy.

Recent efforts face many practical and conceptual hurdles. Grand challenges are by nature complex and largely impervious to top-down rational planning approaches. Even their meanings tend to be highly contested by different actors. Furthermore, any attempts to address them must span a number of long-standing organisational, epistemic and sectoral boundaries, which requires, for example:

- Interdisciplinarity that transcends the boundaries of traditional epistemic communities
- Cross-departmental coordination and coherence beyond the traditional silos that characterise policy making
- Multilevel governance approaches
- Technology convergence or fusion
- Cross-sectoral collaboration between various industries
- Longer-term time horizons to be introduced more explicitly into shorter-term policy agendas and business planning practices

A central question in this chapter concerns the roles that FLA might play in supporting such a new mission focus on grand challenges in order to support the development of a more directed and positively transformative innovation practice.

At the same time, the discussion about multiple stakeholders' participation in public policy and corporate decision making is central to addressing organisational, epistemic and sectoral boundaries and thus to enable a better understanding of alternative ways to deal with grand challenges through STI. Yet this has received very little attention from the FLA community, which has taken for granted that FLA activities are participative. The

stakeholders, their perspectives and the representations of the participants involved are usually not analysed in a systematic way. Therefore, 'genuine' (not just a smokescreen), 'inclusive' (reflecting all views within the community) and 'effective' (not just a talking shop) participation becomes a highly disputed matter (Large, 2003). If the achievement of equity and governance is the ultimate aim of policy making, then high-quality participation that is genuine, inclusive and effective is the essence of FLA processes.

## 2 Governance

The shift from 'government' to 'governance' and to the new global 'regulatory' state explains the substantial changes in legislation, regulation and public policy (Lindblom, 1977). The shift from technocratic decision making towards more democratic processes can be captured in the concept of governance. It explains the involvement of stakeholders in sharing responsibility for the political, economic and juridical decisions in a dialogue process with the political authorities. Governance and regulatory concepts imply a modified description of what regulation is, how it works and where the regulatory limits of state authority and the potential of society to influence, restrain or block public policies are. It also involves the positive contributions of corporations, institutions and associations to enhance public policy within a new framework that emphasises the interactive and interdependent nature of the new regulatory environment.

According to Sheng (2008), governance is the process of decision making and the process by which decisions are (or are not) implemented. The analysis focuses on the formal and informal actors involved in decision making and in implementing those decisions. At the same time, it also focuses on the formal and informal structures that have been put in place to arrive at and implement such decisions.

New forms of governance are based on calls for accountability, transparency, participation and coherence — all of which aim toward a reorganisation of decision making structures with the objective of reasserting social legitimacy. Policy documents, such as the European Commission's White Paper on Governance (COM, 2001), reflect the need to

move beyond formal processes of government and public administration to promote a continuous and closer interface between the state, the economy and society. Yet it argues that governance methods and systems have not been institutionalised on a broad and continuous basis in Europe and elsewhere.

In this context, and in order to achieve a genuine, inclusive and effective participation process, it is important to understand what is meant by the term 'stakeholder'. From Freeman's (1984) definition, Saritas et al. (2007) define stakeholders as 'any group of individuals who can affect or are affected by the policy decisions taken' (p. 3). The new governance and stakeholder approach has various implications for the relationships between society, corporate industrial activities and public governance. The implications of this approach for relationships between the society and public policy explain the shift from government to governance.

With regards to the relationships between corporate industrial activities and society, this new approach brought the concept of corporate social responsibility (CSR) onto the agenda. It explained that businesses have responsibilities other than their shareholders and their economic performance — that is, to take the interests of society and the environment into account.

CSR is a critical cross-connecting theme that involves democracy and participation in shaping corporate decisions. User-centred innovation assumes that user participation might help to prevent technological dead ends, reduce dependency on vendors and promote universal interoperable technology when innovation processes are shaped by the social environment. CSR brings wider societal concerns and values such as human rights, ethics and corruption, into business strategy and decision making.

Although some see CSR as philanthropy by a different name, it can be defined broadly as the efforts corporations make above and beyond regulation to balance the needs of stakeholders with the need to make a profit (Doane, 2005).

From a stakeholder perspective, strategic management needs to create a satisfactory balance of interests among the various stakeholders who contribute to or are affected by the firm's actions (Freeman, 1970).

