OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

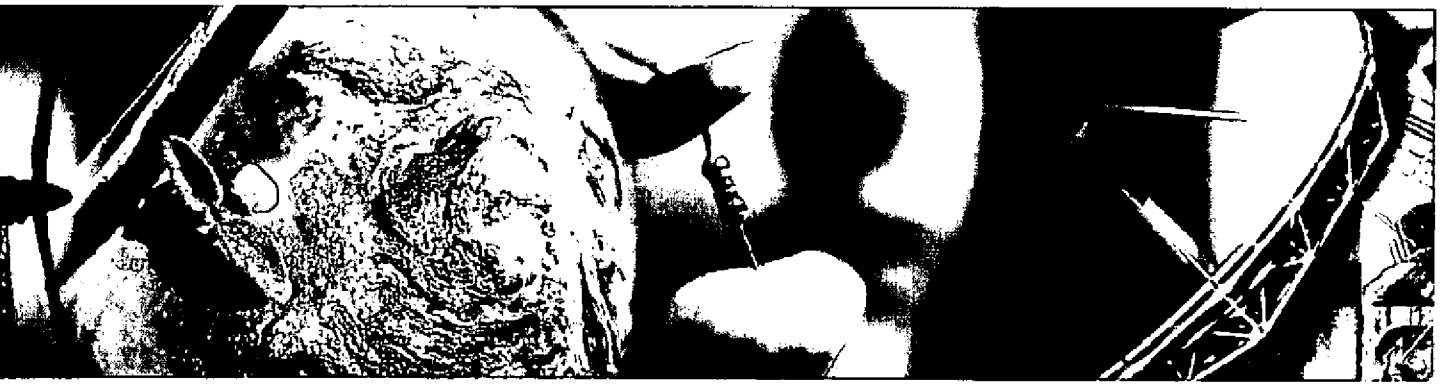
2006/7

TRAINING PROGRAMME

Regional Initiative on

Technology Foresight

for Central and Eastern Europe and the Newly Independent States



formation Day on Technology Foresight for Decision Makers, udapest (Hungary), 9 November 2006

aining Material

Textbook

InfoPark

Budapest

Welcome

„Not even the future is what it used to be..."

...it affects our everyday life faster, more thoroughly and closely. Technology Foresight is one of the tools with which the risks of our decisions can be lowered, and economic competitiveness can be achieved while also considering the conditions of sustainable growth.

Knowledge in the field of Technology Foresight helps decision makers come to the right conclusions in business and political issues, to develop contacts and keep up the pace with the accelerating pace of change. We hope that our city and the premises of Infopark-Budapest will again be a comfortable place to widen your knowledge in Technology Foresight and build your network of contacts.

I wish a fruitful and efficient stay in Budapest for all participants.

Gábor Szabó

Chairman-CEO
InfoPark Co.

DEVELOPING UNIDO TF PROGRAMME FOR THE CEE/NIS REGION

Report*

Prepared by Attila Havas, Hungarian Academy of Science

Vienna, September 2006

* This document has been produced without formal editing.

Acknowledgments

This paper was prepared by Attila Havas, Hungarian Academy of Science, under the project on Regional Virtual Center on Technology Foresight for Central Easter Europe and Newly Independent States (RVC CEE/NIS), funded jointly by UNIDO and governments of Czech Republic, Hungary, Slovakia and Turkey under the supervision of Ricardo Seidl da Fonseca.

