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MT–**DP.** 2003/13

# SOCIO-ECONOMIC AND DEVELOPMENTAL NEEDS: FOCUS OF FORESIGHT PROGRAMMES

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Budapest
November 2003

KTK/IE Discussion Papers 2003/13
Institute of Economics Hungarian Academy of Sciences



# Socio-Economic and Developmental Needs: Focus of Foresight Programmes

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Paper presented at a UNIDO workshop on *Implementation of the Regional Programme on Technology Foresight for CEE/NIS* held in Ankara, Turkey on 8-12 December 2003 to be submitted for publication to *Technological Forecasting and Social Change*

HU ISSN 1785-377X
ISBN 963 9321 91 5

Published by the Institute of Economics Hungarian Academy of Sciences,
Budapest, 2003

## SOCIO-ECONOMIC AND DEVELOPMENTAL NEEDS: FOCUS OF FORESIGHT PROGRAMMES

BY ATTILA HAVAS

***Abstract***

*Emerging economies in the CEE/NIS region – faced with a number of similar or same challenges when trying to find their new role in the changing international settings, while still characterised by their own distinct level of socio-economic development, set of institutions, culture and norms – can benefit significantly from conducting foresight programmes. Yet, foresight should not be conducted for its own sake – just because it is becoming "fashionable" throughout the world, and currently being promoted by the EU. On the contrary, there should be a strong link between foresight, decision preparation and policy-making. In other words, foresight should be used in the context of (adequately identified) policy needs. Its focus (e.g. purely technological, techno-economic or broad socio-economic orientation) is, therefore, largely determined by the perceived socio-economic and developmental needs. Further, its focus, broad objectives, geographical scope (level), themes, time horizon, methods and participation are closely interrelated, and thus a careful – but flexible – project design is needed to assure coherence among these constituents. It should be borne in mind, however, that foresight is only one of the available policy instruments, and definitely not a panacea.*

HAVAS ATTILA

## TECHNOLÓGIAI ELŐRETEKINTÉS ÉS A TÁRSADALMI-GAZDASÁGI FELZÁRKÓZÁS CÉLJAI

***Összefoglalás***

*Bár a technológia előretekintés módszereit a fejlett országokban dolgozták ki, és alkalmazták először, ezt az új döntés-előkészítő eszközt a felzárkózó országok is eredményesen használhatják a fejlesztési céljaik meghatározásához, társadalmi-gazdasági stratégiájuk megalapozásához. Az elmúlt évtizedekben olyan jelentősen változott az előretekintési programok fő célkitűzése, hogy a legújabb szakirodalomban már három*

*modellt különböztetnek meg. Az ún. első generációs programok a hagyományos előrejelzést tekintették a fő feladatuknak; ezeket a piaci szükségletekre, azaz az egyes ágazatok, vállalatok által támasztott műszaki-technikai keresletre összpontosító programok követték. Az 1990-es évek második felében még tovább szélesedett a kérdések köre, ekkor már több ország előretekintési programja is a társadalmi-gazdasági fejlődést állította az elemzés központjába, az ehhez szükséges műszaki, szervezeti-intézményi és gazdaságpolitikai változásokra tettek javaslatokat (tehát nem szűken értelmezett kutatás-fejlesztési célokat emeltek ki). A három modell egymás mellett él, az egyes országok (ágazatok, vállalatcsoportok, régiók) döntik el, hogy milyen kérdésekre keresik a választ az előretekintés segítségével, azaz melyik modellt alkalmazzák. A modelleket azonban nem lehet szabadon „keverni". A fő célok megjelölése egyúttal nagymértékben meghatározza az elemzés időhorizontját, szintjét (pl. vállalati, ágazati, regionális, nemzeti) és a fő témák megközelítési módját, a résztvevők körét, a módszereket. Ezért alapos, de rugalmas megvalósítási, módszertani tervet célszerű készíteni, amely megteremti a program elemei közötti összhangot.*

*A tanulmány röviden áttekinti azokat a szakpolitikai feladatokat (kihívásokat), amelyek megoldásához az előretekintés hozzájárulhat (mind a fejlett, mind a felzárkózó országokban), de azt is hangsúlyozza, hogy ez a módszer sem „csodaszer", nem kínál minden bajra gyógyírt. Az sem elegendő indok az alkalmazására, hogy egyre „divatosabb", most már minden földrészen, a fejlettség lényegesen eltérő szintjén álló országokban használják, és nemzetközi szervezetek, pl. az Európai Unió és az UNIDO is szorgalmazzák előretekintési programok indítását. A módszert csak akkor érdemes alkalmazni, ha szoros kapcsolat teremthető a program elemzései és ajánlásai, valamint a döntés-előkészítés és a fejlesztési stratégiák, illetve szakpolitikai döntések kidolgozása között.*
*A tanulmány röviden jellemzi az előretekintés eltérő modelljeit, azok időtávját, fő témáit, a résztvevőket, és bemutatja a modellek elemei közötti összefüggéseket. Ezután ismerteti az előretekintés leggyakrabban alkalmazott módszereit, majd elemzi, hogy az egyes módszereket hogyan, milyen módosítással lehet/ érdemes a felzárkózó országokban alkalmazni. Végül javaslatokat fogalmaz meg a felzárkózó országok közötti együttműködésre, de nemcsak a lehetőségeket emeli ki, hanem néhány módszertani nehézségre is felhívja a figyelmet.*

