The 4th International Seville Conference on Future-Oriented Technology Analysis (FTA)
12 & 13 May 2011

FTA and Grand Societal Challenges – Shaping and Driving Structural and Systemic Transformations

Introduction

The 4th edition of the International Seville Conference on Future-Oriented Technology Analysis (FTA)[1] focuses on the need and potential of FTA to address disruptive transformations in response to grand societal challenges[2]. FTA offers policy and decision makers the potential to look across such transformations, enabling governments and other organisations to become more adaptive and capable of enacting systemic change.

Transformations can occur in the form of disruptive events (i.e. unexpected, short-term and sudden events, with immediate and ongoing impacts, for which we are usually unprepared), ongoing processes (i.e. difficult to detect processes since change is gradual, with slow diffusion and with medium to long-term impacts), or transformation by design (i.e. change processes that are planned, such as social or economic structural transformations). Drivers of dynamic processes of change and sudden disruptive transformations range from rapid technological changes to shifts in social norms, values and lifestyles. Current and future societal challenges as well as their combination emerge from such transformations and call for appropriate forms of FTA to support and enable both organisations and individuals to anticipate, adapt and respond pro-actively to change.

In this context, FTA has a potentially useful role to play in enabling a better understanding of the complex systems which interact in each situation and in defining effective policy responses, including:

- Improving the quality and robustness of anticipatory intelligence and preparedness for disruptive events through the use of systematic approaches and the development of shared insights and perceptions.
- Creating spaces for an effective dialogue between key players in different policy domains.
- Vision-building and consensus-building for engineering major processes of transformation.
- Shaping and defining research and innovation agendas.

Innovation is both a source of and possible key response to disruptive transformations, if broadly conceived in technological, social, organisational and institutional terms. The scale and direction of innovation is determined by a mix of factors, many national-specific though increasingly less so as economies and societies become more globalised. In this context, FTA can contribute not only to the steering of ***innovation systems***, but also to their adjustment, adaptability and ability to shape responses to challenges and transformations.

At the same time, FTA can contribute to building absorptive capacities that allow organisations to become more adaptive and capable of anticipating and addressing continuous as well as disruptive change. This can be achieved through ***institutionalised and embedded FTA*** providing both integration and networking within

[1] FTA includes foresight, forecasting and technology assessment. Technology can be understood as involving both a body of artefacts and practice as well as a body of understanding, which co-evolve with each other over time. From this perspective, technological systems are best understood as being composed of both physical technologies (i.e. in the form of components, combined systems and infrastructure), and social technologies (i.e. institutions, in the form of social patterns, constraints and mechanisms of behaviour such as social norms, routines, legislation, standards and economic incentive mechanisms).

[2] Examples can range from demographic shifts, the provision of safe and adequate food supply for a growing population, the promotion of environmental sustainability practices able to preserve natural essential resources and revert resource depletion, the mitigation and adaption to climate change, the rise of new and return of previously eradicated diseases, the de-carbonisation of economies while securing energy supply, the preservation of democracy, the reduction of poverty, the fight against crime and terrorism, the management of the impacts of rapid technological change, etc.

and across organisations, which in turn provides insights and capabilities to shift organisations and ultimately societies towards new directions.

Appropriate ***FTA premises and practices*** are essential requirements to enable FTA to fulfil such roles. These should follow certain principles to ensure quality in both processes and outputs and be supported by appropriate ***combinations of quantitative and qualitative methods***, which are fit for purpose and context, and which enable the building of trust through inclusiveness and transparency in processes.

Accordingly, the ***2011 FTA Conference*** addresses the following specific ***themes***:

– Orienting innovation systems towards global challenges and the roles that FTA can play
– Building FTA capacities for systemic and structural transformations
– Premises and practices in combining quantitative and qualitative FTA methods

The 2011 FTA Conference seeks contributions from academics, research, business, government, intermediary organisations and civil society representatives across the globe. ***Contributions*** should be in the form of posters or scientific papers which are empirically grounded, with a strong theoretical component and demonstrating critical or new methodological approaches. These should also describe potential or actual results and impacts, as well as policy options, and should address one of the three conference themes. Scientific and policy-oriented good practice sessions will be organised in parallel during the conference.

A pre-conference online survey will also be launched among experienced FTA practitioners, policy makers and other stakeholders to share ideas and explore future emerging issues. Results will be discussed during the conference.