Content

EXECUTIVE SUMMARY

Relevance of Foresight for decision-making

1. Foresight is a useful decision-preparatory tool, as suggested by its wide-spread use across continents, as well as by theoretical considerations. Foresight can assist decision-makers in tackling a number of complex challenges: it can reduce technological, economic or social uncertainties by identifying various futures and policy options, make better informed decisions by bringing together different communities of practice with their complementary knowledge and experience, obtain public support by improving transparency, and thus improve overall efficiency of public spending.
2. Foresight can be applied for all sorts of decision-making processes (businesses, research institutes, professional associations, NGOs, etc) – but this report is mainly concerned with the role of foresight in shaping public policies.
3. A clear separation should be maintained between the role (competence) of decision-makers, on the one hand, and participants of foresight programmes, on the other. The latter ones provide various types of inputs – e.g. analyses, lists of suggested actions, policy or strategy recommendations – to the decision-making processes. Yet, the ultimate responsibility to make decisions rests with the former ones, as it is clearly indicated by their name.
4. Foresight should not be conducted for its own sake – just because it is becoming "fashionable" throughout the world, and currently being promoted by international organisations. It is crucial to prove the relevance of foresight for decision-making: its timing and relevance to major issues faced by societies, as well as the quality of its 'products' – reports and policy recommendations – are critical. Only substantive, yet carefully formulated proposals can grab the attention of opinion leaders and decision-makers, and then, in turn, the results are likely to be implemented. Otherwise all the time and efforts that participants put into a foresight programme would be wasted, together with the public money spent to cover organisational and publication costs. The so-called process results – e.g. intensified networking, communication and co-operation among the participants – still might be significant even in this sad case, but they are less visible, and much more difficult to measure. Thus, the chances of a repeated programme – when it would be due again given the changing environment – are becoming really thin.
5. Foresight is only one of the available policy instruments, and definitely not a panacea. Even when only future-oriented, prospective decisions are concerned, there are a number of other useful ways, techniques, and methods to assist strategic (long-term) policy processes – and strategic decision-making for businesses – besides foresight. The selection of methods should be based on the policy or strategy issue, i.e. none of these methods is superior to any other ones *a priori* – the context (challenges to be tackled, resources, competence and time available, etc.) should drive the decision as to what approaches and method(s) are adequate, and hence to be applied.
6. It is of crucial importance to maintain a clear distinction among the various approaches, ways, methods and techniques aimed at analysing future developments. In other words, confusing foresight with other future-oriented analyses is likely to lead to ill-defined programmes, methodological deficiencies, and thus questionable, unreliable analytical results and recommendations, and, in turn, clients, sponsors, and participants of foresight programmes are likely to become disappointed and disillusioned.

7. Foresight can be a useful tool in a number of policy fields – well beyond science, technology and innovation. It is time to embrace this broader notion of foresight, and especially in the CEE/NIS countries, facing daunting tasks in a number of fields of socio-economic development. Three different foci of foresight programmes – namely pure S&T, techno-economic and societal/ socio-economic ones – are, therefore, distinguished and discussed in this report.

Relevance of Foresight for the CEE/NIS countries

8. Foresight can be a useful tool in the CEE/NIS region, too; in spite the fact that these countries can only exceptionally push the frontiers of S&T progress. A number of factors seem to contradict this conclusion at the first glance. Foresight is costly in terms of time and money. Further, advanced countries regularly conduct foresight programmes, and their reports, Delphi-survey results, etc. are readily available. Yet, only a national programme can position a country in the global context and stir up dialogues on how to react to major S&T, business, societal and environmental trends. Similarly, strength and weaknesses of a given country would not be discussed by other programmes, 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.

9. There are even stronger needs for strategic thinking in CEE/NIS than in the advanced countries, given their specific challenges, in particular their transition processes and major changes in their external environment. Yet, long-term thinking is discredited across the region. Policy-makers do not rely on modern decision-preparatory tools to a sufficient extent, and quite often do not realise the close interconnections between RTDI processes and socio-economic development. Thus, in many cases, they are only willing to spend on R&D when "we can afford" – although it should be the other way around: "we spend on promoting RTDI processes, because we want to foster wealth creation". Science, technology and innovation policies are isolated from each other – if not "fighting" for the same, limited set of resources –, and major economic policies are not co-ordinated with STI policies.

10. Foresight may change these attitudes, but exactly because of these factors, foresight programmes are only scattered in the region. One cannot observe strong commitment for profound foresight programmes, that is, serious consideration and determined implementation of policy recommendations, accepting/ introducing a new decision-making culture, along with a new way of thinking, with more emphasis on communication, co-operation, consensus among the major stakeholders, and joint commitments to take action.

11. International co-operation can raise awareness among the stakeholders, and also enhance the chances of success by sharing lessons, easing the lack of financial and intellectual resources through exploiting synergies and economies of scale. International organisations can also facilitate foresight programmes in emerging countries, and in particular collaboration among them. It is crucial, however, to maintain the commitment of local actors, e.g. in terms of time and funds devoted to the programme, willingness to implement the results. In other words, the main forms of foreign assistance should be the provision of knowledge-sharing platforms and other fora to exchange experience (among emerging economies as well as with advanced countries), monitoring and evaluating foresight initiatives in the CEE/NIS region.

