

The IPTS REPORT

EDITED BY THE INSTITUTE FOR PROSPECTIVE TECHNOLOGICAL STUDIES (IPTS)
AND ISSUED IN COOPERATION WITH THE EUROPEAN S&T OBSERVATORY NETWORK



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Foresight can be a useful tool in helping accession countries devise appropriate strategies for the coming years to help them confront the multiple, complex challenges of organizational and structural change, together with their integration in the EU.

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In the context of increasing demand for health-care widespread deployment of new technologies is causing a radical transformation in many aspects of health-care delivery.

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Methods and Foresight

27 Science and Technology Roadmapping: from Industry to Public Policy

As the concept and methodologies involved in technology roadmapping have matured, it has come to be applied in an increasingly broad range of areas. In the context of rapid progress in science and technology, S&T Roadmapping (S&TRM) aims to facilitate and provide a more solid basis for decision-making.

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R&D programme managers often do not have a way to systematically apply the lessons of history and Science and Technology Studies in their day-to-day activities. Since risk analysis has become a standard decision-making tool, modelling STS insights in a risk framework can make them more accessible.

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An avenue which deserves much more exploration, both because of its higher acceptability, as well as because of the gains it can generate in terms of jobs, is product and service market liberalization. The benefits from streamlining the launch of new products and services, and facilitating new firms' setting up shop, are two-fold. On the one hand the offer to the consumer is expanded and through product innovation demand can be triggered – or even latent demand can be unearthed – and new jobs can be created. On the other hand, the entry of new firms will facilitate the emergence of more competitive firms (the newcomers and/or incumbents pushed to become more competitive to face the competition); the success of these firms will generate more jobs, not only within these firms but also in their suppliers, and their economic milieu, more generally.

The role of science and technology (S/T) as a key driver of growth was underlined, not only in terms of direct input to innovation and as a generator of technical progress, but also as a key determinant of the quality of human capital, at European level. The goal here can be phrased in a way similar to the one used for the case of employment above: what is needed is more and better R&D, and the drive towards a European research area is meant to enable that. First, more research is needed, since, in terms of R&D spending as a percentage of GDP (R&D/GDP), the gap between the EU and other key technological and economic powerhouses (such as the US and Japan) is not only large but growing: hence the importance of the target of 3% for R&D/GDP

spending. Second, it is important to enhance the articulation of R&D with other dimensions of the innovation process such as financing, regulatory, industry, etc. - a helpful concept here is the one of a European level cluster-type approach.

A key dimension of the above involves a rethinking of the role and action/interaction of national research organizations, for instance in terms of rethinking ways to exploit complementarities, as well as a rethinking of the role of individual researchers, and ways to enhance their mobility, trans-nationally, as well as between industry and academia, public and private sectors.

Last, but certainly not least, on the topic of sustainable growth, or development, more generally, emphasis was placed on the importance of recognizing latent demand making the provision of environment-friendly goods and services a profitable business, as well as on 'win-win' approaches, often technology-driven, which can allow raising efficiency in production and reduce environmental damage. S/T is key here in more ways than one. It affords us ways to substitute between different forms of depletable natural capital, as well as to enhance our ability to substitute natural capital by man-made one. Moreover, S/T helps us preserve the set of options available to future generations (e.g. as to the level of each natural stock) through research warning us on whether we are reaching irreversible thresholds. Finally, through its engine-of-growth role S/T can help us, and future generations, afford and cushion the short term economic cost of exercising these environmental options.

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need to devise an appropriate development strategy, together with a sound innovation policy as one of its cornerstones, and to strengthen their innovation systems.

Foresight – as a systematic, participatory process, collecting future intelligence and building medium-to-long-term visions aimed at influencing present-day decisions and mobilizing joint actions – can be a useful tool in meeting these challenges (EC, 2002). It helps in making choices – and shaping our future – in an ever more complex situation by discussing alternative options, bringing together different communities with their complementary knowledge and experience. In doing so, and discussing various visions with stakeholders, it also leads to a more transparent decision-making process. Foresight processes can reduce certain types of uncertainty, too: participants would learn about each other's broad strategic goals. Moreover, it can align their endeavours once they arrive at a shared vision. Many governments have already realized the importance of foresight activities, and thus this relatively new technology policy tool is spreading across continents (Fleissner, 1998; Gavigan and Cahill, 1997; OECD, 1996).

