EVOLVING FORESIGHT IN A SMALL TRANSITION ECONOMY

The Design, Use and Relevance of Foresight Methods in Hungary

Attila Havas, PhD
Senior Research Fellow, Institute of Economics, Hungarian Academy of Sciences
Researcher, UNU/INTECH, Institute of New Technologies

UNU/INTECH
Keizer Karelplein 19, 6211 Maastricht, The Netherlands
phone: (31) (43) 350 6351 (direct), 350 6300 (switchboard)
fax: (31) (43) 350 6399
e-mail: havas@intech.unu.edu

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Abstract
Hungary launched her first Technology Foresight Programme (TEP) in 1997. This was a holistic foresight programme, based on panel activities and a large-scale Delphi survey, with a strong emphasis on socio-economic needs. The paper discusses why a foresight exercise is relevant to a transition country, then describes what was done (organisation, methods and results), and how the process evolved in Hungary. Policy conclusions, methodological lessons and questions for further research are also offered.
The heritage of the former system, the transition process itself and the current level of socio-economic development all played a decisive role throughout the programme. TEP was set up as a programme controlled by non-governmental experts, and in turn, the Steering Group delegated a great deal of autonomy to the panels. Thus, methods were refined continuously. Given the fundamental socio-economic changes in Hungary and the enlargement of the European Union a strong emphasis was put on scenarios – both at macro and panel levels –, and a large number of Delphi-statements featured non-technological issues. However developing qualitatively different visions, and aligning macro and panel futures, proved to be a difficult and challenging task.

Keywords: technology foresight, innovation system, visions (futures), economic transition, Hungary

Biography: Attila Havas (PhD in economics, Hungarian Academy of Sciences) is currently a Researcher at UNU/INTECH, Institute of New Technologies, on leave from the Institute of Economics, Hungarian Academy of Sciences (Senior Research Fellow). In 1997-2000, he was Programme Director of TEP, the Hungarian Technology Foresight Programme, and in 1991-1997 Research Fellow at IKU, Innovation Research Centre, Budapest University of Economic Sciences.

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1. INTRODUCTION

Hungary launched her first Technology Foresight Programme, TEP in 1997. The country was undergoing fundamental economic and social changes, and major institutions were being shaped. It was therefore a suitable time to think about medium and long-term issues: how to improve quality of life and enhance long-term international competitiveness. Foresight was perceived as an appropriate tool to bring together business, the science base and government in order to identify and respond to emerging opportunities in markets and technologies.

TEP was a holistic foresight programme, based on both panel activities (scenarios, SWOT analysis, policy proposals, etc.) and a large-scale Delphi survey. It put more emphasis on socio-economic needs than on scientific and technological (S&T) issues per se.

The foresight process proved to be more challenging than originally envisaged. It was truly a learning process in many respects, for all the interested parties. For instance, many participants' mindsets were still framed by the legacy of central planning, and thus developing qualitatively different visions took several rounds in the case of some panels. For the Steering Group, one of the major methodological difficulties was to align the macro and panel futures (visions), given their different level of analysis and the unique, inherent logic and structure of the panel issues. Some policy-makers, more accustomed to the linear model of innovation, and hence the dominance of technological issues, also found it hard to interpret and utilise the foresight results. Most business people, however, were rather quick in understanding the significance and benefits of these methods, e.g. establishing new contacts with each other and researchers through the programme.

The paper seeks to unveil the dynamics and key elements of the foresight process by analysing the reasons behind launching TEP, summarising the results achieved up to 2001 and discussing some methodological issues. It draws on the author's experience as the programme director of TEP in 1997-2000 – hence it is bound to be somewhat 'subjective' –, discussions with participants as well as foresight experts and practitioners in other countries. Section 2 discusses briefly the question of *why* to conduct foresight in general and in a transition country. Details of TEP – *what* was done, how it was managed and how the results were disseminated – are described in Section 3. Various TEP activities are assessed in Section 4, with a view on *how* methods evolved in the course of TEP. Some specific policy and methodological conclusions are already offered throughout the sections discussing various aspects of TEP, while the more general lessons and dilemmas, questions for further research are summarised in the concluding section.

2. FORESIGHT: DEFINITION AND RATIONALE

The increasing number of foresight programmes suggests that foresight can be a useful policy tool in 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, governments 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.
- Decision-makers face *complex* challenges: socio-economic and technological factors interact in defining issues of strategic importance, e.g. competitiveness; quality of life; environmental issues; education and life-long learning; regional disparities.
- The prevalence of flat organisations leads to new decision-making methods and more responsibilities for groups and individuals, and thus new skills and behaviour are required (e.g. problem-solving, communication and co-operation skills in multi-disciplinary, multi-cultural teams, as well as creativity). This, in turn, creates new demands on the education and training system.
- Various types of clusters and 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.
- Quite often technological changes occur and diffuse before policy-makers can fully understand the mechanisms at work and socio-economic repercussions so as to formulate appropriate policies (e.g. the recent developments in biotechnology, especially cloning and stem cell research).
- Governments try hard to balance their budgets, while cutting taxes, and hence they need to reduce public spending relative to GDP. Accountability, too, is becoming increasingly important in democratic societies. Public R&D expenditures are subject to these demands.
- Policy-makers also have to deal with intensifying social concerns about new technologies (e.g. ethical and safety concerns in the case of biotechnology and nuclear energy, fears of unemployment and social exclusion caused by the rapid diffusion of information and communication technologies).

In sum, participative, transparent, forward-looking methods are needed to find responses to the above challenges. Technology foresight – a systematic means of assessing scientific and technological developments, which could impact on industrial competitiveness, wealth creation and quality of life – offers an essential tool for this endeavour. 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 various visions with stakeholders, it also leads to a more transparent decision-making process. Foresight processes can reduce uncertainty, too, because participants can align their endeavours once they arrive at a shared vision. Many governments have already realised 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, Technological Forecasting and Social Change [Vol. 60])

The above general considerations apply in transition countries, too. A number of pressures – especially the need to change attitudes and norms, develop new skills, facilitate co-operation, balance budgets – are even stronger than in advanced countries.

Moreover, these countries also have to cope with the challenges of transition: loss of former markets (hence the need to find new ones); weak international competitiveness; relatively poor quality of life and brain drain. These all point to the need to devise a sound, appropriate innovation policy, and strengthen their innovation systems. Here, foresight can be a useful tool.

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

3. AIMS, METHODS AND RESULTS OF TEP

3.1. Background

3.1.1. Systemic changes and economic performance

As a result of the first phase of the transition process in Hungary, the most important political and economic institutions have been re-established: a parliamentary democracy based on a multi-party system, private ownership of assets, free factor and commodity markets and the stock exchange.[1] Some crucial economic institutions – e.g. a two-tier banking system, a 'Western-type' taxation system (VAT, personal income tax) – were introduced as early as 1987, that is, preceding the systemic changes. Most firms and banks were privatised by the mid-1990s, mainly by foreign investors, i.e. 'genuine' owners (as opposed to 'artificial' ones created by various voucher schemes in other transition countries).