Recommendations for the UNIDO Regional TF Initiative

12. The immediate objectives of the UNIDO regional TF initiative are: (a) to raise awareness of (technology) foresight for enhancing competitiveness, and thus contributing to improved quality of life; (b) to adopt and adapt foresight in the region, and develop/ test methods required by international co-operation; (c) to establish and strengthen capability of using technology foresight for designing policies and strategies that focus on innovation; (d) to initiate regional foresight projects on specific sectors or themes so as to demonstrate its relevance; and (e) to provide solutions to relevant problems in the region that can be addressed by foresight.

13. International co-operation in designing/ conducting foresight programmes can be highly beneficial in general, and for emerging economies, in particular. Thus, there are several reasons that justify the regional approach, understood here as co-operation among CEE/NIS countries (not necessarily all of them in the same project, though), or among regions located in these countries. In other words, the principle of *'variable geometry'* is to be followed: the geographic coverage of actual projects would depend on the nature of the issue to be tackled, the willingness of CEE/NIS countries to participate, their skills, financial and intellectual resources, and most importantly the perceived benefits of the project.

14. Foresight should be understood and conducted as a decision-preparatory tool in the context of STI policies and broader socio-economic development strategies – or in the context of strategic planning, if run by/ for businesses. Thus, whenever it is possible and meaningful, the use of other elements of the policy tool box – such as, collection and analyses of relevant data; devising policies; evaluation of policy programmes; assessing and monitoring projects; technology assessment; etc. – should be stressed, e.g. at awareness raising events and training seminars.

15. It is recommended to focus on Foresight activities, and thus keeping a clear distinction between Foresight and other prospective techniques (e.g. key or critical technologies, technology forecasting, technology road-mapping, etc.) However, when there is a well-defined need from the partner countries to use some of these other prospective techniques, a thorough consideration should be given to those initiatives. In case of finding good reasons to co-operate in those types of projects, it is recommended to embark upon these projects, too. Again, whenever it is possible and meaningful, these other prospective techniques/ approaches can be disseminated, e.g. at awareness raising events and training seminars.

16. This regional TF initiative involves the promotion of the concept among the various stakeholders (policy-makers, businesses, researchers, other experts, NGOs, etc.); the development of foresight capabilities by training and re-training (would-be) practitioners; and the co-ordination and implementation of foresight (prospective) projects in the regions, by offering hands-on experience with different methodologies. These three main components consist of a number of activities, to be shared among the partners. The detailed list of these activities and the proposed division of tasks among the partners can be found in the report.

1. INTRODUCTION

The increasing number of foresight programmes – as systematic, participatory processes, collecting future intelligence and building medium-to-long-term visions, aimed at influencing present-day decisions and mobilising joint actions (EC DG Research, 2002) – suggests that foresight can be a useful policy tool in rather different national innovation systems. Emerging economies in the CEE/NIS region – faced with a number of similar or same challenges when trying to find their new role in the changing international settings, while still characterised by their own distinct level of socio-economic development, set of institutions, culture and norms – can also benefit significantly from conducting foresight programmes.

This report is aimed at offering suggestions to underpin the activities of UNIDO to promote foresight activities in the CEE/NIS region. The central theme is the potential use of foresight in decision-making, either for government policies (at various levels) or for strategies of all sort of organisations, including businesses. In other words, foresight is a decision-preparatory tool, not a scientific discipline – although it draws on the results and conclusions of scientific projects, as well as relies on a number of scientific methods. It also should be understood that a clear separation should be maintained between the responsibilities (roles, competences) of decision-makers, on the one hand, and participants (or organisers) of foresight programmes, on the other. The former ones, as their name suggests, make decisions, e.g. on policies or strategies, public or private actions, budgets, regulations and other rules, etc.; while the latter ones provide – as expected, valuable, systematic, sound – inputs to the decision-making processes, in the form of analyses, lists of suggested actions, policy or strategy recommendations. Yet another level is the competence of the UNIDO – or any other international organisation – to 'nurture' foresight activities in the CEE/NIS region by organising awareness raising events, contribute to capacity-building (at the level of decision-makers, organisers and participants of future foresight programmes, etc.), and commission various studies on foresight (its methods, lessons of its use in different contexts, etc.) or co-fund cross-border foresight programmes. Again, it is different from the roles and responsibilities of national governments, businesses, experts, NGOs and other representatives of the civil society.