## INTRODUCTION

The increasing number of foresight programmes suggests that it can be a useful policy tool in rather different national innovation systems. Emerging economies in the CEE/NIS region – faced with a number of similar or same challenges when trying to find their new role in the changing international settings, while still characterised by their own distinct level of socio-economic development, set of institutions, culture and norms – can also benefit significantly from conducting foresight programmes. Foresight has now reached a point, at which different approaches can be compared to highlight 'good practices': what has worked in certain circumstances (level of development, challenges and hence policy aims), and thus what set of tools and approaches are likely to be useful in different environments. In other words, foresight should be used in the context of adequate policy needs – actually, it can also contribute to identify/ reformulate those needs. Its focus (e.g. purely technological, techno-economic or broad socio-economic orientation) is, therefore, largely determined by the perceived socio-economic and developmental needs. Further, its focus, broad objectives, geographical scope (level), themes, time horizon, methods and participation are closely interrelated, and thus a careful project design is needed to assure coherence among these constituents.

This paper is aimed at discussing the relevance of foresight for emerging economies in the CEE/NIS region. In doing so, first the rationale of conducting foresight is summarised: what policy challenges can be tackled by applying foresight? Then different types of foresight programmes are identified, in terms of their focus, orientation and geographical scope. Following upon that, the relationships between focus, themes and time horizon are analysed, pointing to different approaches to the same topic (theme), and emphasising the importance of cross-cutting issues. The next section highlights the pros and cons of various approaches (foci) and foresight techniques in the context of emerging economies. Then the benefits of, and potential for, co-operation among emerging economies are discussed. The concluding section summarises the major lessons, but also presents some policy and methodological dilemmas.

## POLICY CHALLENGES: WHY TO CONDUCT FORESIGHT

Foresight (or the use of some other methods to assist future-oriented thinking) is important to emphasise the possibility of different future*s* (or future states, as opposed to the assumption that there is an already given, pre-determined future), and hence the opportunity of shaping our futures, to enhance flexibility in policy making and implementation, broaden perspectives, encourage thinking outside the box ("think of the unthinkable"). A number of major trends affect all countries and most areas of policy-making, thus a new *culture of future-oriented thinking* is needed.

The increasing number of national foresight programmes suggests that foresight can be a useful policy tool in rather different national innovation systems. As a growing body of literature analyses this surge, the major factors explaining the diffusion of foresight can be summarised in a telegraphic style:

- Globalisation, sweeping technological and organisational changes, as well as the ever-increasing importance of learning capabilities and application of knowledge have significantly altered the 'rules of the game'. Thus, policy-makers have to take on new responsibilities (as well as dropping some previous ones), while firms must find new strategies to remain, or become, competitive in this new environment.
- Given the above factors our future cannot be predicted by any sophisticated model. Planning or forecasting of our future becomes more and more ridiculed in light of rapid and fundamental changes. History also teaches us valuable lessons about the (im)possibilities of planning and predicting the future. Therefore, flexibility, open minds for and awareness of possible future*s* are inevitable. Diversity is a key word: diversity in scope (in terms of possible futures, differing analyses etc), as well as diversity 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 IT-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.
- Most policy problems no longer have 'self-evident' solutions. Governments are forced to make use of 'evidence-based policies', policies based on knowledge/insight into what works and what does not. This does not mean that values are no longer of importance. Values are still very important, but have to be considered in the context of a given issue.
- Policy-makers have to learn to cope with growing complexity and uncertainty of policy issues themselves. Thus the precautionary principle is of a growing significance.
- 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).
- 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.
- There is a widening gap between the speed of technological changes and the ability to formulate appropriate policies (which requires 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, while cutting taxes, and hence 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 subject to these demands.
- Policy-makers also have to deal with intensifying social concerns about new technologies (mainly ethical and safety concerns in the case of biotech or nuclear technologies, and fears of unemployment and social exclusion caused by the rapid diffusion of information and communication technologies).

- Even the credibility of science is somewhat fading. Scientific research no longer stands for ‘true’ in itself. The ‘objectiveness’ of policies based on scientific research is questioned (by citizens, interest groups, etc.) as scientists themselves are known to have different opinions and come to different conclusions on the same issue.
- More generally, individualisation, as a major recent trend, has several repercussions. The ever more mature and independent citizens want to be catered to their needs; this calls for ‘mass customisation’ not only in manufacturing and services, but to some extent also in policy-making. They are also more and more informed about possibilities, possible negative effects, and will not hesitate to voice their preferences. On top of this the social bases for decision-making are quickly eroding. The ‘usual’, erstwhile social groupings to which people belonged (e.g. churches/ religions, socialists, entrepreneurs, workers) no longer provide relevant, sufficient guidance for all areas of decision-making. People can, and nowadays do, belong to a multitude of different interest groups; they are not bound by the traditional ‘pillars’. Thus, the role of the traditional intermediaries (political parties, unions etc) is becoming less dominant. More and more specific interest groups (new intermediaries, e.g. NGOs) have sprung up, and become increasingly important. This can be seen as a supplement to democracy; citizens are exercising ‘voice’ in new ways (not just once in 4-year election periods). Therefore decision-making is becoming ever more complex. Coalitions (not those of political parties, but of stakeholders) are not fixed, they tend shift issue by issue. All this calls for openness on possible futures, flexibility, and room for diversity as mentioned above.