After a sharp decline in the early 1990s, the Hungarian economy is 'bouncing back'. Inflation and unemployment rates declined while GDP grew by 4.4-5.2% annually in 1997-2000. GDP thus has reached the 'pre-transition' level, that is, 1989, by 1999. Foreign direct investment is the highest per capita – since 2000 'neck-to-neck' with the Czech Republic – compared to other Central and Eastern European countries.

3.1.2. Fragmented national system of innovation

In market economies networking, that is, communication and co-operation among innovative firms and other organisations involved in knowledge production plays a crucial role. (Freeman 1994, 1995, Freeman and Soete, 1997, Lundvall and Borrás, 1998, special issue of Research Policy on innovation systems [volume 31, No. 2]) In Hungary, however, exploitation of scientific results for economic and social purposes was rarely a success until the end of 1980s, in spite of a relatively strong and successful research system (reflected by publication and citation indices). Academia-industry links were rather weak and *ad hoc*, as well communication and co-operation among other players. Moreover, crucial organisations required for a strong national innovation system either did not exist, or did so only in a distorted form (the so-called bridging institutions, as well as financial, trade and legal services specialising in meeting the needs of innovative enterprises). In brief, innovation was not regarded important, and hence it did not receive adequate attention, resources and institutional backing. (Hanson and Pavitt, 1987, Havas, 1999)

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[1] The stock exchange was already re-opened in 1989, i.e. before the political transition.

In the early years of transition this fragile system was further weakened: former links were cut off as firms were privatised, R&D institutes reorganised, and R&D expenditures – both public and private – drastically reduced. Since the mid-1990s, favourable developments have occurred, however. Some bridging institutions have been set up and international R&D co-operation has intensified. Foreign firms have brought new technologies in, and diffused them among their suppliers. The number of business R&D units has increased – some of them have been set up by foreign firms –, and firms have started again joint projects with universities and research institutes. (Havas, 1999, 2001, Inzelt, 1996, 1999, 2000, OECD, 1993, TEP, 2001) Yet, attempts to devise and implement a coherent set of policy tools to strengthen the innovation system have failed. (Havas, 2002)

Until 1996-97, the most frequently mentioned argument was the alarming deficit of the government budget. However, money is always a scarce resource, and when a country is in a particularly difficult situation then there are even more pressing reasons to devise and implement a sound strategy. From a broader perspective, one might identify further, even more compelling reasons. Sobering lessons of the former socio-economic system (poor economic performance in spite of the so-called central development programmes), and partly ideological, partly socio-psychological stances were at odds with the apparently increased role of government. Moreover, there are vested interests against concerted efforts, as government agencies usually prefer not to share their resources with other ones even if this may lead to more efficient public spending.

Further, in the first ten years of transition there were strong illusions and misconceptions concerning R&D and innovation activities and policies. One of these was that scientific knowledge would automatically become technological capability; hence no specifically designed schemes would be needed to facilitate this process. Also, in the first half of the 1990s, it was widely believed that economic development and S&T efforts can be separated, and thus R&D expenditures can be cut without severe socio-economic consequences. The irony is that this view was not without foundations in the specific Hungarian circumstances: given the poor economic performance during the planned economy period, return on R&D expenditures was a largely neglected issue, on the one hand, and new technologies brought in by foreign investors ‘in bulk’ in the early 1990s facilitated a quick industrial re-structuring and market re-orientation without much local R&D inputs, indeed, on the other. Yet, there is a major policy problem with this view. Although economic development can be maintained, or even accelerated, without indigenous R&D and innovation efforts in the short run thanks to foreign direct investment, a country opting for this ‘development’ path becomes not only overly dependent on foreign technologies, but would most likely to lose its attractiveness, too: at best becoming the ‘dumping site’ of outdated technologies, or even abandoned by foreign manufacturing firms altogether. From a different angle, this way of thinking clearly cuts innovation from R&D, considering the latter one to be a luxury, or a privilege for a narrow elite – ignoring the abundant evidence accumulated by the economics of innovation and all the policy implications. (EC, 1995, Ergas, 1987, Freeman and Soete, 1997, Levin *et al*., 1987, Lundvall and Borrás, 1998, Nelson, 1993, OECD, 1992, 1998a, 1998b, 2000)

By the late 1990s, it became obvious that the Hungarian innovation system should be strengthened and fundamentally reshaped, and this complex task cannot be postponed any longer.

3.2. Objectives and organisation of TEP

As the so-called transformational recession (Kornai, 1994) turned into economic growth by 1996-97, some policy-makers thought it was time to think about medium and long-term issues. TEP, therefore, was launched in 1997 to

- devise viable R&D strategies and identify technological priorities;
- strengthen the formal and informal relationships among researchers, business people and civil servants;
- support the preparation for the accession negotiations with the European Union.

It was also decided that – following the methods of the first British technology foresight programme – panels should be set up to develop scenarios as well as policy recommendations, and a two-round, large scale Delphi-survey should also be conducted.

The above objectives and methods were designed in 1996-97 by studying other foresight programmes[2] and then discussing Hungarian policy needs with officials of OMFB, National Committee for Technological Development, the government body then responsible for devising and implementing R&D policy.[3] The final decision to launch TEP was taken in April 1997 by the Council of OMFB, the major decision-making body of OMFB.

3.2.1 Political considerations

The OMFB Council was a 15-strong committee appointed by the Prime Minister, consisting of high-ranking representatives (secretaries or deputy secretaries of state) of six interested ministries and the research community, business people and an independent expert. The Council had to approve the strategic goals OMFB, together with the policy schemes to implement them, and the allocation of the Central Technological Development Fund among these schemes. Given the Council's responsibilities and its composition, one might assume that there was a strong policy demand for foresight, and TEP thus enjoyed a strong support from the outset. However,

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[2] The preparatory studies, analysing the British, Dutch, French, German, Japanese and US experiences as well as forecast and foresight methods in general, were written by a group of researchers, including Judit Balázs, Éva Hideg, Judit Mosoni-Fried, Erzsébet Nováky and Dániel Székely. This project was co-ordinated and finally summarised in a feasibility study by Katalin Balázs. Hungarian Science and Technology attaches were also asked to compile reports on foresight programmes conducted in countries where they were stationed.