The report is organised as follows: first the theoretical underpinnings is summarised briefly: how innovation processes are understood by economic theories; the implications of these analyses for science, technology and innovation (STI) policies; and the role of foresight in innovation processes and in shaping STI and *other* policies. Then the rationale of conducting foresight is presented in Section 3: what policy challenges can be tackled by applying foresight? The specific needs of the CEE/NIS countries are summarised in this section, but these are put into the broader context, and spelt out in more detail in Appendix 1. Besides foresight, there are a number of other methods, approaches to provide future-oriented analyses, and more recently the crucial differences among these approaches are not always clearly understood. This confusion can pose significant challenges, e.g. unrealistic expectations by decision-makers. Thus, Section 4 puts foresight onto this map, and highlights three distinctive characteristics of foresight programmes: action-oriented, participatory and consider alternative futures. It is also of crucial importance to appreciate that foresight programmes can have different policy rationales (i.e. they can be aimed at tackling different types of policy challenges), and their focus, therefore, can differ significantly. Three of these different types (foci) of foresight programmes are discussed in Section 5, as well as the need for a coherent programme design, in terms of themes, time horizon, methods, and participants. CEE/NIS countries have scarce financial resources to fund foresight programmes, and relatively little experience in conducing them. International collaboration may ease these

scarcities .The benefits of, and potential for, co-operation among these emerging economies are thus considered in Section 6. The final section summarises the major conclusions, and presents recommendations for the UNIDO regional foresight initiative in terms of its immediate objectives, the overall approach, the components, activities, as well as the division of work among the partners.

The report draws on a number of sources: the growing body of literature on economics of innovation, which is still somewhat separated from the empirical and theoretical writings on foresight; the experience of several foresight and STO policy practitioners and analysts – shared at a number of workshops and conferences organised by the EU and the UNIDO over the last 10 years – as well the previous practical experience of the author in conducting a foresight programme. It has also benefited from the dedicated workshops organised by the UNIDO to discuss the regional foresight initiative, as well as from the intense exchange of ideas with Özcan Saritas while he was working at InfoPark, the service unit of the Regional Virtual Foresight Centre.

2. Theoretical Framework

Foresight programmes do not have a single, all-encompassing theory to support them, and thus they rely on a range of – somewhat overlapping – theories and methods, including (i) evolutionary economics of innovation; (ii) sociology of science and technology; (iii) actor - network theories; (iv) political sciences analyses of policy processes; (v) communication, co-operation, and participation theories; (vi) decision-preparatory and future-oriented methods, techniques. This list is far from exhaustive, and most likely disciples of these theories would change the grouping, the order of their own discipline or even the wording used here. That might be an interesting discussion in its own right, indeed, for theoretical purposes. Yet, the intention here is just to indicate the 'eclectic' – and thus complex – nature of foresight programmes, rather than attempting to provide a meticulous, comprehensive treatise of these issues.

This section is concerned with evolutionary economics of innovation[1] because this theory provides useful observations to appreciate the relevance of foresight programmes from different angles. First, foresight (programmes), future, change, innovation and uncertainty are closely interrelated notions – and some of these are the underlying terms of evolutionary economics of innovation. Second, foresight programmes are important policy tools, and thus the nature of policy formation processes and the policy rationale of foresight programmes should be clearly understood (further explored in Section 3).

2.1. The Process of Innovation and Economic Theories

Obviously, no comprehensive overview on evolutionary economics of innovation can be provided here: only the main features are highlighted.

