Foresight in a small country in transition: Preliminary lessons of the Hungarian Technology Foresight Programme

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FORESIGHT IN A SMALL COUNTRY IN TRANSITION

Preliminary lessons of TEP, the Hungarian Technology Foresight Programme

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Abstract

Hungary launched her first foresight programme in 1997. As the country is undergoing fundamental economic and social changes, major institutions are being currently shaped. Therefore is high time to think about medium and long-term issues. In other words, now it is possible to devise strategies aimed at improving the quality of life and the long-term international competitiveness. Foresight has seemed an adequate tool to bring together business, the science base and government in order to identify and respond to emerging opportunities in markets and technologies.

TEP is a holistic foresight programme, based on both panel activities (scenarios, SWOT analysis, recommendations, policy proposals, etc.) and a large scale Delphi survey. The two-year Programme will conclude in 1999.

The paper is aimed at analysing the reasons to launch TEP, its results achieved so far and some methodological issues, namely

- a strong emphasis on scenarios ('macro' and panel level),
- the structure and composition of panels (education and learning as input of competitiveness, employment as a unique issue, broad issues as panel topics),
- the importance of cross-cutting issues,
- the organisation and management of the programme,
- the socio-psychological legacy of planning in the foresight process.

1 Introduction

Experts and laymen in different historical periods and in different socio-economic systems shared at least on desire: to know their future in advance or even to influence it for their advantage. They used very different approaches and methods from spiritual-religious ones to scientific investigations and various modes of planning. Hence one might bluntly claim that the past (history) of mankind can be written by analysing these different attitudes, methods and approaches towards the future. Recently yet another 'future-oriented' method is being used in an ever increasing number of countries, namely (technology) foresight. It has almost reached that point when it is too fashionable, and too much expectations surround it, and thus it is bound to fail.

This paper, however, has rather modest aims, it does not intend to classify, characterise and analyse all the possible methods used to predict, influence or shape our future in different periods of time in different countries, not even to provide a comprehensive methodological introduction to the 'foresight' school. Its approach is fairly practical, a 'down to the earth', descriptive one, to share some preliminary results – including the ones concerning sustainable development – and rather tentative lessons/characteristics of TEP, the Hungarian Technology Foresight Programme.

As TEP is still going on, it would be too early to formulate firm conclusions, and hence the paper only introduces very briefly the concept of foresight (Section 2), then goes on to outline the specific aims and methods of TEP (Section 3), summarises some preliminary results (Section 4), and finally offers some methodological remarks (Section 5).

2 Foresight: definition and rationale

Global trends cannot be stopped at national borders, and new technology is playing a growing role in our world characterised by increasingly rapid change. The world is also becoming more competitive, with national competitiveness depending on technological, organisational and social innovation. As it is widely realised firms cannot survive the ever more fierce global competition without investing in emerging technologies and strategic research. These activities, however, are often too risky or too expensive for industry to take sole responsibility for them. Therefore governments must assume at least part of the financial responsibility. This, in turn, requires setting R&D priorities, based on thorough, comprehensive, strategic analysis, as even the richest countries cannot afford to support all research programmes. Technology foresight – a systematic means of assessing that scientific and technological development which could have a strong impact on industrial competitiveness, wealth creation and quality of life – provides an essential tool to this end. Another reason why governments have to take part in foresight is that exploitation of science and technology largely depends on effective networking between business, academia and government. Many governments have realised the importance of foresight activities, and thus this relatively new, and innovative, technology policy tool is spreading across continents.[1]

3 Aims and first steps of TEP

Hungary launched TEP, her first foresight programme in 1997. As the country is undergoing fundamental economic and social changes – that is, the transition towards market economy –

[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.

major institutions are currently shaped. The first phase of transition process is over by now. Most firms and banks have been privatised, the most important new political and economic institutions have been re-established, e.g. a parliamentary democracy based on a multi-party system and the stock exchange. The so-called transition decline has turned into economic growth in the last few years; therefore, it is high time to think about medium and long-term issues. In other words, now it is possible to devise strategies aimed at improving the quality of life and the long-term international competitiveness – the major goals of TEP.

