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THE USE AND IMPACT OF FTA

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Summary

The need and relevance of using FTA for decision-making in the private and public sector is becoming ever more apparent. The complexity and multi-faceted nature of issues that need to be addressed, and the inescapable attendant uncertainty, requires a very different approach from the traditional analysis of internal capabilities and external possibilities through strategic planning. What is increasingly required is a capacity to contemplate and engage with a number of possible futures, to draw on the intelligence and perspectives of a wide range of actors, and to apply these in a dynamic, pro-active fashion, in a continuous learning process.

Under these circumstances, demonstration of the impact of the application of FTA and of means to enhance that impact, are paramount. Precise cost-benefit analyses, however, are inappropriate. FTA should be understood as a conceptual framework, an art (practice) and a set of tools. Therefore, a broader set of criteria is required to evaluate its impacts.

The paper first provides an overview of the theoretical frameworks, in which the FTA impacts can be assessed. Then a new, but more simple, pragmatic approach is proposed for analysing the use of FTA, namely a distinction between the arguments used by FTA experts and the expectations of potential 'clients'. The paper concludes that major efforts are needed to operationalise the existing theoretical frameworks to assist actual impact assessment projects, and thus making impact assessment a widely used practice. In doing so, the FTA community will be in a position to analyse the differences between the promised, expected and actual impacts. That would improve the design of FTA projects, and contribute to a more appropriate and wider use of FTA.

Keywords: impacts of FTA

1 Introduction

The need for reliable guiding visions to interpret what the near future holds, and how to prepare for it, could hardly be more pressing.

The work of the UN Intergovernmental Panel on Climate Change (IPCC) over the past twenty years constitutes a major collaborative FTA exercise¹ on the part of many disciplines of the scientific community to analyse, understand, interpret and advise on the possible extent and implications of climate change.

Their analysis has evoked international protocols, such as the one labelled after the 1997 meeting in Kyoto, national initiatives, detailed economic modelling of possible costs and impacts of a variety of approaches to address the identified challenges, and of course, a significant level of scepticism.

Meanwhile, in just the past twelve months we have seen the emergence, or re-emergence, of issues seen as having a major impact on the fundamental shape of the future such as the availability and price of oil, food and water, the extent, directions and management of human movement, the viability of the global financial system, and a realignment of strategic positions.

In the face of such challenges, even if tempered by a recognition that the present always has attached a greater urgency than the past or the future, it is even more appropriate to pose some basic questions of the FTA community:

- How is the practice of FTA contributing to the effective addressing of such major challenges?
- If it is not sufficiently being employed, what shortcomings can be identified?
- What steps can be taken to ensure a greater and more effective application of FTA, with more visible impacts?

Given the current level of maturity of FTA, several attempts have already been made to build theoretical frameworks, in which the FTA impacts can be assessed. First we provide an overview of these frameworks, and then propose to shift the approach from focussing on conceptual structures to an analysis of the rhetoric and underpinning argument that is presented, on the one hand by FTA practitioners in seeking to persuade potential users to invest in the application of foresight methods and processes, and on the other hand by policy- and decision-makers in their calls for an improved FTA. A comparison of what is claimed, what is sought (or stated to be sought), and some actual outcomes may prove revealing.

2 Approaches to the Assessment of the Impact of FTA

While demonstration of the impact of the application of FTA and of means to enhance that impact are paramount, there remains a need for caution in establishing the types of impact that might be expected, and the most appropriate means for assessing them. Therefore, first we examine some typologies of impacts, which have been proposed or used in assessing FTA projects.

¹ Though of course not always conceived or presented as such, nor necessarily explicitly using the language or concepts of foresight/ FTA.

Georghiou has stressed that if his generational model of foresight is accepted, then one should look for different impacts from the different generations. Thus:

“For first generation foresight the key issues are accuracy of prediction and diffusion of results (to non-experts). In the second generation the take-up of priorities and establishment of networks among the industrial and academic participants become key evaluation issues, while the third generation implies the involvement of stakeholders in evaluation and looks for evidence of the emergence of a foresight culture.”²

Johnston has emphasised that these generations should not necessarily be regarded as successive, or that one is necessarily superior to another.³ For example the strong growth in horizon scanning, a first generational approach to foresight, indicates this approach and its associated goals are still seen as appropriate and directed towards relevant goals by some decision makers. Hence, the goals and methods of each generation of foresight continue to be appropriate under particular circumstances.

An alternative perspective is offered by Schartinger and Weber,⁴ who outline four models of foresight:

- an expert-based policy informing tool;
- an integral part of policy processes, operating by forward looking strategic support to informing and co-ordinating functions;
- a pacemaker through capacity building (including structural capacity) for policy intelligence; and
- a tool for impact assessment.