Foresight can also contribute to tackling yet another challenge faced by ACs. Most accession countries are struggling with 'burning' short-term issues (such as pressures on various public services, e.g. health-care, education, pensions and the resulting severe budget deficits; imbalances in current accounts and foreign trade; unemployment; etc.), while at the same time having to confront a compelling need for fundamental organizational and institutional changes. In other words, short- and long-term issues compete for various resources: capabilities (intellectual resources for problem-solving); attention of politicians and policy-makers who decide on the allocation of funds; and attention of opinion-formers who can set the agenda (and thus influence

discussions and decisions on the allocation of funds). These intellectual and financial resources are always limited, therefore choices have to be made. A thorough, well-designed foresight process can help identify priorities and facilitate the process of striking a balance between short- and long-term issues.

Foresight, however, is not a panacea; it cannot solve all the above problems, and indeed on its own, cannot solve any of them.

Level and scope of foresight

Foresight has today reached a sufficient degree of maturity for it to be possible to classify different approaches (Barré, 2001, 2002, Johnston, 2002, Renn, 2002). In other words, although no 'optimal' approach or any form of 'best practice' can be identified, taxonomies can be developed to highlight 'good practices': i.e. what has worked in certain circumstances (level of development, challenges and hence policy aims), and thus the set of tools and approaches that are likely to be useful in various environments.

Foresight programmes can be either holistic or just concentrate on particular technologies or business sectors. Holistic programmes, in turn, may have somewhat different foci, ranging from the identification of priorities in a narrowly defined S&T context to addressing broad socio-economic needs. They can also have different geographical scopes, i.e. they can be conducted at international (groups of countries, collaborating regions straddling national borders), national, regional, local, sectoral or firm level.

Foresight programmes can be product or process oriented, depending on the policy needs they are intended to serve, e.g. informing specific decisions with analytical reports, lists of priorities, recommended actions vs. facilitating networking,

Foresight – as a systematic, participatory process, collecting future intelligence and building medium-to-long-term visions aimed at influencing present-day decisions and mobilizing joint actions – can be a useful tool in meeting these challenges

In many accession countries there is also considerable competition for resources between long- and short-term goals. A thorough, well-designed foresight process can help identify priorities and help strike a balance between competing goals

Although it is not possible to identify 'best practice' as such in Foresight, the techniques are sufficiently mature for various types of 'good practice' to be classified

Some countries, however, might find it more appropriate to launch sectoral or regional programmes as pilot projects to 'test' the willingness of potential participants, gather experience about various techniques, etc., that is, to use these pilot projects as 'on-the-job' training and preparation for their future national foresight programme.

In any case, the organization and the management of any foresight programme is crucial:

- The design of the programme should take into account the level of socio-economic development; the size of the country in question; the socio-psychological legacy of central planning; the overall communication, cooperation and decision-making culture (norms, patterns, written and tacit rules); the legal, organizational and institutional framework, etc.
- Objectives should be formulated clearly at the very beginning. To juxtapose two extremes, a foresight programme can be:
 - limited to assisting the decision-making process relating to setting a narrowly defined R&D agenda (as mentioned above, that was the case in the Czech Republic, accordingly the 'key technologies' method was used); or
 - geared towards the broader socio-economic needs and problems of the country in question, i.e. defining the role of S&T developments, various policies and regulation in solving these broader problems, defining the responsibilities of the various actors: government, scientists and researchers, businesses, NGOs, families, individuals (This was the approach taken in Hungary).