The ***Conference Committee*** consists of the following members:

Ms. Effie Amanatidou, Manchester Institute of Innovation Research, UK
Dr. Mark Boden, European Commission, JRC-IPTS, Spain
Dr. Jennifer Cassingena Harper, MCST, Malta
Dr. Cristiano Cagnin, European Commission, JRC-IPTS, Spain
Mr. Vicente Carabias, European Commission, JRC-IPTS, Spain
Mr. Karel Haegeman, European Commission, JRC-IPTS, Spain
Dr. Michael Keenan, OECD, Paris, and Manchester Institute of Innovation Research, UK
Dr. Totti Könnölä, Impetu Solutions, Spain
Dr. Andrea Ricci, Institute of Studies for the Integration of Systems, Italy
Prof. Ahti Salo, Helsinki University of Technology, Finland
Dr. Fabiana Scapolo, European Commission, JRC, Belgium
Mr. Jack Smith, University of Ottawa, Canada
Dr. Alexander Sokolov, HSE Foresight Centre, Russia
Dr. Matthias Weber, Austrian Institute of Technology, Austria

Conference themes

The ***2011 FTA Conference*** addresses three specific ***themes***:

1. Orienting innovation systems towards global challenges and the roles that FTA can play

Different types of innovation will need to play significant roles in addressing major global challenges. Yet, the direction of innovation and its implications are often highly uncertain while innovation itself is likely to lead to a great deal of disruption to societies and economies over the coming decades, for better and for worse. The orientation of innovation systems – in terms of the problems they address, the actors and linkages they include, and the manner of their governance – will largely determine the part innovation plays in responding to global challenges and the extent to which it becomes itself a source of disruptive transformation. In particular, the orientation and coordination of business innovation, public research and higher education are crucial in shaping innovation developments and have been a traditional focus of public policy intervention, including the use of FTA.

FTA can play a number of important roles in orienting innovation systems so that these can better address global challenges. For example, FTA can generate insights that enable a better understanding of global challenges and the means to deal with them through innovation and policy intervention. It can do this by bringing longer-term perspectives and broader knowledge bases into decision-making processes. FTA can also assist in managing the uncertainty associated with innovation activities and with the future more broadly. It can do this by providing spaces for both businesses and societies to come together to better appreciate their mutual positions vis-à-vis future innovation directions, as well as to build trust and to develop innovation partnerships. This coordination potential extends to policy arenas, where FTA can enhance communication and understanding between policy 'silos' and thereby support the emergence of an effective policy mix for innovation. Finally, FTA can support organisational and societal agility through anticipation of developmental routes and their consequences, and/or the articulation of widely shared visions that steer evolutions along desirable pathways.

Accordingly, the ***aim of this conference theme*** is to explore the roles FTA plays in supporting and directing innovation efforts that manage and/or promote major structural challenges affecting contemporary and future societies and economies. Against this background, papers and posters are invited that specifically address, but are not limited to, the role of FTA in:

- Framing the major structural challenges facing contemporary and future societies and economies, particularly with regards to bringing in longer-term perspectives that incorporate broader knowledge bases;
- Generating insights and understanding on these challenges and the means in which they could be dealt with through various forms of innovation and other interventions;
- Better managing uncertainties associated with innovation, both by businesses and societies as a whole;
- Developing organisational and societal agility and resilience that can accommodate and foster radical change as knowledge, ideas, interests and needs from different sources combine;
- Providing discursive spaces and platforms for a variety of actors, including citizens, to come together to better appreciate their mutual positioning as well as to build trust and partnerships vis-à-vis future innovation developments and to deliberate various scenarios of the future;
- Steering innovation efforts that integrate education, business, research and other stakeholders, for example, through processes of prioritisation and advocacy coalition-building;
- Improving the coherence of policies addressing innovation, identifying the levers for improving the dynamics of the innovation system and strengthening its actors to enable structural transformations in contrast to 'silo' approaches, and outlining realistic approaches in mixing supply and demand side policies;
- Enhancing policy coherence between different levels of governance in support of innovation.