Foresight has seemed an adequate tool to bring together business, the science base and government in order to identify and respond to emerging opportunities in markets and technologies. In short, TEP should contribute to the design and implementation of a national innovation strategy based on a comprehensive analysis of

- world market opportunities (new markets and market niches)
- trends in technological development
- strengths and weaknesses of the Hungarian economy and R&D system.

The above, demanding, aim 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 can be regarded as a means of the principal goal. However, the process in which these experts with different backgrounds communicate and share ideas about longer term issues, generate consensus, and co-operate with increased commitment in devising and realising a national strategy, seems to be so crucial that it is an end in itself. In other words, the programme is also aiming at strengthening the formal and informal relationships among scientists and engineers, managers and civil servants, alike spreading the co-operative and strategic thinking.

Hungary is among the six countries about to join the European Union in the 'first wave'. Accession to the EU is a major challenge since it is likely to shape Hungary's future to a significant extent. It requires a clear and sound vision about Hungary's role and opportunities in the enlarged European socio-economic system. TEP activities and results can contribute to the success of the integration process.

Written TEP results will be comprehensive analyses of strengths and weaknesses, scenarios based on these inquiries and likely global trends, as well as recommendations for public policies regarding how to realise the most desirable scenario. These analyses and information should also assist Hungarian firms in devising and implementing their strategies to improve their competitiveness.

TEP is a holistic foresight programme, based on both panel activities (scenarios, SWOT analysis, recommendations, policy proposals, etc.) and a large scale Delphi survey. The two-year Programme will conclude in 1999. It is being conducted in three stages, namely pre-foresight (October 1997 – March 1998), main foresight (April 1998 – October 1999) and dissemination (November – December 1999) stages.

Awareness seminars were held across the country in the pre-foresight stage to promote this new concept among experts and professionals. Participants and organisers of these seminars (that is, chambers of commerce and scientific associations) were also invited to nominate panel members.

A Steering Group (SG) of 19 leading industrialists, academics and government officials – deliberately with a majority of industrialists and academics with close contacts with businesses – was set up in October 1997 to oversee the Programme. Following a thorough discussion the SG has defined the following topics for panel discussions:

- Human resources (education, employment)
- Health (life sciences, health care, pharmaceuticals, medical instruments)
- Information technologies, telecommunication, media
- Natural and built environment
- Manufacturing and business processes (new materials and production techniques, supplier networks, globalisation ...)
- Agribusiness and food
- Transport

The above panels were formed and trained in April 1998, then they started working by identifying major developments in their respective fields and devising alternative visions (possible futures) for the long run. They have relied on the expertise of their members – 'representing' different schools of thought in a given field –, and also commissioned reports by other experts not belonging to foresight panels. They have formulated statements for the two-round Delphi-survey, and discussed their tentative results with the wider expert community in their fields at workshops held across the country, and organised jointly with the regional chambers of commerce and professional societies. All the background reports, the alternative visions and the Delphi statements have been made available at the Internet, too.

4 Preliminary results

The first draft of the so-called macro scenarios – analysing the broad social and economic trends at a macro level – have been developed by December 1998 and then discussed by the SG and other experts at several occasions. These discussions are to be continued, and their results are taken into consideration when revising the macro scenarios. A number of versions – alternative futures at the macro level – have been sketched, and finally three of them have been elaborated. (see a short summary below)

Scenarios describing the potential developments of the neighbouring countries, broadly defined, are also being developed. The first draft has just been finalised and is to be discussed with the SG and experts in September-October this year.

Panels have formulated the first versions of their alternative futures by September-October 1998, and have discussed, revised and extended them since then.