Clearly, each of these models implies a different objective, context and operating mode.

A detailed examination of the issue of the impact of foresight on policy-making was provided by a team from IPTS at the 2006 FTA conference.⁵ They identified six functions of foresight for policy-making, of which the first two are considered the most significant:

(1) *Informing policy*: generating insights regarding the dynamics of change, future challenges and options, along with new ideas, and transmitting them to policy-makers as an input to policy conceptualisation and design.

(2) *Facilitating policy implementation*: enhancing 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 among stakeholders.

(3) *Embedding participation in policy-making*: facilitating the participation of civil society in the policy-making process, thereby improving its transparency and legitimacy.

² Georghiou L., and Keenan M., Evaluation and Impact of Foresight, in: Georghiou L., Cassingena Harper J., Keenan M., Miles I., and Popper R., (eds) *The Handbook of Technology Foresight: Concepts and Practices*, Edward Elgar: Cheltenham, UK, 2007.

³ Johnston, R., Future Critical and Key Industrial Technologies as Driving Forces for Economic Development and Competitiveness, *UNIDO Technology Foresight Summit 2007*, Budapest, Hungary.

⁴ Schartinger D., and Weber M., Experiences and Practices of Technology Foresight in the European Region, UNIDO Expert Group Meeting, Vienna, May 2007.

⁵ Now published as Da Costa O., Warnke P., Cagnin C., and Scapolo F., The Impact of Foresight on Policy-Making: Insights from the FORLEARN Mutual Learning Process, *Technology Analysis and Strategic Management*, Volume 20, No 3, May 2008, pp. 369-387.

(4) *Supporting policy definition*: jointly translating outcomes from the collective process into specific options for policy definition and implementation.

(5) *Reconfiguring the policy system*: in a way that makes it more apt to address long-term challenges.

(6) *A symbolic function*: signalling a rational approach.

The authors argue that the policy informing function is progressively being displaced by the function of facilitating policy formulation. In addition, in providing guidelines for enhancing the impact of foresight on policy-making, they emphasise the application of Weber's concept of adaptive foresight,⁶ which complements the foresight process with a 'supporting policy definition' phase wherein foresight-based findings are translated into specific policy options and actions.

This leads to the pragmatic proposition that there are three ways to improve at least the communication of foresight findings, if not necessarily their overall impact: (i) increasing the bandwidth of communication, (ii) optimising the signal and (iii) improving receptivity. Just how these advances could be obtained in the complex world of decision-making and policy-formulation under pressure and without complete information remains to be elaborated.

Havas, Schartinger and Weber⁷ have refined these concepts to argue that FTA can assist decision-makers through the provision of three functions: informing, that is, generating consolidated findings concerning the dynamics of change, future challenges and options; interpreting the insights of FTA and merging those results with perspectives on strategic positioning; and facilitating, namely fostering implementation by developing shared visions among major stakeholders on desirable future developments, and thus implicitly co-ordinating their actions. FTA impacts therefore can be demonstrated and analysed against these three functions.

Georghiou and Keenan⁸ have reviewed the evaluation of foresight exercises in Austria, Germany, Hungary, Japan, Netherlands Sweden and the UK and concluded that "a consistent and comparable approach has not emerged".

However, they have developed an "indicator-driven evaluation framework" for the second UK Foresight Programme. While the first four items are largely to do with the process itself, the remaining six all addressing elements of impact.

⁶ Weber M., *Foresight and Adaptive Planning as Complementary Elements in Anticipatory Policy-Making: A Conceptual and Methodological Approach*, in: Voss J-P., Bauknecht D., and Kemp R., *Reflexive Governance for Sustainable Development*, Edward Elgar: Cheltenham, UK, 2006.

⁷ Havas A., Schartinger D., and Weber, M., *Experiences and Practices of Technology Foresight in the European Region*, *UNIDO Technology Foresight Summit 2007*, Budapest, Hungary.

⁸ Georghiou L., and Keenan M, 2008, op cit.