Besides the above trends, there are other specific, policy-relevant methodological reasons to apply foresight. First, it can offer vital input for ‘quantum leaps’ in policy-making in various domains. Usually policies evolve in a piecemeal way, in incremental, small steps. From time to time, however, a more fundamental rethinking of current policies is needed. In other words, policy-makers occasionally need to ask if current policies can be continued: do they react to signs of changes, block or accommodate future developments?

> The parable of the boiling frog illustrates this point ‘vividly’: put a frog in a cooking pot with cold water, and start heating the water. The frog will not jump out, because it does not alerted by the slowly rising temperature. It will boil alive.

Second, foresight can also help in picking up *weak signals*: weak but very important signals that a fundamental re-assessment and re-alignment of current policies are needed. In other words, foresight can serve as a crucial part of an *early warning* system, and it can be seen as an instrument for an adaptive, 'learning society'.

In sum, participative, transparent, forward-looking methods are needed when decision-makers are trying to find solutions for the above challenges. Foresight – as a systematic, participatory process, collecting future intelligence and building medium-to-long-term visions, aimed at influencing present-day decisions and mobilising joint actions – offers an essential tool for this endeavour. (EC DG Research, 2002) It helps in making choices 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 the various visions with a wide range of stakeholders, it also leads to a more transparent decision-making process, and hence provides a way to obtain public support. The foresight process can reduce uncertainty, too, because participants can align their endeavours once they arrive at shared visions. Many governments have already realised the importance of foresight activities, and thus this relatively new, and innovative, technology policy tool is spreading across continents.[1]

The above general considerations apply in catching-up countries in the CEE/NIS region, too.[2] Quite a few pressures – especially the need to change attitudes and norms, develop new skills, facilitate co-operation, balance budgets – are even stronger than in the case of advanced countries. Moreover, most of these countries also have to cope with additional challenges: the need to find new markets; fragile international competitiveness; relatively poor quality of life; brain drain. These all point to the need to devise a sound, appropriate innovation policy, and even more importantly, to strengthen their respective systems of innovation. Foresight can be an

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[1] For a detailed and systematic analysis of the rationale for foresight and description of national exercises see the articles, papers and books listed in the References.

[2] The term of CEE/NIS region denotes Central and Eastern European countries and the Newly Independent States (NIS). The notions of emerging economies and catching-up countries are used interchangeably throughout this paper, and refer to CEE countries and NIS (i.e. the case of other emerging countries e.g. in Africa, South America or South-East Asia is not discussed here).

effective tool to embark upon these interrelated issues, too, if used deliberately in this broader context.

Foresight can also contribute to tackle yet another challenge of emerging economies: most of them are struggling with 'burning' short-term issues – such as pressures on various public services, e.g. health care, education, pensions and thus severe budget deficit; imbalances in current accounts and foreign trade; unemployment; etc. – while faced with a compelling need for fundamental organisational 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 financial funds; and attention of opinion-leaders who can set the agenda (and thus influence discussions and decisions on the allocation of funds). These intellectual and financial resources are always limited, thus choices have to be made. A thorough, well-designed foresight process can help identify priorities, also in terms of striking a balance between short- and long-term issues.

Further, foresight can offer additional "process benefits" in the CEE/NIS region. By debating the various strengths, weaknesses, threats and opportunities of a country posed by the catching-up process, and the role of universities and research institutes in replying to those challenges, the process itself is likely to contribute to realign the S&T system (including the higher education sector) to the new situation. An intense, high-profile discussion – in other words, a wide consultation process involving the major stakeholders – can also be used as a means to raise the profile of S&T and innovation issues in politics and formulating economic policies. (*Georghoiu,* 2002)

To conclude, foresight should not be conducted for its own sake – just because it is becoming "fashionable" throughout the world, and currently being promoted by international organisations. On the contrary, there should be a strong link between foresight, decision preparation and policy-making: foresight should be used as a policy tool to address major socio-economic and political challenges. It is not a panacea, however; it cannot solve all the problems listed above, and cannot solve any of them just on its own. Obviously, other methods and tools are also required, as well as an assiduous implementation of the strategies devised either at national, regional, sector or firm level.

## LEVEL AND FOCUS OF FORESIGHT

The ‘maturity’ of foresight reached a point, at which it can be classified. (*Barré*, 2001, 2002, *Johnston,* 2002, *Renn,* 2002) In other words, no ‘optimal’ approach or any form of ‘best practice’ can be identified, yet, taxonomies can be developed to highlight ‘good practices’: what has worked in certain circumstances (level of development, challenges and hence policy aims), and thus what approaches and set of tools are likely to be useful in different environments.

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

Foresight programmes can be product or process-oriented, depending on the policy needs to serve, e.g. informing specific decisions with analytical reports, list of priorities, recommended actions vs. facilitating networking, communication and co-operation among key players. The separation of the products and the process, however, is somewhat artificial. Without a lively and constructive, creative process we cannot talk of foresight, because in that case it would not be a participatory programme, on the one hand. Moreover, wide participation is likely to improve the quality of the ‘final product’. (The process should be well-organised and focussed, of course, otherwise the more people are involved, the less coherent and concise report would be produced.) Without inspiring ‘semi-finished products’ – background papers, draft visions and reports –, on the other hand, the ‘process’ cannot be triggered at all. Experts would not attend meetings, workshops in a sufficient number as they would not feel being intellectually rewarded for their time and efforts.