The first round of the Delphi survey has been completed by May 1999. Some 1400 questionnaires have been returned, i.e. on average 200 by panels. Each questionnaire is consisted of 60-80 statements and the following set of questions:

- Respondents' degree of expertise
- Respondents' assessment of economic and social impact, and impact on natural environment
- Period within which the event/development will have first occurred (including "never")
- Hungary's current position vs. advanced European countries: S&T capabilities, exploitation of innovations, quality of production, service and regulation
- Constrains: social/ethical, technical, commercial, economic, lack of funding, regulatory standards, education/skill base
- Promotion of development, application: domestic R&D, purchase of licence, know-how or ready-made products

The characteristics of the sample – composition by gender, age, affiliation, type of activity and respondents' degree of expertise – are reported in Tables 1-5, based on the first 1305 questionnaires returned.

Table 1: Composition of the Delphi-sample by gender (percentage)

	Human resources	Health	IT, telecom, media	Natural and built environment	Manufacturing and business processes	Agribusiness and food	Transport
male	65	83	92	79	89	83	90
female	35	17	8	21	11	17	10

Source: Delphi-survey run by Median Public Opinion and Market Research Ltd

Table 2. Composition of the Delphi-sample by age (percentage)

	Human resources	Health	IT, telecom, media	Natural and built environment	Manufacturing and business processes	Agri-business and food	Transport
20-29 years old	3	1	3	3	1	1	5
30-39 years old	8	5	10	10	5	8	8
40-49 years old	37	19	25	28	19	29	27
50-59 years old	39	38	49	45	44	41	42
60-69 years old	10	30	13	11	25	17	13
70+ years old	3	7	0	3	6	4	5

Source: Delphi-survey run by Median Public Opinion and Market Research Ltd

Table 3. Composition of the Delphi-sample by affiliation (percentage)

	Human resources	Health	IT, telecom, media	Natural and built environment	Manufacturing and business processes	Agri-business and food	Transport
private company	8	22	35	13	30	19	23
state-owned company	1	2	5	9	7	6	30
academic research institute	33	46	36	47	42	46	21
public service	35	23	7	4	4	6	4
public administration	15	3	14	17	7	8	11
non-governmental org.	2	1	1	3	5	6	1
other	6	3	2	7	5	9	10

Source: Delphi-survey run by Median Public Opinion and Market Research Ltd

Table 4. Composition of the Delphi-sample by type of activity (percentage)

	Human resources	Health	IT, telecom, media	Natural and built environment	Manufacturing and business processes	Agri-business and food	Transport
research, development	27	61	47	49	44	37	28
other	73	39	53	51	56	63	72

Source: Delphi-survey run by Median Public Opinion and Market Research Ltd

Table 5: Respondent's degree of expertise

	Human resources	Health	IT, telecom, media	Natural and built environment	Manufacturing and business processes	Agri-business and food	Transport
mean	2.64	2.54	2.73	2.26	2.01	2.17	2.22
standard deviation	0.64	0.59	0.64	0.54	0.49	0.59	0.63
N	206	167	161	220	161	200	190

Source: Delphi-survey run by Median Public Opinion and Market Research Ltd

Note: Expertise has been self-assessed on a 1-5 scale, with the following definitions:
1 = unfamiliar, 2 = casually acquainted, 3 = familiar, 4 = knowledgeable, 5 = expert

The second round is to be completed in September 1999, and hence data can be processed and analysed in October.

Then panels complete their reports, consisting of a critical description and assessment of the current situation, alternative futures (visions) and recommendations (policy proposals) to 'prescribe' the way leading to the most desirable – and feasible – future.

Taking into account the membership of the SG and panels – altogether some 200 leading experts –, the respondents of the Delphi survey and the participants of the various workshops organised across the country, a few thousand industrialists, academics and government officials are contributing to the TEP results.

4.1 Three macro scenarios

Having discussed a number of possibilities, 3 macro scenarios have been elaborated.[2] With hindsight, they can be depicted as cells of a 2x2 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 settings.