[3] OMFB was set up in 1965, and reorganised several times in the 1990s. Space limits prevent a thorough discussion of these details, their political background and policy implications. In 1994-99 it was rather independent – although formally supervised by the Ministry of Economic Affairs –, i.e. its responsibilities and status were fairly close to the ones of the Office of Science and Technology in the UK. Since January 2000, it has operated as the R&D Division of the Ministry of Education, with significantly less autonomy. Havas, 2001 provides a detailed description of all these administrative changes and their corollaries (e.g. in terms of organisational culture and policy approaches).

one might also think of the example of the first British foresight programme, launched by the government (not a single agency), which obviously lends even stronger political support. There were a number of reasons not to opt for that solution in Hungary.[4]

First, given the 4-year cycle of general elections, the next elections were to be held just in a year, in 1998, and thus launching TEP as a government programme seemed somewhat risky: it might have been 'hijacked' during the election campaign, and in the case of a change of government, seen by the new one as something 'alien', that is, initiated by their political rivals. Second, it was also clear that obtaining a 'rubberstamp' from the government would be a lengthy and cumbersome process. Moreover, it was also uncertain if the incumbent government would give its support, given the low importance attached to innovation policy by both – politically opposite – governments in 1990-98. (Biegelbauer, 2000, Havas, 1999, 2001, Inzelt, 1996) Third, given the legacy of central planning, it was also important to launch a 'bottom-up' expert-driven professional programme rather than a 'top-down', centralised, politically laden one. Because these intentions had to be made credible, it seemed to be a better solution to initiate TEP by the OMFB Council in which civil servants, business people, representatives of the research community and innovation policy experts took decisions together.

3.2.2. Participants and management

For the above reasons, nobody was involved from either OMFB – the government agency that financed the programme – or the OMFB Council in making decisions e.g. on panel topics, issues to be analysed, priority-setting, etc. Hence, no OMFB-official sat either on the Steering Group of TEP, or was a member of any panel.[5] All the major decisions have been taken by the Steering Group, the panels themselves or at joint meetings of the Steering Group and panel chairs and secretaries. (After a few months, it became a routine to held SG meetings jointly with panel chairs and secretaries in order to have a direct communication among those who made decisions concerning the whole programme and those who were conducting most of the analysis. In other words, the danger of creating two discrete entities – 'us' and 'them' – was diminished this way.)

A Programme Office – first with 3 employees (including a secretary) and in 1998-99 hiring two more colleagues – was set up in June 1997 to co-ordinate TEP and to provide methodological, organisational and logistics support for the Steering Group and panels. The Programme Office reported to the President of OMFB, and once a year submitted a progress report, including a project plan with a proposed budget for the following year, to the OMFB Council.

Ministries, interested government agencies, professional associations and chambers were asked in July-August 1997 to nominate Steering Group members, emphasising that they were not supposed to represent any organisation, but participate actively in a strategic discussion process, relying on their knowledge and experience. Relying on these nominations, a Steering Group of 20 leading industrialists, academics

[4] Discussions with the then President of OMFB in 1997-98.

[5] For a brief comparison with the first British foresight programme, the Chairman of the Steering Group was the Head of the Office of Science and Technology.

and government officials – deliberately comprising a majority of industrialists and academics with close contacts with businesses – was appointed by the OMFB Council in October 1997 to oversee the Programme.

A few months later an Inter-ministerial Committee was also established, comprised of representatives of ministries and government offices, as a vehicle for a two-way communication: to discuss the preliminary results of TEP and provide information on their on-going strategic projects for the Steering Group and panels.

3.2.3 Objectives revisited: the importance of process

The objectives of TEP were refined by the Steering Group as to *identify new market and technology opportunities* and devise adequate responses in order to *achieve long-term competitiveness,* and *improve quality of life*. In other words, the overall objective was to contribute to a strategy for a *socially, economically and environmentally sustainable development*.

More specifically, the goals were defined as follows:

1. contribute to a national innovation strategy based on a comprehensive analysis of
   - technological development,
   - world market opportunities (new markets and market niches),
   - strengths and weaknesses of the Hungarian economy and R&D system,
2. help Hungarian firms improve their competitiveness by providing the results of the above analysis,
3. strengthen the formal and informal relationships among researchers, business people and civil servants,
4. spread co-operative and strategic thinking,
5. support integration into the European Union,
6. formulate recommendations for public policies.

The first, second and fifth objectives can only be achieved if researchers, business people and government officials join intellectual forces to assess Hungary's current competitive position and impacts of likely global market and technological trends. Hence, their re-aligned and re-invigorated relationships are actually means to achieve TEP's two principal goals (enhanced competitiveness and improved quality of life). However, the process in which these experts with different backgrounds *c*ommunicate and share ideas *c*oncentrating on longer-term issues, generate *c*onsensus, and *c*o-operate with increased *c*ommitment in devising and realising a national strategy, was deemed so crucial that it was marked as an end in itself. (Martin, 1996)

Hungary had already been preparing to join the European Union when TEP was designed. Accession to the EU is likely to shape Hungary's future to a significant extent, and it thus requires a clear and sound vision about Hungary's role and opportunities in the enlarged European Union. It was expected that TEP would contribute not only to the *accession* itself, but also to the *integration process* by providing visions and diffusing new decision-making methods, as well as fostering changes in norms, attitudes and behaviour.

It was also anticipated that the results – and in the case of the participating business people the foresight process itself – would also assist Hungarian firms in devising and implementing strategies to improve their competitiveness.

With the benefit of hindsight, the preparatory phase can be seen as an 'unnoticed early warning' on the overall nature of TEP is: methods and objectives were discussed in several rounds and even revised already in the very beginning. Yet, at that stage no one thought that this continuous adaptation – albeit always within the original 'terms of reference' – would be an important characteristic of TEP.

There are two main reasons for the constantly evolving nature of TEP. First, foresight is a learning process even in those countries where previous programmes have produced tacit knowledge, and lessons have been diffused either in codified forms or through personal links. This learning obviously applies *a fortiori* in a country with no tradition, and hence no experience, in foresight.

The second reason relates to the broader political and social psychological context of TEP. To avoid being seen as a centralised, top-down programme, a conscious decision was taken to give panels a great deal of autonomy.[6] First only an 8-page document, entitled *Methodological Guidelines,* was developed and distributed to panels, and relatively short kick-off workshops were organised in March – April 1998. Later, two specific training workshops were organised on the Delphi method with British and German experts. Subsequently an outline (or 'template') for panel reports was developed by TEP Office, and discussed jointly with panel chairs and secretaries at a Steering Group meeting.

3.3. Methods and outcomes

TEP was conducted in three stages, namely pre-foresight (July 1997 – March 1998), main foresight (April 1998 – May 2000), dissemination and implementation (June 2000 onwards) stages.

3.3.1. Pre-foresight

Awareness seminars were held across the country in the pre-foresight stage to promote TEP among experts and professionals. Seminar participants and organisers (that is, chambers of commerce and scientific associations) were also invited to nominate panel members, together with ministries and government agencies. In the meantime, the Steering Group decided to set up the following panels:

- Human resources (education, employment)
- Health
- Information technologies, telecommunications, media
- Natural and built environment
- Manufacturing and business processes (new materials, production processes and management techniques, supplier networks)
- Agribusiness and food

[6] A panel secretary at some point even likened this approach to the "management by exception" method.