Foresight programmes can be supported by a number of analytical and participatory methods ranging from desktop research, expert discussions and brainstorming, SWOT- and trend analyses, scenario-building, Delphi-survey, to various forms of stakeholder involvement (workshops, consensus conferences). Some of them are exploratory in their nature (starting with the present situation and then identifying potential future states), while others are normative ones (describing desirable futures and asking what paths could lead there). In certain contexts, for certain purposes

quantitative methods are more relevant, whereas in other cases qualitative ones can or should be used. (Cuhls *et al*., 2002, FOREN, 2001)

Following *Georghiou* (2001) and (2002), three 'generations' of foresight – or rather, prospective/ strategic technological analyses – can be identified. The first generation is the classical technological forecasting. It is still around in many reports, and as its name clearly suggests it is aimed at predicting technological developments, based on extrapolation of perceptible trends. These predictions are produced by a relatively small group of experts: futurologists and/or technological experts (that is, other types of expertise or actors are not sought after in the process of forecasting). The main objective is to predict which S&T areas are likely to produce exploitable results. Forecast results, in turn, are used in economic planning, either at firm or macro level.

In a second-generation foresight programme a different set of actors is involved: researchers working on various S&T fields and business people, bringing knowledge on markets into the process, as the main aim becomes to improve competitiveness by strengthening academy-industry co-operation, correcting the so-called market failure[3] and trying to extend usually too short time horizon of businesses. Accordingly, futurists and technological 'gurus' play hardly any role in these exercises. These programmes are organised by following the structure of economic sectors (various industries and services).

A third-generation foresight programme further broadens the scope in terms of the major issues to be tackled and thus participants: the focus shifts to broad/er/ socio-economic challenges, and hence besides researchers and business people government officials and social stakeholders are also involved. The shift in focus is reflected in the structure, too: these programmes are organised along major socio-economic concerns (e.g. health, ageing population, crime prevention as in the case of the Hungarian, first Swedish or second UK foresight programmes). A new element in the underlying rationale can also be discerned, the so-called systemic failure argument: the existing institutions (written and tacit codes of behaviour, rules and norms) and organisations are not sufficient to improve

[3] In short, private returns on R&D are smaller than social returns (as firms cannot appropriate all the profits stemming form R&D), and thus firms do not invest into R&D at a sufficient – socially optimal – level.

quality of life and enhance competitiveness, and thus new institutions should be 'designed' by intense communication and co-operation among the participants. In other words, the existing gaps should be bridged by new networks, appropriate policies aimed at correcting systemic failures and relevant organisations. A foresight programme, based on this rationale, can deliver solutions in various forms: by strengthened, re-aligned networks as 'process' results of the programme, as well as by policy recommendations.

The above brief description, of course, only depicts 'idealised prototypes': an actual foresight programme might combine certain elements from various "generations". As learning is rather intensive in this field, too, one can easily detect elements of a given programme applied in another one, with a slightly different rationale. In most cases, however, one type of rationale would be chosen as a principal one – it thus would underlie the more detailed objectives and structure of a programme, as well as the choice of its participants – otherwise it would likely to lead to an incoherent – even chaotic – exercise, characterised by tensions between (a) the various objectives, (b) elements of its structure, (c) the objectives and methods, (d) the participants and objectives, and/or (e) among the participants themselves. A certain level of tension might be quite useful – or even essential – to produce creative, innovative ideas and solutions, of course, but too intense and too frequently occurring – structural, inherent – conflicts would most likely tear a foresight programme apart.

To illustrate the above general considerations it is worth recalling that in the CEE region so far two countries have concluded holistic foresight programmes at a national level, albeit following different approaches. Hungary took a broader approach, focussing on socio-economic issues, relying on both visions (scenarios) and a large-scale, two-round Delphi questionnaire, and producing a broad set of policy recommendations to strengthen the national innovation system (correct the systemic failures). (Havas, 2003a, www.tep.hu) The Czech programme, on the contrary, aimed at identifying S&T priorities, and thus applied a modified version of the so-called key (or critical) technologies method. (www.foresight.cz) This difference has confirmed that context does matter: even countries with a more or less similar history, facing similar challenges on the whole and being broadly at a similar level of development can opt for different foresight approaches/ methods. Other emerging economies in the CEE/NIS region might consider taking somewhat different routes, given their own specific circumstances and goals. It all depends on the policy challenges, as well as on the policy environment: if decision-makers strongly favour a certain

approach, it is definitely not a good idea to try to push through a drastically different programme design – even if it might seem to be relevant from an abstract theoretical/ methodological point of view.

## THEMES AND TIME HORIZON

At a first glance, the focus of a foresight programme determines the themes to be discussed/ analysed to a large extent. For instance, as already alluded, typical themes for a technology forecast program would be specific fields of science and technology, such as microelectronics, communications, bioinformatics, energy technologies, new materials, bio- and nanotechnology. These topics have been dictated to a non-negligible extent by 'fashion' or fads, too: earlier much had been written on nuclear and space technologies, then came ICT to yield significance and notice more recently to fields denoted by prefixes of 'bio-' and 'nano-'. The time horizon can be driven by the dynamics of a given discipline or the imagination (agenda) of the futurist. For the latter, perhaps an extreme example is when Molitor (2000) predicts the weight and height of human beings in 3000. He has also published a book entitled *The Next 1000 Years*. It is not uncommon, however, to try to predict major events in a 50-100 years time horizon.