2. Building FTA capacities for systemic and structural transformations

The increased incidence of disruptive events and scientific discovery in recent years is driving governments and businesses to scale down FTA activities, shifting from individual large-scale foresight programmes and projects, to invest in developing in-house competencies for coping with sudden change. This capacity-building drive is primarily aimed at addressing specific societal trends, concerns and needs as well as identifying the means to optimise on social innovation and related opportunities. Apart from a renaissance of parliamentary technology assessment in some countries, the development towards institutionalisation of foresight is reflected in the setting up of horizon scanning centres and dedicated foresight units in firms and public administration.

The reasons for this shift from projects and programmes to institutionalised forms of FTA are manifold. On the one hand, a tighter embedding of FTA in support of decision making is needed in the light of a fast-changing, turbulent and complex environment. This is, rendering the interpretation of contextual developments very difficult and challenging. On the other hand, there are internal reasons why novel forms of future intelligence are needed, ranging from the need to provide solutions in time to achieve coordinated and coherent decisions within and across organisations. As a consequence, there is a growing need for the capacity to anticipate change to be centrally embedded in policy and decision making, and to achieve this embedding quickly and strategically.

While the trend towards institutionalisation of FTA may appear obvious, it is important to understand the advantages and disadvantages of different organisational models along the lines of which FTA can be set up. The implementation of individual FTA projects or programmes of a limited duration and with a targeted

objective can be seen as the alternative model to the establishment of dedicated FTA units providing continuous input to their embedding or mother organisations. Different combinations of elements from these ideal-type models are possible as well, such as (international) FTA networks as informal but nevertheless stable settings allowing to bundle or coordinate resources and competencies.

It is also important to highlight that these models are complementary in many respects. Service providers as well as FTA institutions need to be able to draw on networks for many purposes, and the boundaries between service provision and institutionalised forms of FTA are blurring. The balance between these three forms of FTA activities (i.e. external FTA services, institutionalisation of FTA, and FTA networks) in empirical terms requires further investigation, in order to understand how effectively different combinations of activities work in their respective decision making context. In the very end, the most suitable model of FTA will strongly depend on the wider institutional and organisational environment in which FTA is embedded, be it in the private or the public sector.

Against this background, it is ***important to improve our understanding of how far institutionalised FTA can form part of the solution for building capacity*** to handle disruptions. Many sorts of combinations of elements from different organisational models are needed to enable learning, experimentation and capability development appropriate for the wider decision making context in which FTA is embedded. ***This conference theme is aimed at*** exploring the extent to which FTA can provide enhanced support to decision making through different organisational models for capacity building, generation and assessment of future developments, and corresponding abilities to transform organisations, thus enabling them to anticipate and address identified challenges and emerging weak signals. Papers and posters are expected to address, but not be limited to, the following areas of work:

– Organisational models for building anticipatory capacity to manage disruptive and transformative change as a support to decision making including experiences with change management;
– The role of supporting 'infrastructures' for conducting FTA within and across private organisations;
– Embedding of different forms of FTA in the public sector and implementing FTA results into policy and decision making, e.g. ex ante impact assessment and trend monitoring of performance indicators;
– Advantages and drawbacks of centralised and distributed forms of institutionalising FTA activities;
– Provision and use of horizon scanning functions in different contexts and at different governance levels: results and experiences from practice;
– Evaluation and impact assessment of FTA as a source of legitimacy.

03. Premises and practices in combining quantitative and qualitative FTA methods

The range of different methods and techniques that are applied in the field of FTA keeps growing. This offers an opportunity for more tailored design of approaches and techniques to fit the context and purpose of specific endeavours, thus benefiting from each method’s particular strengths. In particular, the combination of qualitative and quantitative methods has the potential to produce rounded results, thereby offering policy and other decision makers' robust information on which they can base their strategies and decisions.

The development and application of creative combinations of qualitative and quantitative FTA methods is complex, and requires a good understanding of the epistemological principles behind each approach and methodological school, its context, units of analysis and processes. Until today the communities associated with each of these schools – foresight / forecasting / technology assessment / futures communities – are perceived as different worlds that are competing rather than collaborating in looking at the future and trying to understand the present. An optimal integration of methodologies therefore requires solid theoretical premises as well as appropriate and ethical practice leading to congruent and valid results and winning the trust of the users and other stakeholders of FTA.

It is also relevant to identify and make explicit existing good practices which link the growing need for participation in decision making with the increasing policy demand for evidence-based options and their expected impacts. Assessing FTA studies on how they fulfil this demand will also require new ways of evaluating FTA that implement new combinations of techniques, and that build trust through inclusiveness and transparency.