Figure 1: Three macro scenarios

	Drifting (no strategy)	**Active strategy**
Fundamental, structural changes occur in the global settings		*Macro Vision III:* Hungary is integrated into a new, 'green' world by active strategy along a knowledge-intensive way
No major changes in the global settings	*Macro Vision II:* Hungary is 'grabbed' into the current system of the international division of labour by multinationals along a low-skills, low-wages path	*Macro Vision I:* Hungary implements an active strategy characterised by strong integration and high level of knowledge-intensity

These three macro visions share one common feature, namely in all cases Hungary is integrated into the international division of labour in the future, too, as it is already part of the global and European economic and political systems. In other words, we have excluded the case of isolation (although we might have to reconsider this assumption once the regional scenarios – describing the potential futures for the EU and the Central and Eastern European region – are available).

'Activity' or 'strategy' is understood as an interplay of yet another 'magic trio', namely the civil society, businesses and the government, i.e. the actual value of this variable is determined by the intensity and quality of the activities of these players.

[2] A group of experts – co-ordinated by Anna Vári and László Radácsi – drafted these scenarios in September-October 1998, which were then discussed in November 1998 – February 1999, and then revised extensively. Yet, these are still "work in progress" visions, i.e. might be revised substantially as TEP progresses (e.g. regional scenarios are developed and discussed, panels visions are revised, etc.).

One major characteristic, that is, knowledge-intensity is not represented by a separate axis in Figure 1 as it can be regarded as a dependent variable of 'strategy'. In other words, active strategies pursuing a path of low knowledge-intensity – and thus low value-added, low wages and weak local markets – as well drifting along a highly knowledge-intensive path can be excluded from scenario-building.

All these macro visions take into account demographic, societal, environmental, economic and political factors as well as the physical infrastructure when describing potential futures states.

5 Characteristics of TEP: methodological remarks

Having summarised the reasons to launch TEP, and the preliminary results, some methodological issues are highlighted in the remaining sub-sections.

5.1 Strong emphasis on scenarios, institutions and regulation

Given the transition process major institutions are still being shaped in Hungary, as opposed to, for instance, the UK, where 'the lawn is cut and watered for centuries'. The fundamental institutions have crystallised in the advanced countries for quite some time, whereas Hungary is still at cross-roads. Moreover, coming back from the Soviet political, military and economic bloc and attempting to join the EU, which is also in a middle of a major transition process, the wider, international institutional context (economic environment) where Hungary tries to find her room, is changing. It is of the utmost importance to analyse this turbulent environment, hence the emphasis on scenario-building, both at macro level (socio-economic framework conditions) and at the level of panels (micro, mezzo). Macro scenarios had not been developed in any other country engaged in foresight activities when we designed our programme.[3]

We are also devising regional scenarios, i.e. trying to identify the possible futures of that part of the Central and Eastern European region which might have significant influence on the Hungarian developments, and searching for global and European scenarios, too, as background information for our own analysis.

For the above reasons, TEP panels also devote a significant part of their interest to institutional development and regulatory issues. It is also reflected in the Hungarian Delphi-statements: quite a few of them deal with these issues, rather than technological ones.[4]

5.2 Education and learning as input of competitiveness

There was a *Leisure and Learning* panel in the first British foresight exercise, where learning was mainly understood as a market opportunity, not as a major factor of competitiveness. TEP has opted for the latter approach – for obvious reasons.[5]

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[3] Scenario-building has been an important innovation in the first British foresight exercise, but only applied at panel level. More recently, macro-scenarios have been developed in the South African foresight programme.

[4] To compare with the first British foresight exercise, in that Delphi questionnaire there were four categories: elucidation, prototype development, first practical use, widespread use – all are clearly characterising different phases of technological development.

[5] In the process of the second British foresight exercise, launched in April 1999, more emphasis would be given to learning as input to competitiveness.

5.3 Employment as a unique issue

TEP has put together Education, learning and employment into one panel under the heading of Human resources. To my knowledge, employment has not been an issue anywhere else. Our decision, however, is self-explanatory in a country in transition, where unemployment has been an unknown phenomenon for decades, and suddenly it jumped to 12 per cent (in the early 1990 – by now it is down to around 8 per cent).