The so-called critical or key technologies method is also concerned with technological fields – as its name clearly indicates – but in this case the time horizon is much shorter, usually 5-10 years, as it is derived from policy-makers' needs to set mid-term priorities.

A typical second-generation foresight programme, e.g. the first UK one, deals with economic sectors, such as chemicals, construction, financial services, food and drinks, leisure and learning, retailing and distribution, transport, as well as technological fields, such as aerospace and defence, communications, IT and electronics, life sciences, materials. The time horizon in this case was 15-20 years, similar to a number of other national foresight programmes.

At a national level only a handful of third-generation foresight programme have been conducted so far. As already mentioned, these are concerned with broad socio-economic issues, such as human resources, health, ageing population, crime prevention, usually with a time horizon of 20-25 years.

**Box 1: UK1 and UK2 foresight themes**

| **UK 1st round (1994-99)** | **UK 2nd round (1999-2002)** |
|---|---|
| *Science driven sectors*: | *Thematic panels* |
| Chemicals | Ageing population |
| Defence and aerospace | Crime prevention |
| Health and life sciences | Manufacturing 2020 |
| Materials | *Sector panels* |
| *Exploitation sectors*: | Built environment and transport |
| Communications | Chemicals |
| Financial services | Defence aerospace and systems |
| Food and drink | Energy and natural environment |
| IT and electronics | Financial services |
| *Policy driven sectors*: | Food chain and crops for industry |
| Agriculture, natural resources and environment | Healthcare |
| Energy | Information, communications and media |
| Retailing and distribution | Marine |
| Transport | Materials |
| *Human resource and management driven sectors*: | Retail and consumer services |
| Construction | |
| Leisure and learning | |
| Manufacturing, production and business processes | |

**Box 2: Hungarian and Swedish foresight themes**

| **TEP, Hungarian Foresight Programme (1998-2000)** | **Swedish Foresight Programme** |
|---|---|
| Human resources | Health, medicine and care |
| Health (life sciences, health care system, life style, pharmaceuticals, medical instruments) | Biological natural resources |
| Natural and built environment | Society's infrastructure |
| Information technologies, telecommunications, media | Production systems |
| Manufacturing and business processes (new materials, production processes and management techniques, supplier networks) | Information and communications systems |
| Agri- and food businesses | Materials and material flows in the community |
| Transport | Service industries |
| | Education and learning |

### *Different approaches to the same topic*

A premature, conclusion from the above examples would suggest a mechanistic link between the focus and themes of a given foresight programme, as well as between themes and time horizons. A more detailed look, however, would reveal there is no strict one-to-one relationship in either case. E.g. information and communication technologies (ICTs) are usually analysed by all sorts of foresight programmes – with important differences, of course:

- in a critical (key) technologies programme the emphasis would be on specific technological terrains of this broad field, usually with a 3-5-year time horizon, and hardly any attention would be devoted to social issues (e.g. exclusion – inclusion of certain social groups; gaps between generations, regions cities vs. villages; e-democracy; regulations on, and incentives for, different types of content; etc.);
- technology forecasters would also put the emphasis on – usually positive, glorious – technical aspects (including perhaps also the overall impacts on the society in general, i.e. not differentiated/ elaborated by social strata; but no impact the other way around, that is, how socio-economic needs and trends would shape technological developments). They opt, however, usually for a significantly longer time horizon (20-25 or even 50 years, because the intention is to predict big events, technological breakthroughs) than the one used in a critical (key) technologies programme.
- a second-generation foresight programme is likely to focus on broader technological fields – as opposed to specific sub-fields analysed by the critical technologies approach or forecasters. (Yet, in the first UK programme, IT, electronics and communications were not integrated into a single panel.) It would pay much more attention to the economic (market) aspects than the above ones, and perhaps would discuss some social factors, too, as they shape demand, but not much elaboration can be expected on social challenges (either dealing with the new ones caused/ accentuated by ICT or asking how ICT can contribute to tackle existing social challenges). The usual time horizon is around 10-15 years when this approach is chosen.
- a distinctive feature of a third-generation foresight programme is the marked, deliberate shift towards precisely to those socio-economic aspects which are neglected by all the other approaches, and thus mentioned above as “negative examples”. Technical aspects, however, are not ignored by this approach, either, but discussed in a

different context (also usually in a more integrated way, e.g. ICT and various types of media are understood as a complex, closely interrelated entity): other types of questions are asked, and new drivers and shapers come to the forefront. The time horizon, therefore, is also determined by the socio-economic issues identified by the programme: it would depend on the amount of time required to change the underlying settings, to influence the major shaping factors so as to achieve a certain (desirable) future state. (In other words, the time horizon cannot be shorter than the period of time needed for a change aspired by the programme.)

ICT has been used as an example here because it is – by definition – a technology, and as it is a significant one, it is no surprise at all that various generations of technology foresight programmes would deal with this issue. Non-technological topics – such as human resources, crime prevention, etc. – on the contrary, are only addressed by third-generation programmes as major issues. (This is not to be mistaken with the fact that some socio-economic factors might be included in a second-generation foresight programme as shapers influencing market dynamics – as mentioned above.)

Finally, it goes without saying that some inherent features of a given topic to be analysed also have repercussions on the time horizon. Usually changes take much more time e.g. in the field of agriculture (classical breeding), environment, education or in demographic trends than in rapidly evolving technologies, such as ICT or biotechnology. These determinants should not be ignored, and various themes/ topics of a given foresight programme, therefore, might have somewhat different time horizons. The sponsors and the managing team should be prepared for that.