Moreover, CSR is believed to deliver the greatest benefits to a company and its stakeholders when integrated with business strategy and operations (BSR, 2003). Hence, a core issue of CSR is partnership development. Moreover, a central assumption behind innovation systems theory is that knowledge is the fundamental resource in the modern economy and therefore learning is the most important process. It is also assumed that learning is an interactive and socially embedded process that cannot be understood without taking into consideration its institutional and cultural context. Factors such as public awareness of industrial and technological risk, growing instances of social resistance to new technologies, and calls for novel forms of public involvement and for democratisation of knowledge, raise the need to look at how perceptions and values, which are brought about by the so-called risk society, are shaping innovation processes. Hence, it is important to be clear that there is a need for emerging technologies to be subject to social scrutiny. Whereas technological innovation originates within firms and is protected to a great extent by secrecy and intellectual property, it is clear that novel modes of governance presuppose the transparency and openness of decision making procedures to stakeholders while acknowledging the relevance of knowledge other than science, such as experimental, ethical and social knowledge.

In this context, the question is how to formulate and facilitate policy making when taking into account the active involvement of society and the requirements of the new governance systems. This becomes ever more critical in formulating new missions for STI policy with a focus on addressing grand challenges.

### **3 Innovation Systems, Their Functioning, and Orientation towards Grand Challenges**

Innovation can be understood as a systemic activity, with firms and other innovating actors operating in linked environments of institutions and other actors. In this view, national innovation systems are complex constructs that display a variety of structures over a range of contexts and perform various functions. The

advantages of thinking in terms of innovation systems is that they provide a more complete picture of the topography of innovation-relevant actors and the relations between them, which are patterned by nationally – and sectorally – specific institutions (including ‘hard institutions’ like the law, but also ‘soft institutions’ like trust). There are distinct differences in actors and relations-shaping institutions between countries and sectors and in the way they perform. This means there is no possibility of a one-size-fits-all policy mix to improve the performance of innovation systems.

Innovation system analysis often takes as its starting point the system’s structure. It is here that innovation system ‘failures’ that demand policy attention tend to be identified while the analysis focuses on actors’ capabilities, the scale and nature of system interactions, and the workings of institutions (Arnold, 2004; Woolthuis et al., 2005). Indeed, expected system elements might be completely absent in some national settings – particularly in less developed countries – and/or weakly developed or dysfunctional in others. Each of these structural elements is further described below:

- Actors – these include a wide range of types of organisations, including firms, universities, public research labs, government ministries and agencies, and intermediary bodies such as industry associations and private consultants. Any reorientation of innovation systems towards grand challenges is likely to require both the establishment of new organisations and the adaptation of existing ones.
- Interactions – cooperation and interactive learning are central to the process of innovation. Such interactions involve not only firms, but also universities, government labs, ministries and funding agencies, among others. When innovation systems need to be reoriented, a great deal of ‘unlearning’ and disruption of existing linkages will be required as part of the process of transformative change.
- Institutions – these constitute the ‘rules of the game’ and ‘codes of conduct’ that reduce uncertainty in the innovation system. Institutions are emergent in that they are generated by the activities of actors and their interactions with one

another. At the same time, they also structure these activities and interactions. A distinction can be drawn between hard institutions (e.g., formal written laws and regulations) and soft institutions (e.g., social norms and values) that can enable or hinder innovation. Generally speaking, institutions provide important levers for policy to shape the behaviours and interactions of actors. This makes them an essential starting point in efforts to set in motion virtuous cycles of transformative change directed at grand challenges.

Extending the heuristic construct of ‘systems’ of innovation, some authors (e.g., Bergek et al., 2008) have recommended ‘functions’ of an innovation system as an alternative point of analytical departure. Such functional analysis, which is intended to supplement rather than substitute more traditional structural analysis, implies a focus on the dynamics of what is actually achieved in an innovation system. This is a potentially useful perspective for efforts that are directed at reorienting innovation systems towards grand challenges. The following six ‘high-level’ functions of innovation systems can be identified (Cagnin et al., 2012):

- facilitate experimentation and learning,
- nurture the development of knowledge,
- promote the diffusion of knowledge,
- guide the direction of search and selection for investment,
- promote market formation, and
- develop and mobilise resources.

Table 1 uses these functions to map a number of actions that are conducive to systemic reorientation towards grand challenges. The key challenges lie in engaging different voices, protecting spaces, balancing vested interests, establishing connections, co-ordinating experiments, leveraging investments, facilitating learning and formulating informed expectations. In this regard, there is a need for additional policies that are related to networks, community building, visions, experiments and learning. Such ‘socio-technical’ approaches refrain from simple policy recipes. Instead, they highlight co-evolution, multidimensionality, complexity and multi-actor processes – conditions that, as will be argued below, are intrinsic to FLA (Cagnin et al., 2008). At the same time, appropriate constellations of policy

interventions will vary depending on specific challenges, opportunities and problems encountered in sectors, technologies and social networks (Stirling, et al. 2009).