Given the challenges of enlargement in general, and the very nature of the systemic changes in the case of transition countries, it seems appropriate to stress the importance of 'visions' ('futures', or fully fledged scenarios) for ACs both at panel (i.e. micro or meso) and macro levels. Visions (scenarios), however, have been mainly used at micro level so

far (e.g. in the case of the UK, Portugal, Sweden and Spain), with the exception of Hungary and South Africa. Yet, combining micro and macro visions is not an elementary or self-evident task (Havas, 2003). Obviously, there is a need for methodological innovations in this respect.

If the panel method is to be applied, the decision on the issues for panel discussions and reports is also crucial in terms of the expected output. One possibility is to set up panels to analyse various disciplines and/or economic sectors (e.g. the first UK foresight programme). A different approach would be to analyse broader socio-economic issues, like human resources, health, environment, business processes, of course with a strong emphasis on technological drivers/opportunities, too, in that context (see e.g. the Swedish and the second UK foresight programmes). Again, taking into account the various accession challenges, the latter approach is clearly more appropriate for ACs.

The process of accession also calls for explicit policy recommendations (as opposed to, those of the German and Japanese foresight exercises, for example). Again, the decisions on the objective, methods and scope (if it has a technological or a broader socio-economic focus) of the programme would influence the issues for policy proposals (e.g. narrowly defined S&T policy vs. human resources, various fields of regulation, competition, innovation, FDI and regional development policies, institution and network building).

Besides panel discussions/reports, a Delphi-survey could also be useful in ACs. Its benefits are threefold: (i) it collects information (experts' opinions), it (ii) disseminates this information, and by doing so, contributes to consensus building or identifying dissenting views, and (iii) it usually involves a wider range of participants in the process (as opposed to the case when only panels

Given the specific accession challenges, it seems to be more appropriate to start with a holistic foresight programme at national level, although some countries might prefer to launch sectoral or regional programmes to test participation and build up expertise

The challenges of enlargement and the nature of the systemic changes being undergone by transition countries make it important to develop 'visions' or scenarios at the macro level

relations, i.e. building trust through actual cooperation during the national/regional foresight programmes.

This type of regional cooperation can also help by exploiting economies of scale (compensating for insufficient intellectual resources in highly specialized fields, be they technical, socio-economic or policy expertise). Some possible ways of kicking off this cooperation include:

- producing (commissioning) joint background studies on major technological and socio-economic drivers (relevant for the cooperating accession countries). More in-depth, context-specific analyses, of course, should be conducted and policy conclusions should be drawn as part of the national foresight programmes.
- devising scenarios on European/global developments (if scenarios are to be used in the various national programmes);
- building partially aligned scenarios (the structure of scenarios might be partially coordinated, in other words some 'variables' might be the same, while their actual 'value' would differ from country to country).

Once cooperation starts, other issues to be discussed jointly and further possibilities for building capabilities and sharing resources, exploiting economies of scale are likely to be identified by the participants themselves. In other words, any rigid 'blueprint' for this cooperation might be counter-productive: insisting on a detailed plan (methods and milestones) might do more harm than good.

International cooperation, however, also poses a significant challenge: the broader the programme's geographic scope, the more difficult and costly it is to maintain its participatory character. Moreover, when participants are drawn from different countries – which vary in terms of level of development, norms, ways of thinking, values, behavioural routines – it is not only a question of

the cost and time involved in travelling and in organizing meaningful workshops. In such cases potential communication problems should be taken into account carefully when preparing these meetings: possible gaps should be identified in advance, and efforts have to be made to bridge them as well as to remove other obstacles to fruitful discussions. Of course, not all the problems can be envisaged, i.e. some 'slack' (e.g. extra time for clarification, reconciliation, other means to exchange ideas) should be allowed for.

Another important direction to advance methodology – mainly via experimentation, i.e. including 'action research'² – is to develop and test various methods e.g. for virtual meetings; electronic discussions; arranging and exploiting feedback from a series structured, 'aligned' meetings held separately across various countries on the same set of problems (allowing for somewhat different approaches, and yet following the same broad lines of discussion); on-line questionnaires with (almost) real-time ('instant') feedback; etc.