The combined use of qualitative and quantitative methods can rely on the specialisation and shortcomings of different methods/tools within the same FTA exercise. In participatory methods the scientific quality and validity of outcomes is still an issue. In addition, the exclusive use of such methods can lead to partial views on possible futures, e.g. when relying on qualitative scenarios in devising technology roadmaps. Quantitative

models in turn tend to be challenged to demonstrate their reliability in terms of data treatment and outcomes. Beyond a certain time horizon, they tend to lose robustness whereas narrative storylines start to present a higher credibility. There is an increasing awareness of the need to avoid the risk of partial use or misuse of available tools. A critical element in the combined use of such methods is the nature of the interfaces between them, and how these relate to the complementary and contradictory aspects of the methods used.

Ultimately, for what concerns the selection of the most appropriate combination of methods and tools when initiating a given FTA exercise, it is often agreed that no optimal, one-size-fits-all recipe is applicable. Rather, the choice must take into account context-dependent criteria and methods that can deal with information of all sorts.

Hence, scientific contributions are sought in the form of papers and practical contributions in the form of posters highlighting the application of new and creative, systematic and robust processes, which describe potential or actual results and impacts, as well as policy options. Contributions to this conference theme should focus on but not be limited to:

- General principles underlying the combination of methods in FTA, in particular:
  - Better understanding of ontological and epistemological positions that practitioners and theorists of FTA might adopt implicitly or explicitly;
  - Incorporating subjectivity in FTA practices (for instance to reflect individual risk aversion) while enforcing common ethical principles;
- Methods and evaluation, in particular:
  - Theoretical premises and methodology when different methods are combined;
  - Methodologies and practices for assessing FTA studies that combine methods, and provision of evaluation as to which method combinations best suit which types of studies and impacts;
- Analysis of problems and possible solutions in combining qualitative and quantitative approaches, in particular:
  - In relation to the use of modelling and/or simulation in combination with creative and participatory approaches dealing with uncertainty and which look at different possible futures. Contributions can amongst others relate to the extent to which approaches are complementary or contradictory, to the interfaces between approaches, the analysis of practical cases;
  - 'Compatibilities' and ‘incompatibilities’ in combining quantitative and qualitative methods in FTA when addressing discontinuities or societal challenges;
- New tools and disciplines entering FTA, in particular:
  - The use of advanced tools (e.g. Web 2.0) that help process, search, mine, organise, display, interpret and model data of all sorts. Amongst others this includes layman and expert opinions (and the scientific quality, validity and optimisation of participatory governance approaches), forecasting, and ways to reduce risks associated with the heterogeneity of information sources that feed into FTA.
  - Building capacities in using the appropriate combination of tools which are fit for purpose, and communication skills required to bridge the quantitative and qualitative schools.

Pre-Conference Survey

A pre-conference survey will explore emerging issues and related challenges that can influence society and directly or indirectly impact innovation activities. The focus will be on innovation integrating higher education, business innovation and public research.

The survey will have two phases:
i) identification of emerging issues and related challenges that can affect innovation and
ii) assessment of the issues.

The survey will allow the elaboration of quantitative multi-criteria analysis of the data and improve understanding of the identified issues and their impacts on policy and decision making.

Survey results will be presented and discussed during the conference.

Submitting Abstracts for Posters or Scientific Papers

Abstracts should have a maximum of 500 words. Please note that only abstracts submitted directly through the online form available at the conference website (http://foresight.jrc.ec.europa.eu/fta_2011/abstracts.html) will be considered. Abstracts should include:

- Title
- Contribution to selected theme(s)
- Methodological approach
- Results, impacts and/or policy options and their implications

Deadlines

The deadline for submitting abstracts is Thursday 23 November 2010. Authors will be informed by 7 December 2010 whether their abstracts have been accepted. Full text of papers and posters as well as presentations are to be submitted no later than 5 April 2011.

Registration

The Conference will have a limited number of places. Conference registration will open before the end of January 2011. There is no conference fee charge for participants. Furthermore, a number of grants to cover travel costs and subsistence expenses (i.e. hotel, local transport and food) during the conference will be available for funding mainly early career researchers from all over the world.

Only those presenting a paper or a poster during the conference will be entitled to apply for a grant. The full criteria for applying for such grants will be available on this website when registration is open and after the selection of abstracts.