### *Cross-cutting issues*

As already mentioned, third generation foresight programmes put emphasis on broad socio-economic issues, as opposed to organising the panels either by scientific branches or economic sectors. For instance, TEP, the Hungarian Foresight Programme has brought together various issues treated

separately in most other foresight exercises, and put more emphasis on socio-economic needs, than on science and technology 'push'.[4]

An important lesson of various second-generation foresight programmes has been, however, to put a strong emphasis on the so-called cross-cutting (cross-panel, or horizontal) issues. Taking TEP again as an example, it was a conscious effort, in spite of defining broad fields as panel topics to be analysed. Panels were encouraged to identify, and adequately deal with these issues when analysing major trends and developing alternative visions for their fields.[5] A workshop was also organised to analyse these issues when the first drafts of the panels' visions were completed.[6]

Although TEP panels were set up around broad issues, real-life cases proved to be even more complex, of course. They require expertise from many disciplines and economic sectors: e.g. our health is influenced by a number of factors, among others by one's life style (eating and drinking habits, if one smokes or not, time and efforts for active recreation, etc.), social status, diet, housing and employment conditions, as well as the level of the medical care system and the environment. All these issues belonged to different TEP panels, i.e. a close and well-thought collaboration was required to carry out a reliable, thorough analysis and formulate sensible policy proposals. Having recognised that need, some panels joined forces,

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[4] For example, the *Health and Life Sciences* panel has encompassed life sciences, related fields of biotechnology, the health care system, pharmaceuticals and medical instruments industries, but all from the point of the health of the population. Some of these issues were not analysed at all in the foresight exercises known when TEP started, e.g. the health care system. Others were treated in separate panels, e.g. life sciences (a 'stand-alone' panel in the first UK foresight programme), pharmaceuticals (as part of the *Chemicals* panel in the same programme). Also, *agriculture and food processing* belong to a single panel in the Hungarian foresight programme (as opposed to the first British one). Similarly, *IT, telecom and media* were brought under the same 'roof'.

[5] A list was developed at the very beginning of TEP, including, among others: education, training and re-training; impacts, threats and opportunities of IT; environmental issues; accession to the EU; competitiveness; social cohesion; the role of large (multinational) and small and medium-sized (indigenous) firms; control and self-control of different systems and sub-systems; research and development, manufacturing (services), marketing; new materials.

[6] TEP Office staff prepared matrices of issues, actions to be taken, etc. panel by panel. Face-to-face, 'bi- or trilateral' meetings of respective panel secretaries and members were also organised during and after the workshop.

i.e. their budget, and commissioned together a group of experts to analyse cross-cutting issues from different points of view.[7] Given the legacy of the planned economy – that is, strong 'departmentalism' – and the inherent isolation of various disciplines, it can be regarded an achievement in itself.

Some of these cross-cutting can be further analysed by a specifically designed Delphi survey. In the case of TEP, two cross-cutting issues were also put into the Delphi questionnaire as variables, namely impacts of a given event/development on the environment and lack of skills as a potential constraint. There were a number of 'cross-cutting' Delphi-statements, too, e.g. those concerning environmental issues but formulated by other panels (e.g. Health; IT, telecom and media; Manufacturing and business processes). TEP Office staff collected these statements, and the respective panels were urged to analyse them, i.e. both those panels that had formulated these 'cross-cutting' Delphi-statements and those which are 'affected' by these statements.

In sum, although there is a great deal of overlap in terms of broad themes discussed by various types of foresight programmes, a closer look clearly shows that these apparently same topics are dealt with in rather different manners. A different focus means different approaches are applied when analysing seemingly similar issues: a different set of questions are asked, and hence various – social, technological, economic, environmental and political – factors and values are taken into account to a different degree (some of these factors not at all in certain foresight programmes) by a different set of participants (futurists, technology gurus, business people, researchers, policy-makers, lay people). The time horizon, in turn, is determined to some extent by the inherent (technical, social, etc.) features of the various themes, but also by the focus (main objectives) of the programme in which these topics are taken up. Even in a case when panels are set up to discuss broad socio-economic issues, it is inevitable to devote systematic efforts – and probably more sophisticated methods than currently known – to deal with the so-called cross-cutting issues. Further, there is also an obvious need to find appropriate – efficient, convincing – ways and means to convey these complex 'messages' to decision-makers and opinion-leaders.

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[7] *Health* and *Agri- and food businesses* panels set up two such task forces to analyse jointly healthy diet and allergy.

## CHOOSING APPROPRIATE METHODS: THE DESIGN AND USE OF VARIOUS FORESIGHT TECHNIQUES IN EMERGING COUNTRIES

The propositions below are formulated in the conceptual framework of the so-called innovation system approach. This understanding of the innovation process emphasises the importance of communication, mutual learning and co-operation among various actors (e.g. scientists and engineers, business people and policy-makers), strengthening the existing – and building new – institutions, formal and informal networks conducive to innovation. It is systemic as well, in the sense that a successful innovation process encompasses not only technological elements (inputs, actors and factors) but economic, organisational and social ones as well. (*Lundvall* and *Borrás*, 1998; OECD, 1998)