5.4 Broad issues as panel topics

In general, we have brought together various issues treated separately in most other foresight exercises. For example, our *Health* panel covers life sciences, related fields of biotechnology, health care, pharmaceuticals and medical instruments. Some of these issues are not analysed at all in other foresight exercises, e.g. the health care system, others are treated in separate panels, e.g. life sciences on their own and pharmaceuticals as part of chemicals. Also, agriculture and food processing belong to a single panel in our case (as opposed to the first British exercise).

Although we have tried to set up panels around broad issues, some 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 and diet, as well as the level of the medical care system and the environment. All these issues belong to different panels, i.e. a close and well-thought collaboration is required to carry out reliable, thorough analysis and formulate sensible policy proposals. Having recognised that need, some panels have joined forces, i.e. their budget, in the early phase of our programme, and commissioned together a group of experts to analyse issues from different points of view (e.g. healthy diet: *Health – Agribusiness and Food Industry* panels, causes of allergy: again the above two panels).

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.

5.5 Cross-cutting issues

In spite of defining broad fields as panel topics to be analysed, we have also put strong emphasis on the so-called cross-cutting (cross-panel) issues. We encourage our panels to identify, and adequately deal with these issues while analysing major trends and developing alternative visions (futures) for their field, and in doing so we have developed a list of them at the very beginning of TEP. This list include, among others:

- education, training and re-training
- IT
- environment
- accession to the EU (threats and opportunities, impacts)
- 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.

We have organised special workshops to analyse these issues, and put two of them into the Delphi questionnaire as variables, namely impacts of a given event/development on the

environment and lack of skills as a potential constraint. The latter variable (availability of skills) has been used in a number of Delphi questionnaires (in Britain, Germany, Japan, etc,), but – as far as I can tell – the former one is only applied in the Hungarian survey.

There are a number of 'cross-cutting' Delphi-statements, too, e.g. those concerning environmental issues but formulated by other panels (health, IT, manufacturing and business processes, etc.). We have collected these statements, and the respective panels are going to analyse them, i.e. both those panels which formulated these 'cross-cutting' Delphi-statements and those which are 'effected' by these statements.

5.6 Organisation

The former socio-economic system has been influential concerning the organisation and management of TEP, too. It has been a well-considered, conscious decision from the very beginning not to involve anybody from the OMFB (a government agency responsible for S&T policy) to run the programme (from a professional point of view, i.e. decision on panel topics, issues to be analysed, priority-setting, etc.). The role of OMFB has been restricted to providing finance and methodological support. Therefore no OMFB-official sits either on the Steering Group (SG), or is a member of any panel.[6] Moreover, members of the SG and panels have been appointed as a result of a wide consultation process. All the major decisions are taken by the SG – more recently at joint meetings of the SG and panel chairs and secretaries – or the panels themselves.

5.7 Ambiguous ('double') legacy of planning

Centrally set, mandatory plan targets were abolished in 1968 in Hungary, the first time among the centrally planned economies.[7] Yet, its legacy is still rather strong among some experts, and it has had some non-negligible impacts on the foresight process, especially in the beginning of it. Two – rather different – consequences, have become visible:

- some engineers and scientists have understood foresight as just another form (tool) of (central) planning, and hence want to devise just one future (vision, scenario), i.e. not alternative, qualitatively different ones, and seeks funding for that target (as a sort of 'central development programme [plan]');
- some other professionals have also understood foresight – at least at the first glance – as just another form (tool) of (central) planning, and hence reject it immediately.

It is obviously changing as we go along, yet, not everyone share the same understanding of the role and aims of foresight.

To sum up, the on-going Hungarian Technology Foresight Programme – its goals, methods and organisation – is shaped to a large extent by the legacy of the former socio-economic systems, their impacts on the national system(s) of innovation, the size of the country and the level of her economic development.

[6] To compare, the Chairman of the Steering Group was the Head of the OST during the first British foresight programme.

[7] Central planning has not been abolished until 1989.

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