- Transport.

Panel chairs and secretaries were appointed by the Steering Group, while panel members were invited by chairs and secretaries, in either case relying on their own suggestions and the nominations collected through the above consultation process.[7]

3.3.2. Main foresight

Panel reports

The seven panels were specifically asked to start their activities by developing alternative visions for the future. Of course, panel members had their own views on the current situation when discussing futures, but the idea was to urge them to explore new avenues, rather than to stick with the day-to-day difficulties. They then turned to the present by analysing human resources, techno-economic performance, as well as institutions and regulations in their respective fields. Panels mainly relied on the expertise of their members, but commissioned reports from other experts as well. Their tentative results were discussed within the wider expert community at workshops held across the country, organised jointly with the regional chambers of commerce and professional societies. All the background reports, the alternative visions and the Delphi-results were posted on the Internet as soon as they became available. (http://www.om.hu/j2tepuj.html) The final reports, relying on internal discussions, background reports, the Delphi-results, as well as conclusions from the regional workshops, were structured as follows: a critical appraisal of the present, alternative futures (visions) and recommendations for realising the most desirable – but of course still feasible – future.

At the request of some panels, a separate expert group was commissioned to analyse the field of energy, following the structure of the panel reports, but without a Delphi-survey in this field.

Delphi-survey

Each panel formulated statements for a Delphi-survey by identifying the major trends in Hungary and studying foreign questionnaires (the fifth Japanese, the second German, the British and Austrian ones). The Delphi-statements were revised several times to ensure that experts who were not panel-members would understand them in the same way. Then, a small pilot survey – with 5-7 non panel-member experts for each questionnaire – was conducted, leading to the final round of revision.

Co-nomination (Nedeva *et al.,* 1996) was used to identify potential respondents, started with panel members in the first round. The entire Delphi-survey, including the co-nomination process and the small pilot study to test the questionnaires, was administered by a pollster company, selected at a public tender. The tender had not specified either the size of the pool of experts or the method how to collect questionnaires, only a target was set: around 200 questionnaires had to be returned in the

[7] The Steering Group set some guidelines for the latter selection process, emphasising the need to have representatives of different schools of thought in a given field, the balance between age groups, genders and those from the capital and other parts of the country. No rigorous statistical analysis has been conducted to describe the panels, yet, it can be said safely that these guidelines were respected only partially.

first round so as to have a sufficient number of answers for statistical analysis. To increase the response rate the contractor did not mail the questionnaires, but delivered – and 2-3 weeks later collected – them personally.

Each questionnaire consisted of 60-80 statements and the following questions:

- Respondents' degree of expertise (options ranging from 'unfamiliar', 'casually acquainted', 'knowledgeable' to 'expert')
- Respondents' assessment of economic and social impact, and impact on natural environment (options ranging from 'strongly harmful', 'slightly harmful', 'neutral', 'slightly positive' to 'significantly positive')
- Period within which the event/development will have first occurred (including "never")
- Hungary's current position vs. advanced European countries in the following four respects: S&T capabilities, exploitation of R&D results, quality of production or service and efficacy of regulation (options ranging from 'unacceptable', 'lower level, but acceptable', 'fairly similar', to 'higher level')
- Constraints: social/ethical, technical, commercial, economic, lack of funding, regulatory standards, education/skill base (options: yes or no)
- Promotion of development, application: domestic R&D, purchase of licence, know-how or ready-made products (ranking the relevance of these three policy tools).

The first round of the Delphi-survey was completed in May 1999. Some 1400 questionnaires were returned (i.e. on average 200 for each panel, as it was targeted). The second round was completed by the end of 1999, in some cases with a disappointingly low (50-60 per cent) response rate, despite special efforts to reach 70-80 per cent. Although data were used by panels for their final reports, this rich set of data can – and, indeed, should – be exploited by more detailed, more systematic analyses as well, for instance by firms and research institutes for their own purposes as well as by policy analysts, e.g. comparing the Hungarian results with foreign ones. (Preliminary analysis has shown that around 20-40 per cent of the statements is comparable.)

Steering Group report: macro visions and policy recommendations

While only meso- (or panel-) level scenarios were envisaged initially, both the Steering Group and a number of panels noted in the course of TEP the need to develop visions for alternative futures at a macro-level, too. Having discussed a number of possibilities at Steering Group meetings and various workshops with experts, eventually 3 macro visions have been elaborated.[8] These can be depicted as cells in a two-by-two matrix, where the columns represent whether Hungary actively pursues a firm, well-designed strategy, and the rows describe if there are fundamental structural changes in the global context. (Figure 1)

Figure 1 about here

The actual content of 'strategy' (or 'activity') is determined by the intensity and quality of the activities of the civil society, businesses and the government (including

[8] A group of experts – co-ordinated by Anna Vári and László Radácsi – drafted these scenarios in September-October 1998, which were then discussed and revised in November 1998 – February 1999.

the motivations and objectives driving their actions) and the interplay among these players. In other words, this variable is understood here as what is implemented (rather than what is planned).

Knowledge-intensity is perhaps the most important feature of these macro visions. Yet, it is not represented by a separate axis in *Figure 1* because it depends on the actual strategy. Specifically, active strategies pursuing a path of low knowledge-intensity (and thus low value-added, low wages, weak local markets), or drifting along a knowledge-intensive path, would not be plausible, and thus were excluded from scenario building.

In all these macro visions, Hungary is integrated into the international division of labour, as she is already part of the global and European economic and political systems; the possibility of isolation(ism) was hence excluded.[9]

Macro visions took into account demographic, societal, environmental, economic and political factors as well as the physical infrastructure. Their major features are summarised below.

Co-operative partnerships

In this vision, Hungary adopts an active strategy, based on mutual, shared benefits with her foreign partners, and becomes more closely integrated into the world economy along a development path of high knowledge-intensity. The pillars of this strategy are: significantly increased support for knowledge generation and exploitation; high priority for health and environment; and strengthening solidarity and social cohesion. In addition to active government policies, the close co-operation between governmental institutions, civil organisations and business communities play a crucial role at national, regional and local level. These lead to a significantly improved quality of life and allow Hungary to catch up with the medium-developed countries.

Drifting

This scenario assumes that Hungary becomes increasingly integrated into the global economy over the next 20 years, and joins the European Union. However, due to the lack of an active government strategy Hungary's present semi-peripheral position is reinforced. This trajectory is, at best, of a medium level of knowledge-intensity, which, in turn, leads to an increasing foreign policy and economic dependence, and to a gradual loss of the ability to influence social trends. Hungary is unable to fully exploit the opportunities of international co-operation, especially those offered by the European Union. The net results are a rapidly widening development gap internationally and significantly deepening social divide internally.