Given the challenges of the catching-up process, it seems to be more appropriate to start with a holistic foresight programme at a national level. Then, relying on the various results achieved this way – including not only the information collected and analysed, reports published, but also the skills and experiences accumulated, as well as the so-called process results – sectoral and/or regional foresight programmes can be launched with a higher probability of success. Some countries, however, might find it more relevant to launch sectoral or regional programmes as pilot projects to 'test' the willingness of potential participants, collect experiences 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 organisation and the management of any foresight programme are crucial:

- The design of the programme should take into account the level of the socio-economic development; the size of the country in question; in many emerging countries the socio-psychological legacy central planning, too, as it used to be their way of organising economic activities; the overall communication, co-operation and decision-making culture (norms, patterns, written and tacit rules); the legal, organisational and institutional framework, etc.
- The focus and thus the main objectives should be formulated clearly at the very beginning. To juxtapose two quite different positions, a foresight programme can be:
  - confined to assist the decision-making process of setting narrowly defined R&D (as mentioned above, that was the case in

the Czech Republic, and accordingly the 'key technologies' method was used); or

- geared towards broader socio-economic needs and problems of a country in question, i.e. what is the role of S&T developments, various policies and regulation in solving these broader problems, what are the responsibilities of the various actors: government, scientists and researchers, businesses, NGOs, families, individuals? (that was the approach taken in Hungary)

Given the challenges of catching-up in general, and the very nature of the systemic changes of transition countries in the CEE/NIS region, 'visions' ('futures', or fully fledged scenarios) are of high relevance both at panel (i.e. micro or mezzo) 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, it is not an elementary, evident task to combine micro and macro visions. An inherent difficulty is that panels analyse a certain field, with its specific structure (players, institutions, norms, values and attitudes), socio-economic and technological dynamics, etc., while the macro visions deal with issues at a different level, by definition. For this reason alone, there are obvious constraints to harmonise macro and meso (panel) visions.[8] 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/ 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 challenges of the catching-up process, the latter approach seems to be more appropriate for emerging economies – but as already stressed, only in the case when this view is shared by at least the majority of stakeholders.

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[8] For a more detailed account of these, and related, difficulties in the Hungarian case, see *Havas*, 2003*a*.

The catching-up process also calls for explicit policy recommendations (as opposed to, e.g. the German and Japanese foresight exercises). Again, the decisions on the focus (if the foresight programme should be concerned with technological priorities or broader socio-economic issues), objectives and methods would influence the issues for policy proposals (e.g. S&T priorities *vs.* human resources, various fields of regulation, competition, innovation, FDI and regional development, institution- and network-building).

Besides panel discussions/ reports, a Delphi-survey can also be useful in emerging economies. Its benefits are threefold: (i) it collects information (experts' opinion), but (ii) also disseminates those pieces of information, and by doing so, contributes to consensus building or identifies dissenting views, and (iii) usually it involves more participants in the process (as opposed to the case when only panels are included). However, it should be carefully designed, and certain aspects need to be considered thoroughly. Just to give a few examples:

- Are there a sufficient number of technical/ technological experts to conduct a large-scale postal survey, or is it better to use it as a supporting tool at experts' meetings?
- What structure is more appropriate: the traditional one aimed at collecting opinion or a more decision-oriented version (e.g. the one used in Austria)?
- What is the appropriate balance between the strictly technological and non-technological issues in the Delphi-statements (rows of the questionnaire)?
- What are the appropriate questions, i.e. the column headings in the questionnaire, taken into account the focus and objectives of a given foresight programme? How to create consistency among the questions (column headings), the nature of statements/ issues (rows in the questionnaire) and the country characteristics?
- What is the appropriate size of the questionnaire (the number of statements and questions)?

For a successful, effective foresight programme a strong emphasis should be put on organising awareness raising seminars in the first stage, and then on continuous, wide-ranging dissemination, discussions in parallel with the analytical activities. It is needless to say that without a carefully designed dissemination and implementation most of the efforts and resources com-

mitted to the programme (time of experts, tax-payers' money to cover the organisational and publication costs) would be wasted.

In sum, it is not only the 'products' – i.e. the different documents, final reports, policy recommendations – that are important results of a foresight programme, but also the 'process' itself, namely disseminating a new, participatory, transparent, future-oriented decision-making method; intensified networking, co-operation and institution-building activities. In other words, a foresight programme can contribute to the strengthening of the national system of innovation in two ways: through reports, recommendations as well as via facilitating the communication and co-operation among various professional communities.

## CO-OPERATION AMONG EMERGING ECONOMIES

There is an obvious scope for co-operation in the CEE/NIS region. Most of these countries are relatively small, and have not accumulated much experience with foresight, while facing a number of similar structural challenges. Thus, it can be extremely useful to exchange experiences on methods applied in various countries, as well as identifying success and failure factors. Moreover, some analytical activities on issues going beyond national borders might also be harmonised if there is a mutual interest in doing so. In other words, it cannot, and should not, be imposed upon the region (or group of countries in the region) by any national or international player. However, various international organisations, notably the EU and UNIDO, as well as national governments and professional associations might play a crucial role in facilitating this co-operation, contributing significantly to achieve synergies and economies of scale in a number of ways.

A well-designed co-operation among the players would assist local (national) capacity building and regional (trans-border) networking by

- promoting interactive learning through joint, tailored workshops (i.e. not a one-way flow of codified knowledge at traditional training seminars) to develop skills and generate shared tacit knowledge. The most important issues are the benefits and drawbacks of various foresight techniques (methods) in the context of catching-up.
- facilitating future co-operation among major players by establishing good, mutually beneficial working relations, i.e. building

trust through actual co-operation during the national/ regional foresight programmes.