Conclusions

To conclude, foresight can be a useful tool to help ACs devise adequate strategies for the coming years when they continue to be faced with the multiple, complex challenges of building a significantly enlarged, new EU, while fundamental changes occur in the global structures, too. However, the success of any foresight programme depends on the match between its context (level of development, and hence the policy challenges faced by a given country), scope, goals, methods and participation. In short, it has to be carefully designed. Furthermore, it is crucial to demonstrate the relevance of foresight for decision-making: its timing and relevance to major issues faced by societies, as well as the level of its 'products' – reports and policy recommendations – are critical. Only substantive, yet carefully formulated propo-

Regional cooperation can also help by exploiting economies of scale. Once cooperation starts, other issues to be discussed jointly and further possibilities for building capabilities and sharing resources are likely to be identified by the participants themselves

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of HIV positive people is currently about 560,000, and transmission rates are decreasing, while infection rates remain higher in eastern European countries (approximately 1 million people).

Despite the fact that HIV has spread across the whole of society, and is not limited to particular groups, it has been surrounded by social prejudices and of the social exclusion of HIV positive individuals. The social, emotional and political aspects of the epidemic have been accompanied by rapid progress in research results and clinical treatment. In just two decades, a variety of therapies and clinical protocols have been made available to HIV carriers. Many of these treatments have serious side effects which can have a negative impact on the patient's quality of life². Paradoxically, HIV positive individuals in developed countries now face an unexpected challenge: getting over the idea of inevitable death as the syndrome has turned out to be not necessarily lethal. They are often confronted with the hard task of making a new life, when part of their youth has already elapsed on stand-by.

It is not surprising that, in such stressful circumstances, many people living with HIV have been compelled to develop a variety of strategies, mostly based on social support. For most HIV sufferers, this support can be achieved, in one way or another, within the social milieu of friends, family and organization-based communities, typically NGOs (non-governmental organizations). The Internet, however, has offered them a range of opportunities complementing these resources. In many cases, it has been the only contact point with information - take the case, for example, of the newly diagnosed who are afraid to approach a social organization or cannot count on their families' support; or those living in regions where such social support organizations are not available. The ages of affected people and the development of the Information Society, together with the spread of the virus, are

additional reasons to take HIV/AIDS as a very particular case amongst chronic diseases.

European context and e-Health initiatives

The health-care sector is undergoing a profound change in Europe as ISTs play an ever greater role in the delivery of health-care services. ISTs offer the potential to cut costs, deliver healthcare services remotely and avoid unnecessary duplication of medical tests. In addition, the Internet is increasingly being used by citizens to obtain medical information. At the same time, patients expectations regarding the quality of the services they receive are increasing in a context where health-care systems in the EU member states are under pressure from a number of angles due to demographic changes, technological advances creating new expectations among patients, and constraints on budgetary resources.

Considerations for e-Health: expectations and barriers

e-Health consists of applying ISTs to healthcare delivery. Its aim is therefore to enhance the health and wellbeing of the population, and the quality of healthcare services and outcomes as well as the efficiency in health-care services and management. There are many motivations for moving towards e-Health. Among them, the growing mass of retired people demanding more and more health-care services. European health-care systems are indeed facing changes resulting from the ageing of the population together with a high prevalence of concurrent chronic diseases. Recent projections indicate that these two factors are likely to increase up until the year 2020. Increased effectiveness is expected from the electronic support to a complex activity that involves many stakeholders, skills and resources, while there is a growing expectation for health systems to be more patient-focused to match

Despite the fact that HIV has spread across the whole of society, and is not limited to particular groups, it has been surrounded by social prejudices and of the social exclusion of HIV positive individuals

The health-care sector is undergoing a profound change in Europe as ISTs play an ever greater role in the delivery of health-care services

e-Health consists of applying ISTs to healthcare delivery in order to boost the efficiency of health-care services while enhancing the health and well-being of the population

Barriers encountered while trying to diffuse e-Health-related ISTs into patients and citizens' lives include incomplete (or even unavailable) infrastructure for efficient connectivity; the lack of strong evidence that ISTs enhance DM or HM, i.e. the need for clinical trials demonstrating the usefulness of ISTs in given cases like chronic diseases; the complex issue is that ISTs enable new services challenging the health-care systems in terms of ways of delivering care, organization, thus facing inertia from clinical bodies and problems over reimbursement; the motivation of patients -or their compliance in the case of DM- and the security concerns that data protection arises, such as unauthorized access, disclosure, and manipulation of medical records.