Item Measured	Indicator
1. Level of awareness of Foresight and Foresight culture in industry	SME survey questions
2. Commitment of participants	Consistency of attendance at Panel and Task Force meetings
3. Consultation exercise	Number and quality of responses received to consultation documents
4. Cross-Panel communication	Documented contacts and joint activities, cross-references in reports to issues from other Panels
5. Influence on government departments spend	Additional resources committed to Foresight activities
6. Influence on government departments co-ordination	Frequency of Foresight on Agenda of Ministerial Science Group
7. Influence on science base spend	Proportion of new programmes and initiatives which are clearly aligned with Foresight priorities
8. Influence on the formation of new industry-science networks	Persistence of groups founded by Panels or Task Forces, co-publication of scientific papers between academic and industrial authors and citations to academic work in patents
9. Contribution to quality of life goals	Engagement of voluntary sector in Foresight activities, take-up of recommendations by regulatory or standards-setting bodies in areas such as environment protection, health and safety etc
10. Regional engagement	References to Foresight in Regional Innovation Strategies, number and extent of regional foresight groups

Ladikas and Decker⁹ have provided a typology of impacts, which could be used as a guide as to what types of impact might be expected, and how they could be promoted and/or evaluated.

Impact Dimension	I. Raising Knowledge	II. Forming Attitudes/ Opinions	III. Initialising Actions
Issue Dimension			
Technological/ Scientific Aspects	<i>Scientific Assessment</i> a) Technical options assessed and made visible b) Comprehensive overview on consequences given	<i>Agenda Setting</i> f) Setting the agenda in the political debate g) Stimulating public debate h) Introducing visions or scenarios	<i>Reframing of Debate</i> o) New action plan or initiative to further scrutinize the problem at stake p) New orientation in policies established
Societal Aspects	<i>Social Mapping</i> c) Structure of conflicts made transparent	<i>Mediation</i> i) Self-reflecting among actors j) Blockade running k) Bridge building	<i>New Decision-Making Processes</i> q) New ways of governance introduced r) Initiative to intensify public debate taken
Policy Aspects	<i>Policy Analysis</i> d) Policy objectives explored e) Existing policies assessed	<i>Re-structuring the Policy debate</i> l) Comprehensiveness in policies increased m) Policies evaluated through debate n) Democratic legitimisation perceived	<i>Decision Taken</i> s) Policy alternatives filtered t) Innovations implemented u) New legislation passed

⁹ Ladikas M., and Decker M., Assessing the Impact of Future-Oriented Technology Assessment, *EU-US Seminar: New Technology Foresight, Forecasting & Assessment Methods*, Seville 13-14 May 2004

As part of their extensive investment in the promotion and performance of technology roadmapping (TRM), Industry Canada has developed a framework for monitoring and measuring the results of the roadmapping process:¹⁰

Impact	Measures
1. Level of TRM-related activity	<ul style="list-style-type: none"> • level of industry resources allocated to TRM projects/ plans • increased commitment of funding to TRM projects/ plans by industry • number of projects and/or action plans established • number projects selected for implementation • level of senior technology managers' time in TRM development • extent of promulgation of TRM document within the industry
2. Extent of other stakeholder involvement in the TRM initiative for the industry	<ul style="list-style-type: none"> • how many and what type of new participants have become involved since the development of the TRM? • to what extent is the breadth of stakeholder involvement increasing? How was this achieved?
3. Changing behaviour of industry members	<ul style="list-style-type: none"> • number and types of new strategic alliances • change in attitude about importance of technologies developed as a result of TRM initiative • change in attitude about importance of TRM initiative
4. Industry benefits that are, to some extent, attributable to the TRM initiative	<ul style="list-style-type: none"> • number, type, and importance/significance of technological solutions developed/implemented • the nature of these solutions – importance and significance to your industry, your organisation • marginal/incremental or breakthrough solutions • number and importance/significance of potential marketing opportunities created/provided by TRM for technology suppliers • number of barriers to development, replication, and commercialisation overcome • number, types, and importance/significance of new products or uses of products • number/ volume, and importance/significance of new products exported. • number and importance/significance of new markets exported to • number and characteristics of spin-off projects. • barriers to implementation • likelihood that these results would have been realised in the absence of the TRM

The UK Government's Foresight Programme has commissioned the London School of Economics Public Policy Group to conduct a survey of the impacts of its most recent 8 foresight

¹⁰ Industry Canada, Evaluating Technology Roadmaps: A Framework for Monitoring and Measuring Results, [http://www.ic.gc.ca/epic/site/trm-crt.nsf/vwapj/evaluation_eng.pdf/\\$file/evaluation_eng.pdf](http://www.ic.gc.ca/epic/site/trm-crt.nsf/vwapj/evaluation_eng.pdf/$file/evaluation_eng.pdf), accessed 12 September 2008

projects.¹¹ (Obesity, Infectious diseases, Intelligent infrastructure, Brain science, addiction and Drugs, Cyber trust and crime prevention, Exploiting the electromagnetic spectrum, Cognitive systems, and Flood and coastal defence)

While the results have not yet been released, the survey has canvassed issues such as:

- the extent of impact of these projects and their findings on central and local UK government, academics and scientists, third sector (i.e. charities, NGOs), private sector, and foreign governments;
- aspects which contributed to impacts, such as building a team of experts to co-ordinate these processes, getting senior policy officials involved, bringing together experts from different disciplines, commissioning state-of-art reviews, designing and developing scenarios, arranging events to develop findings, and building further networks and collaborations;
- impact on relevant policy communities, in the form of provision of a new focus for discussion about future policy challenges, influencing the way, in which members of the policy community think about these issues, setting out practicable recommendations for moving forward, making a useful contribution to the existing pool of knowledge in these fields, and providing useful context or background research.