Innovation, defined as "the search for, and the discovery, experimentation, development, imitation, and adoption of new products, new production processes and new organisational set-ups" (Dosi [1988a], p. 222), leads to variety (diversity), and competition. The latter one, in

[1] See, *e.g.*, Dosi [1988], Dosi *et al.* [1988], [1994], Dodgson and Bessant [1996], Dodgson and Rothwell [1994], Edquist [1997], Ergas [1987], Freeman [1994a], Freeman and Soete [1997], Levin *et al.* [1987], Lundvall [1992], Lundvall and Borrás [1999], Metcalfe and Georghiou [1998], Nelson and Winter [1982], Nelson [1993], [1995], OECD [1992], [1997], [1998], [2001b], [2002], Smith [2002].

turn, both conducive to innovation and induced by innovation, selects among firms (or organisations, more generally).

In spite of the apparent similarity with biological processes, one should not mistakenly equate evolutionary economics with evolutionary biology. Freeman [1994b] highlights two fundamental differences. First, selection is at least partly conscious in the innovation process as decision-makers can choose between various 'mutations' (that is, new products, processes and organisational forms). Moreover, their expectations, hopes, plans and values also shape the 'evolution' of these 'mutations'. Ethical and social considerations, therefore, play an increasingly important role in the innovation process, notably in the development and utilisation of nuclear energy and biotechnology, as opposed to the process of biological evolution. Second, selection is taking place at a number of levels in the course of competition: among products, firms (organisations), sectors, regions, countries and socio-economic systems. There are some autonomous rules and laws of the selection process at these different levels. Strong interrelations and interdependencies, however, can also be observed. Technological innovations are shaping both their natural and socio-economic environment, while the success of innovations strongly depends on their environment, including the quantity, quality and distribution of accumulated capital in the form of production equipment, roads, railways, communications networks, bridges, etc., as well as policies, attitudes and norms, that is, institutions in short.

While rational agents in the models of neo-classical economics can optimise via calculating *risks* and taking appropriate actions, "innovation involves a fundamental element of *uncertainty*, which is not simply the lack of all the relevant information about the occurrence of known events, but more fundamentally, entails also (a) the existence of techno-economic problems whose solution procedures are unknown, and (b) the impossibility of precisely tracing consequences to actions" (Dosi [1988a], p. 222 – emphasis added). Thus, the notions of *optimisation* or *maximisation* become meaningless.

Another important implication of uncertainty concerns the scientific and policy relevance of forecasting, based on the extrapolation of (supposedly) known trends. The space of events, in which *forecasting* can be meaningful is strictly limited: the only certain – and thus easily predictable – outcome of innovative activities is that most of the underlying technological and business trends can change quite radically even in the space of 10-15 years.[2] From a policy perspective, therefore, new methods are required, which can take into account uncertainty during a decision-preparatory process. *Foresight* is a prominent one from this point of view, for two reasons. First, it is capable of dealing with uncertainty by devising alternative (qualitatively, or fundamentally different) 'futures' (visions of future, future states or scenarios). Indeed, it is a distinctive feature of foresight to consider alternative futures. Second, foresight processes can reduce uncertainty, too, because participants can align their endeavours once they arrive at a shared vision. To this effect, however, it is a necessary condition to involve the major stakeholders, who can significantly influence the underlying trends by shaping the strategies or policies of their respective organisations (government agencies, businesses, research organisations, NGOs, unions, etc. – depending on the issues in question, as well as the political and decision-making culture of the 'entity' conducting a

[2] Obviously, there are certain trends, e.g. demographic ones, which are not directly influenced by innovative activities, on the one hand, and their 'stability' (predictability) extends to a much longer time horizon (in this case around 40-50 years), on the other. Also, the pace and intensity of innovative activities – and hence their impacts on major technological and business trends – vary significantly across time (different historical periods) and countries (socio-economic systems).

foresight programme: international organisations or regions, nation states, sub-national regions, business associations, groups or individual firms, cities, etc.)

As opposed to the 'time-less' world of neo-classical economics, "*history counts*: past technological achievements influence future achievements via the specificity of knowledge that they entail, the development of specific infrastructures, the emergence of various sorts of increasing returns and non-convexities in the notional set of technological options" (Dosi [1992], p. 183). In other words, technological change is a *cumulative, path-dependent* process, and hence increasing returns are at least as important as diminishing returns. Closely related notions, also in the heart of evolutionary thinking, are *learning by doing, using, interacting* (Freeman [1994a]) and *comparing* (Lundvall and Tomlinson [2002]).