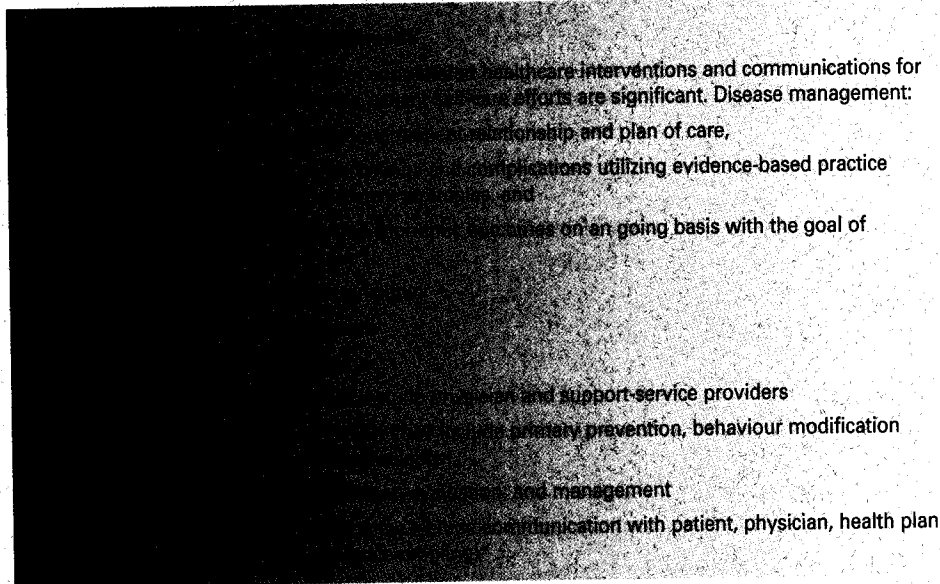
Chronic diseases. The case of HIV/AIDS

Chronic diseases -estimated to affect 20% of the total population, comprising about the 5% of all sickness cases, and causing about 60% of medical costs- are of major interest to the citizens, as well as to the clinical community. Groups of chronic diseases are particularly suited to adopt new e-Health practices within the new healthcare

paradigm that will emerge out of the profound transformation of health-care.

HIV/AIDS is nowadays considered as a chronic disease in the developed world⁴. Along the recent years the Highly Active Anti-Retroviral Therapies (HAART) have been the main therapeutic remedy to combat HIV/AIDS. Those therapies have evolved rapidly due to the outstanding pace of research results; so rapidly in fact that patients have had to face changing protocols as well as cope with side-effects, often undermining their quality of life. The patients themselves have partially or totally dealt with methods for alleviation of the side-effects on their own. Those effects have not always been viewed as being the top priority by immunologists, concerned with the main objective of keeping a tight rein on patients' immunological status and viral load within the complexity of a set of serious opportunistic diseases associated with the syndrome. Patients have turned to the Internet looking for information needed to cope with those effects in the hope of finding empirical knowledge shared by patients world-wide. This phenomenon, together with the information sought both on treatments and on emotional support have led many HIV carriers,

As well as the barriers created by inadequate infrastructure, the lack of strong evidence of the value of e-Health initiatives is also slowing progress



Source: the Disease Management Association of America (<http://www.dmaa.org/definition.html>)

Chronic diseases are estimated to affect 20% of the total population, comprise about the 5% of all sickness cases, and be responsible for about 60% of medical costs