Alternative development

This scenario presumes that a fundamentally new way of thinking and value system becomes dominant in the world in some 40-50 years (as opposed to the 15-20 year time-horizon of the previous two visions), whereby a socially and ecologically sustainable globalisation prevails, based on co-operation. Technological developments are modest,

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[9] The fourth logically possible option – Hungary is drifting on the sea of fundamental global changes – was not elaborated either, because the other version of drifting was seen gloomy enough, and also hoped to be a sufficiently 'loud wake-up call'.

appropriate, 'harmless', small-scale and prudent.[10] The Hungarian civil society and the government prepare for these fundamental changes in advance. This trajectory leads to a new state of development, based on high quality education, new skills and cultural standards as well as the widespread use of sophisticated technologies.

Policy recommendations of the Steering Group aim at facilitating the first vision (*Co-operative partnerships*), emphasising the importance of an educated, flexible and healthy population and an appropriate, strong national system of innovation. (Fairly similar policies can promote the third vision, too. In other words, the major factor differentiating these two visions is the nature of global settings, and not the aims and tools of the domestic policy). Of course, panels' and Steering Group recommendations should be understood as equally important elements of an integrated policy 'package'.

3.3.3. Dissemination and implementation

Preliminary TEP results were disseminated and discussed at workshops and through the Internet already in their first draft forms. The final reports, including policy recommendations, were discussed by parliamentary committees, and were received favourably; e.g. some of these committees (e.g. the ones on Health, Education and Environment) specifically asked the responsible ministers to form task forces to analyse how to implement policy recommendations put forward by TEP panels.

Panel reports were also discussed at face-to-face meetings with government officials responsible for devising strategic plans of ministries. Some of them expressed their willingness to incorporate certain TEP proposals into their own policy documents (e.g. Ministry of Environment, Ministry of Transport and Water Management, Office for Government Commissioner in charge of Information Technology). A new Health programme – co-ordinated by a member of the Health and Life Sciences panel of TEP – was launched in 2001 by a newly appointed minister who used to be a member of that panel, too. Finally, a new scheme, aimed at human resource development for R&D – and fairly similar to a Steering Group recommendation, namely granting a sabbatical year for scientists and engineers working for companies – was launched in 2002 by the Ministry of Education.

Yet, the implementation could have been faster, more extensive and better co-ordinated with a stronger political support.

3.3.4. 'Process' results: workshops, networks, new ways of thinking

It is difficult to separate 'products' from the 'process', because the Steering Group, the panels, the Delphi respondents and the workshop participants (i.e., altogether several thousand industrialists, academics and government officials) all contributed to the 'products', that is, written, codified results. A lively and constructive, creative process is essential to produce a high-quality 'final product', on the one hand. 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 workshops were

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[10] It is worth emphasising that this vision was drafted just before the first major demonstration against the current form of globalisation in Seattle in November 1999.

they not able to benefit from the process (e.g. in the form of learning and/or joining new networks).

The process in itself was a very important 'result'. For instance, more than one hundred regional workshops were organised by the end of 2000 to discuss the Delphi-results, background papers, draft visions and policy proposals. These workshops are likely to have contributed to the strengthening and re-focussing of existing co-operation and communication among different communities. The extent to which these new fora were useful, however, is very difficult to measure in an exact way.

Yet, there are clear signs of new ways of thinking. One example is that the policy recommendations of TEP took into account the complex, 'multi-sectorial' nature of crucial issues, e.g. health, environment, info-society. Moreover, non-panel-member experts also understood the significance of these new types of policies, and were willing to 'subscribe' to them – as the policy workshops have shown. A real challenge is to convince policy-makers to implement these policies, based on a new type of analysis. This is going to be more difficult than reaching consensus in a professional community. The learning process as a whole still has to be completed with this 'lesson'.

It also seems that a better understanding of the relationship between technological and non-technological factors influencing the quality of life and competitiveness evolved. This is explicitly reflected in the reports – especially in the policy recommendations, see Table 1 –, and was discussed at some workshops.

Table 1 about here

However, there is a need for a systematic evaluation, conducted by independent experts, in order to establish what process-type results and benefits have been achieved, and what should be done to improve the efficiency of the foresight process in the next phase of TEP.

4. ECONOMIC TRANSITION AND FORESIGHT METHODS

4.1. Definition of panel topics

4.1.1. Broad issues: socio-economic problems

The OMFB Council resolution on TEP only stipulated that it should be a holistic programme, and the choice of issues for panels was left to the Steering Group. Having studied other programmes and taking into the Hungarian circumstances, two proposals were drafted. Both proposals put emphasis on broad socio-economic issues, as opposed to organise the panels either along scientific branches or economic sectors. The Steering Group accepted the first version, with a smaller number of panels, i.e. representing a more integrated approach. In short, TEP brought together various issues treated separately in most other foresight exercises, and put socio-economic needs in the centre, rather than following the logic of science and technology 'push'.

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 by other foresight exercises, while 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* belonged 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'.

4.1.2. The importance of human resources

TEP treated education and life-long learning as a major factor determining competitiveness, and thus the *Human Resources* panel was always listed as the number one – although the order of the further six panels did not reflect any priority. (In contrast, learning was mainly understood as a market opportunity by the *Leisure and Learning* panel in the first British foresight exercise.) Another sign of the importance given to Human Resources is that seven policy proposals of the Steering Group – out of 22 altogether – are concerned with this issue.

4.2. Cross-cutting issues

In spite of defining broad fields as panel topics to be analysed, a strong emphasis was put on the so-called cross-cutting (cross-panel) issues – again due to the lessons of other foresight programmes. Panels were encouraged to identify, and adequately deal with these issues when analysing major trends and developing alternative visions for their fields.[11] A workshop was also organised to analyse these issues when the first drafts of the panels' visions were completed. (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.)

Although panels were set up around broad issues, real-life cases are even more complex. 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, social status, diet, housing and employment conditions, as well as the quality of the medical care system and the environment. All these issues belonged to different 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, i.e. their budget, and commissioned together a group of experts to analyse cross-cutting issues from different points of view. (For example the *Health* and the *Agribusiness and Food Industry* panels set up two joint task forces to analyse jointly healthy diet and allergy.) 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.

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[11] A list of cross-cutting issues 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.

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 on 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 formulated these 'cross-cutting' Delphi-statements and those which were 'affected' by these statements.

The discussions of the panel and Steering Group reports clearly show that even more systematic efforts – and probably more sophisticated methods – are required to deal with these cross-cutting issues. 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.