Clearly, the reorientation of innovation systems puts particular demands on STI policy and the governance of innovation systems. In this regard, FLA as a tool of governance has a promising role to play in reorienting innovation systems towards grand challenges. Here FLA can play a number of important roles (Table 2) in orienting innovation systems so that they can better address grand challenges.

| Innovation system function              | Reorientation towards grand challenges  |
|---|---|
| Facilitate experimentation and learning | Solutions to grand challenges will require, in many instances, radical socio-technical innovations. Experimentation and learning need to be strengthened, with greater amounts of probing and experimentation in areas that are potentially relevant to grand challenges. This can be facilitated through, for example, research and innovation programmes.   |
| Knowledge development                   | The transformative shifts required by solutions to grand challenges will need new knowledge as well as a new type of knowledge production. New knowledge (which also includes non-technological knowledge) has to be developed on topics that are relevant to grand challenges among a distributed landscape of actors. This implies a type of knowledge production close to the so-called 'mode 2' (Nowotny, et. al. 2003), which acknowledges the distributed nature of knowledge and facilitates knowledge creation across different boundaries at various levels. |
| Knowledge diffusion                     | Knowledge diffusion is essential given the boundary-spanning nature of grand challenges. The need for cross-disciplinary/departmental/national/sectoral coordination entails new channels for knowledge diffusion among actors that have traditionally worked apart.  |
| Guide direction of search and selection | Dealing with grand challenges requires strong visions — strong in the sense that they constitute mobilising convictions among a large group of actors. These should be socially embedded and provide guidance for businesses, policy makers and consumers. Building these visions should be an inclusive joint process that highlights interdependencies and encourages the alignment of actors. The incompatibility of existing visions that has led to unsustainable solutions must also be addressed in this process.  |
| Create spaces for market formation      | Market formation means generating protected spaces for the supply side to experiment and learn (see the 'Facilitate experimentation and learning' function above) but also for the demand side to develop. This can be done through a mix of regulation, procurement and other market-creating incentives.  |
| Develop and mobilise resources          | The development and mobilisation of new resources translates into new skills (or the reorientation of existing ones) and the reallocation of financial resources. There is the need for forums/spaces for advocacy coalitions to emerge and be mobilised. This is especially important given the boundary-spanning nature of grand challenges.  |

Table 1. Innovation system functions and their reorientation towards grand challenges (Cagnin et al., 2012)

| Innovation system function              | FLA roles   |
|---|---|
| Facilitate experimentation and learning | FLA can provide ‘safe spaces’ for new ideas to emerge and for existing knowledge to be combined in novel ways. Such experimental spaces can occupy multiple positions in systems of multilevel governance (i.e.. FLA can be performed at different levels and in different places), thereby contributing to the creation of variety in innovation systems.  |
| Knowledge development                   | FLA, as a source of ‘strategic intelligence’ for policy and other actors, is itself a knowledge-creating activity. It can, for example, provide insights on longer-term developments, the scope and opportunities for shaping futures and the mutual positioning of other innovation system actors vis-à-vis the future. In addition to these, FLA processes can encourage the multidisciplinary in research that is needed when exploring the nature and impact of grand challenges as well as their possible solutions. |
| Knowledge diffusion                     | FLA involves bringing together often disparate actors that might not normally interact to imagine and debate possible and desirable futures. In this way, FLA provides forums for knowledge to be exchanged and created. At the same time, FLA can raise awareness and sensitivity in society towards sustainable solutions while also bringing public concerns and interests into debate..   |
| Guide direction of search and selection | FLA tends to lead to the articulation of visions and expectations that guide actors in their search and selection of future opportunities. It is perhaps the main rationale offered for conducting FLA as a means for setting directions and priorities.  |
| Create spaces for market formation      | FLA’s contribution to market formation tends to be more indirect — for example, through the articulation of market-shaping expectations and visions and the conditions for the coordination of market actors that these provide.  |
| Develop and mobilise resources          | FLA processes lead not only to new combinations of knowledge but also to new combinations of actors that are mobilised to fulfil the promises articulated in guiding visions. Even where new actor networks have not emerged, the FLA process and its products can mobilise those involved to reassign resources.   |

Table 2. FLA roles in innovation functions (Cagnin et al., 2012)

#### 4 FLA in Support of New Forms of Governance

As already mentioned, a reorientation of innovation systems towards grand challenges puts particular demands on STI policy and the governance of innovation systems.