With this detailed background of approaches to assessing the impacts of FTA, we can now turn our attention to the rhetoric of FTA impact dialogues.

3 The Rhetoric and Reality of ‘Selling’ FTA

There is general agreement amongst FTA practitioners about the range of possible objectives of foresight exercises, allowing for both content and structural categories. Thus, the ForLearn Manual identifies four major objectives:

- informing policy-making
- building networks
- developing capabilities
- building strategic visions.

This generic list can be expanded¹² by distinguishing between:

- direction-setting
- determination of priorities
- anticipatory intelligence
- informing debate
- increasing stakeholders’ involvement
- building social capital

¹¹ See <http://www.ppgsurvey.org/foresight/>

¹² Seidl da Fonseca R., Scientific and Technology Foresight, International Scientific Studies of the Implementation of the CTBT Verification System Experts Meeting, Vienna, March 2008

- building identities
- advocacy
- consensus generation

Based on more than fifteen years of experience with FTA, and direct involvement in more than 100 FTA projects with greatly varying constituencies, objectives and scale, the authors have developed the following generalisations, which inevitably are highly idiosyncratic and reflective of our own experience. Acknowledging these profound limitations, it nevertheless may provide an alternative entry into the vexed question of the use and impact of FTA.

3.1 Arguments used by FTA experts to promote the adoption of FTA

Experts tend to use somewhat theoretical/ abstract arguments to convince decision-makers that (i) a variety of issues needs to be tackled, and (ii) FTA has certain benefits when faced with these issues. The most widely used arguments can be summarised as follows:

- Given globalisation, coupled with sweeping technological and organisational changes, our future cannot be predicted by any sophisticated model. History also teaches us valuable lessons about the (im)possibilities of planning and predicting the future. Decision-makers, therefore, need systematic analyses of the already visible, likely future trends, on the one hand. It is also necessary to consider some disruptive changes ('wild cards'), on the other hand, to be better prepared for their unusual/ unexpected consequences – or even prevent some of these potential disruptions. FTA can improve decision-making processes by emphasising the possibility of alternative futures, and hence the opportunity of shaping our futures. Diversity is crucial in terms of possible futures, differing analyses, as well as in solutions or policy options.
- Decision-makers face complex challenges: socio-economic and technological factors interact in defining issues of strategic importance, e.g.
 - education and life-long learning (new demands on education systems; new, mainly ICT-based tools and methods for teaching and learning; the growing need for interaction and co-operation with businesses);
 - environmental issues;
 - quality of life (health, education, demographic changes, especially the growing share and special needs of elderly people, living and working environment, social conflicts, crime prevention, etc.);
 - competitiveness (at national and EU-level for attracting talents and capital, at firm level maintaining and increasing market shares nationally and internationally, etc.);
 - regional disparities.

FTA can cope with these complexities by bringing together different communities with their complementary knowledge and experience.

- FTA process can reduce uncertainty, too, because participants can align their endeavours once they arrive at shared visions.
- New skills and behaviour are required (e.g. problem-solving, communication and co-operation skills in multidisciplinary, multicultural teams meeting more often only "virtually", as well as creativity) if individuals or organisations are to prosper in this new setting. This, in turn, creates new demands on the education and training system (see

above). FTA processes help in identifying and achieving attitudinal/ behavioural changes, and encourage creative thinking.

- Clusters, networks (business – academia, business – business, both at national, international levels) and other forms of co-operation have become a key factor in creating, diffusing and exploiting knowledge and new technologies, and therefore in satisfying social needs and achieving economic success. FTA processes contribute to strengthening existing networks and building new ones.
- There is a widening gap between the speed of technological changes and the ability to devise appropriate policies. FTA can assist policy-makers by providing a sound understanding of the underlying causes and mechanisms at work.
- Given the growing political and economic pressures, governments try hard to balance their budgets: when cutting taxes, they need to reduce public spending relative to GDP. In the meantime accountability – why to spend taxpayers' money, on what – has become even more important in democratic societies. Public R&D expenditures are also subjected to these demands. FTA dialogues with a wide range of stakeholders lead to a more transparent decision-making process, and hence offer a way to obtain public support.
- FTA can assist policy-makers when faced by intensifying social concerns about new technologies (mainly ethical and safety concerns in the case of bio- and nano- or nuclear technologies, and fears of unemployment and social exclusion caused by the rapid diffusion of new technologies in general).