4.3. Strong emphasis on visions in an innovation system approach

Fundamental institutions have crystallised in the advanced countries for quite some time, whereas they are still being shaped in Hungary, given the transition process. Moreover, coming back from the former Soviet bloc and attempting to join the EU, which is also in a middle of a major transition process, the wider, international institutional context, where Hungary tries to find her room, is changing. It is of the utmost importance to analyse this turbulent environment, hence the emphasis on visions, both at macro level (socio-economic framework conditions) and at the level of panels (micro and meso issues).[12]

Macro scenarios had not been developed in any other country engaged in foresight activities by the time when TEP was designed, and – as already mentioned – they were not part of the originally planned toolkit in Hungary either.[13] Already in the first few months of the main foresight phase, however, it seemed to be inevitable to develop macro visions, too. The Steering Group did not want to impose anything on the panels, though, and thus the idea was 'frozen' for a while. Yet, not much later, when the panels realised the difficulties of building their own visions in the turbulent environment referred to above, it was them, who were requesting the definition of socio-economic framework conditions, as a point of reference. Then a joint preparatory work started, involving some panel chairs and secretaries, as well as experts experienced in scenario building. Various structures were discussed at workshops and Steering Group meetings, attended by panel chairs and secretaries. First an outline was approved, identifying 'strategy', 'integration' and 'knowledge-intensity' as major variables. Taking them as binary variables, in principle 8 (2^3) visions could be developed, but some could be

[12] The terms of 'visions', 'futures' or 'scenarios' are mostly used as interchangeable ones in the foresight literature, although 'scenarios' might well also have a narrower meaning: a 'time-line' of actions and events leading to a specific end state. If this distinction is applied, it is more appropriate to speak of visions or futures in the case of TEP. Some of these visions, however, especially the ones developed by the *Transport* panel, are rather close to scenarios, narrowly defined.

[13] More recently, macro-scenarios have been developed in South Africa.

excluded as contradictory one. Thus 3 versions were selected to be developed in more detail. When these macro futures were discussed – again both at Steering Group meetings and workshops attended by 'external' experts – rather vivid, and sometimes even heated, debates took place. Eventually the third vision had to be revised to such an extent that the original structure was not valid anymore. The 'integration' variable became almost indifferent in its original sense: what matters in the finally accepted visions is the mode (or, quality) of integration, not its existence or extent (as it was originally defined). More importantly, a new variable, or dimension, changed the whole structure: the rules, norms, values, attitudes and behaviour in the global settings.

The underlying concepts of a broad innovation system approach – such as generation, diffusion and exploitation of knowledge, interaction among the research community, business, the government and the civil society – play a central role in the macro visions.

TEP panels also devoted a significant part of their interest to non-technological issues, e.g. institutional development and regulatory issues, although most members were technical experts. Yet, faced with the pressures of the transition process in their day-to-day work, they understood the importance of non-technological issues. It was also reflected both in the Delphi-statements and the survey results (Section 4.4).

The above discussion on the nature of TEP scenarios and the process to leading them can be captured more orderly by Ian Miles' taxonomy of scenarios. (Figure 2) TEP visions were mixed in terms of exploratory vs. normative approaches, and can be positioned on the borderline between mixed and bottom-up approaches in terms of the participants of scenario building workshops, that is, somewhere between 5 and 6 in *Figure 2*. Again, it was not a planned, favoured method well in advance of the process leading to TEP visions; this structure simply evolved in a kind of trial-and-error fashion.

Figure 2 about here

A number of difficulties arose during the scenario-building process. The most severe one was the unexpected, but sometimes rather strong resistance to this way of thinking. Two reasons might explain this opposition. First, it was openly stated that "being scientists, we should think about the future in a scientific manner, and apply scientific methods to identify the optimal future"; hence, there would be no need for alternative visions.

The other, more context-specific, and less vocal reason relates to the legacy of central planning, which did not promote thinking in terms of alternative futures. (Central planning actually was very much in favour of the old paradigm of futures research, i.e. extrapolation based on trend analysis.) Plans only had 'optimist' and 'pessimist' versions of a single, 'socially optimal' future. Influenced by this legacy, most TEP participants could only think of 'optimist', 'pessimist' and 'business-as-usual' scenarios at the beginning of TEP.

These two factors fortified each other, and thus prolonged the process of changing the mindset of experts affected by them. When pressed hard, these participants came up with some 'variations on a theme' (to meet formally the 'demand'), but still were unable to think in terms of qualitatively different alternatives. In these cases, as a 'last resort',

TEP Office staff had to moderate the panel workshops, taking also into account the need to harmonise macro and meso visions.

Another, inherent, difficulty was that panels had to analyse a certain field, with its specific structure (players, institutions, norms, values and attitudes), socio-economic and technological dynamics, etc., while the macro visions had to deal with issues at a different level, by definition. For this reason alone, there were obvious constraints to harmonise the macro and meso (panel) visions. Moreover, TEP panels had already started working on their own visions, when it was decided that macro futures should also be built.[14] When the first drafts of the various meso and macro futures were completed, a background paper, entitled *Matrix of Scenarios*, was commissioned to analyse their relationships. The conclusions were discussed at length together with Steering Group members, panel chairs and secretaries, again, both for professional reasons and keeping a favourable group dynamics. In the light of that, some existing panel 'futures' were revised, and even new ones were developed.

Comparing the structures of the macro and the panel visions, two panels (*Agribusiness and Food, Transport*) achieved a rather close correspondence, two others (*Manufacturing and business processes, IT, telecom and media*) partially aligned their futures with the macro ones, while the remaining 3 ones developed fairly context-specific structures. (see some examples for these different cases in *Figure 3*) Not surprisingly, the 'outliers' were those with the least 'economic-type' inner logic: *Human resources*, *Health and life sciences*, *Natural and built environment*. Yet, even these panels paid close attention to one or two major variables of the macro visions in their own way, namely 'strategy' – or its dependent variable, knowledge-intensity – and/or the way of 'integration' as well as the nature of the global (or European Union) settings.

Figure 3 about here

4.4. Policy implications of the Delphi-survey

Neither the Steering Group nor the TEP Office influenced the panels in any way as far as the actual content of the Delphi-statements is concerned. No guidelines were issued as to their nature – technological vs. non-technological – either. If anything, the almost exclusively technology-oriented Japanese and British questionnaires could possibly affect the panels when formulating their actual statements. Moreover, most of them not policy analyst or social scientist were, but technical experts. In this regard, it is worth highlighting that the number of statements dealing with non-technological issues exceeded that of the technological ones.[15] Moreover, this approach has been validated by

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[14] As already mentioned, for group-dynamics considerations, the Steering Group wanted to avoid the perception that something was imposed upon the panels, and thus this decision was postponed until panels themselves requested to formulate macro futures.