However, governance methods and systems have not been institutionalised on a broad and continuous basis possibly because participation seems to be guided mostly by social legitimacy rather than by a genuine desire to involve the public in decision making. Hence, it is important to reflect on how FLA methods and processes could support a move

towards genuine governance and thus a more democratic society.

One might argue that citizens who are given the opportunity to be informed effectively,, to understand and to have a say in new technological choices in appropriate settings, might be ready and willing to exert their own right in decision making processes and at the same time contribute to firms’ and public decision making. But what then would be the role of government and industry in developing human capacity and enabling the literacy of citizens at large? This question is especially relevant because globalisation must offer opportunities for all. In fact, the latter poses a number of questions that need to be addressed, such as: How do FLA methods and

processes address the complex issue of literacy asymmetries of different stakeholders? How can FLA strategies and methods make sure that the visions of different stakeholders can be harmonised and represented in the final outcomes and products? To what extent would the literacy of public and private leadership as well as building citizens' capacity in FLA methods and processes lead to more participation in overall decision making?

Actors affected by innovation processes ought to be more involved in technological development so that their needs are taken into account. Therefore, it is critical to reflect on how FLA methods and process contribute to governance modes that are more responsive to risk society perceptions, values and apprehensions.

Among the questions that need to be considered are the following: What kinds of governance are needed to permit actors who are external to the innovation processes to become more actively involved in technological development? What kinds of governance would enable their needs and requirements to be taken into account in functional as well as in social and ethical terms? Are conventional technocratic modes of regulation yielding to governance modes that are more responsive to risk society perceptions, values and apprehensions? Above all, how do FLA methods and processes contribute to such governance modes?

The conditions for democratic governance of technology and innovation need to be acknowledged and discussed. Rather than just opening a dialogue between science and society solely in terms of environmental or health impacts, there is a need to tackle broader social concerns such as ethical and cultural values, power relations and the role of experimental or local knowledge. Thus issues that underlie social reaction to new technologies and the undisclosed ways in which industries make decisions must be resolved.

More openness and participation might further the social legitimacy of procedures that is at stake. What then does the practical reality of participation of social and economic agents, and civil society at large, in the new institutions and procedures look like? At the same time, which FLA methods and processes could contribute to an increase in societal

participation in development strategies (at local, regional, national and international levels)?

Finally, integrating business and social needs takes more than good intentions and strong leadership.. It requires adjustments in organisation, reporting relationships and incentives. Few companies have engaged operating management in processes that identify and prioritise social issues on the basis of their salience in business operations and their importance to the company's competitive context (Porter and Kramer, 2006). Even fewer have unified their philanthropy with the management of their CSR efforts, much less sought to embed a social dimension in their core values. Doing these things requires a new approach to both CSR and philanthropy than the one that is prevalent nowadays. Companies need to shift from a fragmented, defensive posture to an integrated, affirmative approach. The focus needs to move away from an emphasis on image to an emphasis on substance. One of the main challenges for the FLA community is to support such a shift by embedding forward looking participatory practices into strategic decision making.

## 5 Conclusions

A reorientation of innovation systems towards grand challenges could offer opportunities for a more responsible and transformative innovation practice to develop. But it is important to consider the boundary-spanning scope of grand challenges and the difficulties this implies in mobilising actors and resources for enacting transformative change. In essence, a different kind of innovation policy is required that better acknowledges the co-evolutionary, multidimensional, complex and multi-actor nature of the processes that are involved in enabling transformative change. In this context, this chapter has introduced some of the contributions that FLA could make to orienting innovation systems towards grand challenges.

In this sense, FLA has a new role to play in the emerging landscape of governance due to changes and transformations in society. The move towards a new mantra for FLA has been slowly and quietly shaped since the Second International Seville Conference on Future-Oriented Technology Analysis (September

2006). The greater acknowledgement of the co-evolution of technology and society as well as the calls for FLA practices to be submitted to an interpretation of their significance by the relevant disciplines of the social sciences and humanities (SSH) has been pivotal in this move since it led to the understanding that FLA activities, and their umbrella communities, should necessarily adopt more complex perspectives. Long-term and systemic analyses are key characteristics of FLA, which explicitly deals with complex socio-technical systems and relationships between science and society. FLA is also an agenda-setting process that is aimed at providing anticipatory intelligence as the basis for decision making. At the same time, it allows for the construction of common visions and produces issue-specific knowledge through dialogue, creating joint learning between users and producers, knowledge generation and a shared sense of commitment. Not surprisingly, FLA has relevance in all human activities in which there are collective stakes (Cagnin et al., 2008). With this in mind, linking FLA to models that emphasise the creative aspect of living systems would be key to enabling the kind of dialogue, interactions and participation in decision making processes that are required in the evolving governance landscape.