3.2 What Users Want from FTA

Potential users – often in contrast with the somewhat theoretical arguments advanced by FTA experts – tend to prefer a more pragmatic reasoning. They expect immediate or short-term advantages, especially:

- greater certainty in decision-making
- a feasible ('actionable') plan
- a tool that aligns with organisational decision-making processes and timeframes
- a means to challenge and catalyse staff and stakeholders

Business people, in particular, look forward for being able to understand markets and competitors better.

The above general considerations hide major differences among the potential FTA 'clients'. Countries of different size, being at different level of socio-economic development, having their own governance culture and structures, faced by specific problems obviously perceive the potential benefits of FTA in their own ways. The same applies to different types of firms (size, technological, financial and marketing power/ opportunities, management structures and methods). We highlight some of these major differences below, acknowledging that this list can be extended significantly, as the extent of real life variety cannot be reflected in any paper.

Governments of industrialised countries with well developed market and governance systems and planning and decision-making capacities, largely regard FTA as one of many tools that can

be brought to bear on particular issues. Practical delivery of outcomes is the most important criterion for adoption.

Governments of industrialising countries with less well-established market and governance systems and planning and decision-making capacities may view a major national FTA project as a central component of their economic development strategies, and have expectations of a transformative effect.

Government (national, regional, local) departments and agencies of industrialised countries are essentially pragmatic about the use of FTA within the world of bureaucratic politics, using it to deliver a desired outcome, be it a new programme, a strengthening of influence, a means of meeting a directive, or in challenging an alternative perspective.

Large global companies are faced with many management fads and fashions that they choose among in accord with immediate priorities and pressures. Their preference for FTA is in the form of enhanced strategic planning, preferably embedded in high performance software systems.

The time horizon of an industry sector is largely determined by the dynamics of the investment equation and product life cycles, which can vary from 20-50 years for resource and infrastructure sectors, to 1-2 years for software systems, to 2-6 months for fashion-driven sectors such as clothing, entertainment and which now includes mobile telephones. Hence the perspective varies by sector.

Innovation-intensive SMEs generally express an impatience with any tool that diverts them from their core business, while at the same time regularly applying improvised FTA perspectives. They are most likely to value a checklist approach – ‘Six Tips to Faster Thinking about the Future’ – and any networking opportunities offered by a process that assembles an ‘unusual’ set of people.

4 Tentative Conclusions and Suggestions for Further Work

The paper has addressed two major issues, as its title suggests. As for the first one, we have proposed a new, pragmatic angle when analysing the use of FTA, namely a distinction between the arguments used by FTA experts and expectations of potential ‘clients’. We have identified a number of arguments, which can be boiled down into five distinct, but often mutually combined arguments:

- grapple with complexity, uncertainty and rapid change
- contribution to make a specific resource allocation task more efficient and objective
- enhance the capacities of the organisation
- develop and reinforce constituencies and networks
- FTA capacity reflects modern management thinking, is up with the times, “everybody is doing it now”.

Our personal experience suggests that potential clients prefer more pragmatic reasoning, and thus in many cases two of the above arguments are really powerful: a contribution to resource allocation decisions and “everybody is doing it now”. Major differences can be observed among different types of clients, no doubt, given their different context. For example, countries at a higher level socio-economic development, and more advanced decision-making systems tend to

value the potential impacts of FTA in terms of developing and reinforcing constituencies and networks.

These impressions need to be corroborated – or rejected – by thorough, systematic empirical analyses. These studies should also explore what communication channels are used in the dialogues among FTA experts and potential clients (e.g. formal, informal; oral, written; etc.), what impacts are ‘promised’ and expected, respectively, what arguments are the most powerful ones.

As for the second major topic of the paper, there is a substantial literature on assessing the impacts of foresight exercises, much of it cautionary about the difficulties involved, the problems of attribution of cause and effect, and the long time horizons that need to be accommodated. Major efforts are needed to operationalise the existing frameworks to assist actual impact assessment projects, and thus making impact assessment a widely used practice. In doing so, the FTA community will be in a position to analyse the differences between the promised, expected and actual impacts. That would improve the design of FTA projects, and contribute to a more appropriate and wider use of FTA.