This type of regional co-operation can also help in exploiting economies of scale (compensating for insufficient intellectual resources in highly specialised fields, be they technical, socio-economic or policy expertise). Some possibilities to kick-off this co-operation are:

- producing (commissioning) joint background studies on major technological and socio-economic drivers (relevant for the co-operating 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 co-ordinated, in other words some 'variables' might be the same, while their actual 'value' would differ country by country).

A more close co-operation might address jointly identified and/or trans-border issues, e.g.

- issues of relevance for cross-border regions: enhancing competitiveness by building/ strengthening clusters, synergies among firms, regional S&T base, and higher education; tackling environmental, region-specific health problems, etc.
- 'emerging-country' problems, such as critical mass in RTDI; the role of, and opportunities for, emerging countries in international co-operation in general, and with the enlarged EU in particular.

Once co-operation 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 co-operation might be counter-productive: insisting on a detailed plan (methods and milestones) might cause more harm than good.

International co-operation, however, poses a significant challenge, too: the broader the geographic scope of a programme is, the more difficult and costly is to maintain its participatory character. Moreover, when participants are coming from different countries – in terms of level of development, norms, ways of thinking, values, behavioural routines – it is not only a question of travel time and costs to organise and facilitate meaningful workshops. In that 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 that.

Another important direction to advance methodology – mainly via experimentation, i.e. including 'action research' – 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 discussions); on-line questionnaires with (almost) real-time ('instant') feedback; etc.

## CONCLUSIONS

To conclude, foresight can be a useful tool for emerging countries to devise adequate strategies for the coming years when they continue to be faced with the multiple, complex challenges of restructuring in the CEE/NIS region (notably how to deal with a significantly enlarged, new EU either as a member or a partner), 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 of a given country), focus, goals, geographical scope (level), themes, time horizon, methods and participation. Although one can come up with a large number of combinations of these constituents on paper, only some of them are feasible in practice: they cannot be 'mixed' freely. In other words, relevant policy needs should be addressed by applying appropriate tools, and involving relevant players. Given the wide choice of aims and techniques, it is of utmost importance to develop a clear programme concept at the outset, and then design a consistent, thorough project plan.

It is still likely, though, that some important methodological details would evolve throughout the programme, and that some objectives will have to be revisited and revised. This is in line with the general observation that foresight is predominantly a learning process, even in advanced countries with more experience in foresight, as reflected by the recent changes for instance in the UK and Germany. Moreover, a trade-off seems to exist be-

tween the ‘methodological sophistication’ of a programme and willingness to participate. Potential foresight participants might be ‘deterred’ by advanced, demanding methods, especially when foresight conducted for the first time in a country. (Of course practically any method can be taught at training seminars. Yet, foresight participants tend to be respected, and hence busy, researchers or business people who find difficult to attend even the “usual” panel or Steering Group meetings. Thus it might be hard to convince them to attend yet more meetings so as to learn certain sophisticated methods.)

Further, it is crucial to prove 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 proposals can grab the attention of opinion leaders and decision-makers, and then, in turn, the results are likely to be implemented. Otherwise all the time and efforts of participants put into a programme would be wasted, together with the public money spent to cover organisational and publication cost. The so-called process results – e.g. intensified networking, communication and co-operation among the participants – still might be significant even in this sad case, but they are less visible, and much more difficult to measure. Thus, the chances of a repeated programme – when it would be due again given the changes in the circumstances – are becoming really thin.

Foresight can be relevant even in a small country, being not in the forefront of technological development, but rather somewhere in the semi-periphery. A number of factors seem to contradict this conclusion at the first sight. It is costly in terms of time and money, but even more so in terms of the participants’ time required by meetings, workshops and surveys. Moreover, rich(er), more developed countries, whose experts, in turn, know more about the leading edge technologies regularly conduct their foresight programmes, and the ‘products’ – reports, Delphi-survey results – are readily available. Yet, only a national programme can position a country in the global context, and discuss how to react to major trends. Similarly, a SWOT of a given country would not be analysed by others, let alone broad socio-economic issues. Process benefits cannot be achieved without a national programme either. Without these, a country would not be able to improve the quality of life of her population and enhance her international competitiveness.

Yet, it is important to highlight some dilemmas, too, which are partly to do with policy, and partly methodological in character:

- How to solve the inherent contradiction between the long-term nature of foresight issues (policy recommendations), on the one hand, and the substantially shorter time horizon of politicians (and some policy-makers), on the other?
- What organisational set-up is necessary to ease another inherent contradiction between the need for a strong (but 'reserved') political support (or 'embeddedness') for a foresight programme on the one hand, and for enjoying intellectual, organisational, financial independence from any government agency, on the other?

International co-operation can enhance the chances of success by sharing lessons, easing the lack of financial and intellectual resources through exploiting synergies and economies of scale. Yet, its more ambitious form, i.e. a joint foresight exercise on trans-border issues also necessitates methodological innovations. International organisations can also facilitate foresight programmes in emerging countries, and more specifically collaboration among them. It is crucial, however, to maintain the commitment of local actors, e.g. in terms of time and funds devoted to the programme, willingness to implement of the results. In other words, the main forms of foreign assistance should be the provision of knowledge-sharing platforms and other fora to exchange experience (among emerging economies as well as with advanced countries), monitoring and evaluating foresight initiatives in the CEE/NIS region.

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