[15] It was only possible to categorise five panels' statements, using the British typology (elucidation, prototype, first practical use or widespread practical use of a product) as a starting point. Even in these cases a number of categories had to be added, e.g. human resources, organisational innovation, regulation, institutions, as all panels followed a context-specific logic – as reflected in the categories in Table 2. Yet, the remaining two panels (*Human resources*, *Natural and built environment*) were so far away even from this 'relaxed' classification, that it did not make sense to include their statements in this exercise.

the respondents: half of the 'top 10' Delphi-statements – those deemed to be the most favourable ones by the respondents, i.e. with the highest combined socio-economic and S&T impacts – are non-technological in their nature. (Table 2) It proves beyond doubt the importance of human resources, regulation and institutions, that is, the salient relevance of an innovation system approach in a transition country: even those who have not been influenced by the panel discussions, answered the questionnaire by realising the significance of these issues. This result is even more striking when juxtaposed with the currently re-animated linear model of innovation by some Hungarian policy-makers. (Havas, 2001) The majority of respondents – mostly technical experts (Havas, 2000), and not social scientists attracted to some 'fluffy' theories on the importance of networks, co-operation and institutions, etc. – put as much weight on these non-technological issues as on the technological ones.

Table 2 about here

5. CONCLUDING REMARKS

TEP was the first foresight programme in a former planned economy. The size of country and the level of economic and social development played a decisive role in setting the objectives of the programme: it was driven by broad socio-economic needs and problems, rather than a narrow S&T agenda. The legacy of the former socio-economic system had a strong impact on the major decisions on the organisation and management of TEP. In short, the Steering Group was not directly influenced by the government agency which initiated and financed the programme; and the panels, too, were given a great deal of autonomy. These factors, of course, had significant methodological repercussions.

As TEP did not start with a detailed, rigid methodological blueprint, the major decisions were taken jointly by the participants, and thus some important methodological details evolved throughout the programme. When participants were faced with various tasks (e.g. formulation of Delphi-statements, drafting the reports), it was necessary to rethink the objectives set in advance, and to 'trim' them if they seemed too ambitious. Methods were also adjusted to the Hungarian context: e.g. a large number of non-technological Delphi-statements were framed by the panels, as opposed to, for example, the Japanese or British questionnaires. Nor was it foreseen that the scenario-method would have to be used in a context-specific way in two respects. First, the uncertainties of the overall transition process, called for the development of macro visions as a 'reference frame' for the panels when they were working on their own scenarios. Second, the difficulties of applying the scenario technique showed the endurance of the planning 'mode' in people's mindset; it was therefore an important means of breaking away from previous ways of thinking about the future. Yet, probably not all the participants fully grasped the difference between planning and vision building. (Discussions at various international foresight workshops have also clearly shown that without being involved in actual scenario-building exercises it is rather difficult for some policy-makers to understand this difference, in other words the use and relevance of visions about qualitatively different futures.)

Thus, TEP was a participative, continuous learning process from a methodological point of view, too – with all its advantages and drawbacks. A more rigorous approach, where all the details are planned well in advance, might have produced more 'elegant', more 'orderly' results, but probably at the expense of the reduced commitments from the participants.

Hungarian lessons may be applicable to other countries or, at least, they can highlight some intrinsic dilemmas in foresight. Most of these point to the inescapable responsibilities of policy-makers.

First, in spite of an emerging consensus concerning the relevance and use of foresight as a policy tool, and the importance of the potential process benefits to strengthen, or shake and re-shape a national system of innovation, in particular, the specific aims and method have to be tailored to the actual needs of a region, country or transnational entity. Therefore, different foresight programmes may have dissimilar foci, ranging from addressing broad socio-economic needs to the identification of priorities in a narrowly defined S&T context. These would essentially influence the organisation and management of the process, interested communities and define the relevant tools. 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 that some important methodological details would evolve throughout the programme, and that some objectives will have to be revisited. 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. Also, there seems to be a trade-off between methodological rigour and the willingness to participate. Potential foresight participants might be 'deterred' by sophisticated, demanding methods. (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 panel or Steering Group meetings. Thus it might be hard to convince them to attend yet more meetings to learn certain sophisticated methods.)

Second, TEP has also shown, that foresight can be relevant even in a small country, which is not at the forefront of technological development but rather in the semi-periphery. A number of factors seem to contradict this conclusion at first glance. Foresight can be a costly project in terms of money, and even more so if participants' time required by meetings, workshops and surveys is taken into account. Moreover, advanced countries, whose experts, in turn, know more about the leading edge technologies, regularly conduct their foresight programmes, and their 'products' – reports, Delphi-survey results – are readily available. Yet, only a national programme can position a country in the global context and spark a discussion on how to react to major trends. Similarly, strength, weaknesses, opportunities and threats (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.

Third, the current structural changes in the world economy and the emergence of new, global concerns related to environmental, health and demographic issues, imply

that the scenario method may be relevant not only in transition countries, per se, but also in countries with long-established, crystallised institutional systems. A growing body of literature suggests that technological and socio-economic changes are intertwined. Scenario workshops, therefore, can contribute to a better understanding of these complex relations, leading to policy proposals, which help in making appropriate choices in an increasingly complex environment. As TEP has shown, technical experts are aware of the importance of non-technological issues (human resources, institution-building, legislation, regulation, organisational innovation). Also, taken alone, the Delphi-method can facilitate the foresight process only to a limited extent, and thus the process benefits are bound to be limited, too.

Fourth, TEP has highlighted some important methodological dilemmas, too. Apparently, there is a trade-off between:

- the overall coherence of a programme (in terms of the correspondence between specific panel futures and compatibility between macro and panel 'futures') vs. the inner logic of panel issues (the possibility to tackle the most relevant issues, developments);
- the need to conduct an easy-to-control ('centralised') programme vs. the autonomy of panels. This is, of course, partially overlapping with the previous point. A more important caveat is that the perceived autonomy of panels is obviously context-specific: it is far less important in advanced countries with stable value systems than in a 'shaky' transition country, where decisions on professional issues used to be dominated by ideological considerations.

Fifth, other dilemmas disclosed by TEP 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 intellectual, organisational, financial independence from any government agency, on the other.

Finally, due to the importance of some process elements (especially awareness-raising, communication and consensus building) of any foresight programme, 'insider' views are indispensable in the analysis of methodological or policy questions. There are at least three ways to obtain those views: (a) 'direct' insider accounts (such as this article); (b) formal evaluations, based on interviews with participants ('insiders') and other sources of information; (c) a 'social anthropology' approach, that is, commissioning anthropologists or political sociologists to observe the process of decision-making and implementation as participants. The first one runs the risk to be overly subjective. The second one is rather costly given the large number of participants, and thus government agencies are reluctant to finance it; moreover, it is in its infancy as far as its application to foresight programmes is concerned. Further, it is also bound to have a specific focus, depending on the agency's agenda commissioning such a study (in terms of its major questions, of course, not its content). The third one is not only costly,

but also likely to be perceived by foresight participants and/or policy-makers as too 'risky', too 'sensitive', and hence unlikely to occur frequently and in large numbers. These reasons may limit our abilities to advance knowledge on the policy and methodological aspects of foresight.