## Acknowledgements

This book chapter brings together extracts from three different papers: Cagnin et al. (2011), Cagnin et al. (2012) and Cagnin and Loveridge (2012). The ways in which these elements have been brought together is the sole responsibility of the author, as it is for the interpretations and considerations offered here. The author would like to acknowledge, however, that the material on which this chapter is based is the product of joint research with Denis Loveridge, Michael Keenan, Effie Amanatidou and Ozcan Saritas.

## Sources and References

Arnold E. 2004. Evaluating Research and Innovation Policy: A Systems World Needs Systems Evaluations. *Research Evaluation*, 13(1), pp. 3-17.

Bergek A, S Jacobsson, B Carlsson, S Lindmark and A Rickne 2008. Analyzing the Functional Dynamics of

Technological Innovation Systems: A Scheme of Analysis. *Research Policy*, 37, pp. 407-429.

BSR, Corporate Social Responsibility, 2003 (available at: <http://www.bsr.org/BSRServices/CSR.cfm#ZURICH>, last viewed on 03 October 2008).

Cagnin C, M Keenan, R Johnston, F Scapolo and R Barré eds. 2008. *Future-Oriented Technology Analysis – Strategic Intelligence for an Innovative Economy*. Heidelberg: Springer.

Cagnin C, Loveridge D and Saritas O. 2011. FTA and Equity: New Approaches to Governance. *Futures*, 43(3), pp. 279-291.

Cagnin C, Amanatidou E and Keenan M. 2012. Orienting EU Innovation Systems towards Grand Challenges and the Roles that FTA Can Play. *Science and Public Policy* 39 (2), pp. 140-152.

Cagnin C and Loveridge D, 2012. A framework, with embedded FTA, to enable business networks to evolve towards sustainable development. *Technology Analysis and Strategic Management*, forthcoming.

COM, 2001. *European Governance: A White Paper*, Commission of the European Communities.

Doane D, 2005. The myth of CSR: the problem with assuming that companies can do well while also doing good is that markets don't really work that way, *Stanford Social Innovation Review*.

Freeman E, 1970. Stakeholder theory of the modern corporation, in: M. Hoffman, R.E. Frederick, M.S. Schwartz (Eds.), *Business Ethics: Readings and Cases in Corporate Morality*, fourth ed., McGraw-Hill, New York.

Freeman R E, 1984. *Strategic Management: A Stakeholder Approach*, Pitman, Boston.

Large D, 2003. Participation and representation, A Review of Sustainability Here and Now, in part of The Great Debate: Development Sustainability Environment, Newcastle Civic Centre on 27 September 2003 (available at: <http://www.thegreatdebate.org.uk/GDDSEDL1.html>, last visited on 03 October 2008).

Lindblom, 1977. *Politics Markets: The World's Political-Economic System*, Basic Books.

Nowotny H, Scott P, Gibbons M. 2003. Introduction. 'Mode 2' Revisited: The New Production of Knowledge. *Minerva*, 41, pp. 179-194.

Porter M E, Kramer M R, 2006. Strategy & society: the link between competitive advantage and corporate social responsibility, *Harvard Business Review*.

Rittel H and M Weber 1973. Dilemmas in a general theory of planning. *Policy Sciences*, 4, pp.155-169.

Saritas O, Pace L, Stalpers S, 2007. Stakeholder Participation and Dialogue in Foresight. From Oracles to Dialogue: Exploring New Ways to Explore the Future, COST A22 Conference (CD: P042-T4), Athens, 9-11 July (key-note paper).

Sheng, Y K, 2008. What is good governance? United Nations Economic and Social Commission for Asia and the Pacific.

Stirling A, Geels F, Scrase I, Smith A, and Van Zwanenberg P. 2009. *Transformative Innovation. A research report for the Department for Environment, Food and Rural Affairs*. SPRU – Science and Technology Policy Research, University of Sussex, August 2009.

Woolthuis R K, M Lankhuizen and V Gilsing 2005. A System Failure Framework for Innovation Policy Design. *Technovation*, 25, pp. 609-619.

ISBN 978-3-200-02811-1