This problem is not explicit in the literature, although usually 'insiders' publish about foresight programmes. The first step would be to start a systematic discussion about its significance and ways to find solutions. International workshops and conferences are particularly important in this respect, as they provide fora not only for scientific discussions on methods and new ideas, but also opportunities to exchange experiences in an informal, somewhat more 'blunt' way.

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Figure 1: Three macro visions

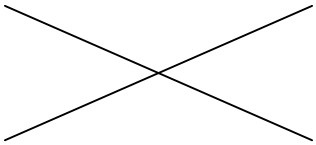
	Active strategy	**Drifting (no strategy)**
No major changes in the global settings (values, norms, and operation of large corporations and major international organisations)	*Co-operative partnerships:* Hungary implements an active strategy characterised by strong integration, based on mutual benefits and high level of knowledge-intensity	*Drifting:* Hungary, having no strategy, is 'grabbed' into the current system of the international division of labour along a low-skills, low-wages path
Fundamental, structural changes occur in the global settings	*Alternative development:* Hungary is integrated into a new, 'green' world by pursuing an active strategy along a knowledge-intensive way	

Table 1: 6 panels' recommendations by type (number of recommendations)

Improving human resources	6
Others	7
Application of IT tools	8
Finance*	11
Sector-specific or general policy	15
R&D priorities, innovation policy	17
Institution-building, legislation, regulation	19

Note: Based on a somewhat arbitrary grouping and classification of panels' policy proposals. One panel (*Human resources*) had to be excluded because of the very specific nature of their recommendations.

* Mainly the application of new methods, e.g. public-private partnership

Figure 2: Taxonomy of scenarios

	Top-Down Approaches	Mixed Approaches	Bottom-Up Approaches
Exploratory Approaches	**1)** Analysts define "what-if" scenarios	**2)** Analysts heavily structure group discussion or survey instruments to focus on a few predefined exploratory scenarios	**3)** Experts involved in free-form scenario workshop, or provide survey responses (e.g. conventional forecast Delphi) which are grouped by statistical methods to yield scenarios
Mixed Approaches	**4)** Analysts define scenarios based on different theories/ perspectives	**5)** Analysts define normative profiles, these are elaborated by experts	**6)** Experts grouped according to worldviews and expectations by statistical methods or discussion, and then elaborate scenarios as distinct groups
Normative Approaches	**7)** Analysts define normative end-state scenarios	**8)** Analysts define normative scenarios, experts comment on them, identify key issues	**9)** Experts involved in free-form normative scenario workshop, or provide survey responses (e.g. goals Delphi) which are grouped by statistical methods to yield scenarios

Source: Ian Miles: "Scenarios for TAP-ASSESS", 1999, PREST, cited in James P. Gavigan and Fabiana Scapolo: "FOREN Workpackage 3, final report", Appendix III, http://foren.jrc.es

Figure 3: Examples for alternative futures/ visions developed by TEP panels

HEALTH

	„Health-oriented, multi-sectoral"	„Restrictive, efficiency-oriented"	„Profit-oriented, driven by suppliers' interest"
Conditions	Conscious governmental policy, long-term professional programme	State supply: uniform, cheap, equally available	Minimal role of the state (regulation + public health)
	Public expenses: 5.5-6.0% of GDP, private spending: 3.0-3.2 %	Reduced public expenditures → limited health services	Health expenditures: ~ 10 % of GDP Deepening gap between the poor and rich
Results	Public finance dominates	Rate of public finance: 60-65%	Increasing role of private finance
	Priority: prevention	Meet non-financial requirements: ambulance, epidemic control, international regulation	Preservation of health is not a priority
	Basic health services for all	Limited services by the state, need for private finance	Fixed-price services predominate

IT, TELECOMMUNICATIONS, MEDIA

	„Tiger"	**„Sparrow-hawk"**	**„Dinosaur"**
Technological trends in Hungary	Continuos, well-balanced development	Continuous, well-balanced development	Slow technological development, lack of convergence
Global environment	Favourable conditions	Strong influence of global players in Hungary	Favourable, but hardly any impact in Hungary
Role of the state	Active, promotes development	Passive, weak	Passive, weak
Impacts	EU-conform regulation	National cultural heritage threatened	Economic and technological isolation
	Integrated ICT networks	Widening economic gaps between regions	Size advantages are not ceased

AGRIBUSINESS AND FOOD

	„Garden Hungary"	**„Drifting"**	**„Green alternative"**
Overall features	Shift to vegetables, fruit, bio-cultivation	Grain-meat chain predominates	Socially & ecologically sustainable system
Integration	Local and global actors, mutually beneficial co-operation	By the pressure of the world market	High-level international collaboration
Knowledge-intensity	High + wide-ranging	High, but only in a small circle	High + wide-ranging
Activity/ strategy	State + farmers' co-ordinated responsibility	Low, foreign actors dominate	High: state + civilian self-organisation
Results	Increasing employment	Fewer market players	Priority: employment + environmental farming
	Most dynamic development	Increasing efficiency in a shrinking agribusiness	Efficiency is subordinate to environmental and social aspects

Table 2: Technological vs. non-technological Delphi-statements (number of statements)

Types of statements	**Health**		**IT, telecom, media**		**Manuf, busin. Processes**		**Agribusin., food**		**Transport**		**Total**	
	A	*T*	A	*T*	A	*T*	A	*T*	A	*T*	A	*T*
Elucidation	9	–					2	–			**11**	–
First practical use	2	–			22	–	11	*1*	11	*2*	**46**	*3*
Widespread practical use	12	*2*			26	*4*	38	*6*	24	*5*	**100**	*17*
S&T developments			15	*4*							**15**	*4*
Risk factors	12	*7*									**12**	*7*
Human resources	10	1			8	–					**18**	*1*
Institutions	12	–							6	–	**18**	–
Regulation	8	–	6	–	2	–			3	*2*	**19**	*2*
Services in Hungary			9	*3*							**9**	*3*
Future services			15	*2*							**15**	*2*
Information society			7	*1*							**7**	*1*
Organisational innovation					20	*6*	16	*1*	11	*1*	**47**	*8*
Others					4	–	12	*2*			**16**	*2*
Consumers' behaviour							16	–			**16**	–
Total technological	**23**	*2*	**15**	*4*	**48**	*4*	**51**	*7*	**35**	*7*	**172**	*24*
Total non-technological	**42**	*8*	**37**	*6*	**34**	*6*	**44**	*3*	**20**	*3*	**177**	*26*

Legend: A = all statements; *T* = Top 10 statements; [■] = counted as technological statement