Mainstream economics is mainly concerned with the availability of *information* (or information asymmetries in its jargon). Both theoretical and empirical studies reflect, however, the growing recognition that the success of firms – regions and nations – depends on their accumulated *knowledge,* both codified and tacit,[3] and *skills*, as well as *learning capabilities*. Information can be simply bought, and hence mainstream economics is comfortable with it. Knowledge – and *a fortiori,* the types of knowledge required for innovation – on the contrary, cannot be mistaken with goods that can be purchased and used instantaneously; one has to go through a learning process to acquire knowledge and skills.[4] It obviously takes time and involves the process and costs of *trial and error.* Thus, the uncertain, cumulative and path-dependent nature of innovation is reinforced.

An important aspect of learning should be underlined here, namely its level. Some analysts and policy-makers highlight network re-alignment and science, technology and innovation (STI) policy updating as key foresight benefits – which are crucial impacts, depending on the 'focus' of a given foresight programme. (see Section 5.2 on 'focus') Case studies and anecdotal evidence clearly suggest, however, that there are often overlooked or 'hidden' benefits relating to learning at the level of individuals and communities. Actually, it is almost a commonplace among practitioners to refer to foresight as a learning process, although quite often they mean methodological learning. In any case, it might be a fruitful idea to make a clear distinction among the different levels of learning, i.e. not to focus exclusively at the 'macro' level, but give more prominence to individual and community learning when devising or evaluating foresight programmes.

Cumulativeness, path-dependency and learning lead to *heterogeneity* among firms and other organisations. Moreover, sectoral characteristics of the innovation process should also be taken into account while devising strategy or policy.[5]

A vast body of empirical literature has also clearly shown that innovators are not lonely scientists. While some path-breaking scientific or technological ideas might come indeed from individuals, successful innovations can only be generated by a close collaboration of different organisations such as: university departments, government and/or contract research labs, firms and specialised service-providers. Forms of their co-operation can also be varied

---

[3] For a brief, but highly informative, discussion of codified and tacit knowledge, and the policy relevance of this distinction, see Lundvall and Borrás [1999] (especially pp. 31-33), as well as the literature they refer to.

[4] Borrowing a sparkling parable of Dosi [1988b], although there are market conditions of access to information e.g. there is a market for textbooks and economic conditions of access to higher education (the level of tuition fees, the availability or scarcity of grants for students), "in any proper sense of the word, getting a PhD is not simply acquiring information, and it is even less true to say that there is a market for PhDs" (p. 1130).

[5] A seminal taxonomy developed in Pavitt [1984] identifies supplier-dominated sectors, specialised suppliers, scale-intensive and science-based sectors.

widely from informal communications through highly formalised R&D contracts to alliances and joint ventures.[6] Thus, conscious network-building efforts of foresight programmes are crucial, indeed – as well as their unintended impacts on networking (in case of the lack of explicit objectives to strengthen existing networks, facilitate the formation of new ones, and more generally, foster communication and co-operation; see Section 4.2 on different types of foresight programmes).

2.2. Implications for STI Policies

Evolutionary account of the innovation process offers some sobering lessons: in a world of uncertainty, policy cannot bring about the optimum either. The policy-maker is not "a perfectly informed social planner correcting imperfect market signals to guide private decisions toward more desirable outcomes". (Metcalfe and Georghiou [1998], p. 94) Of course, this conclusion is not easy to accept, especially for those trained in the paradigm of rationality, maximisation and optimisation:

> "For obvious reasons, many economists prefer models that provide precise policy recommendations, even in situations in which the models are inapplicable to the world of our existence. Our own view is that, rather than using neo-classical models that give precise answers that do not apply to situations in which technology is evolving endogenously, it is better to face the reality that there is no optimal policy with respect to technological change." (Lipsey and Carlaw [1998], p. 48)

Variety, selection and uncertainty also have repercussions on the very nature of policy and strategy formation, and thus decision-makers – either devising public policies or strategies for firms or RTDI organisations – should take into account these features. The relevant and potentially successful policies and strategies *adaptive* ones, relying on, and learning from, feedback from the selection process to the development of further variation. (Metcalfe and Georghiou [1998]) In other words, policy and strategy formation is increasingly becoming a learning process. (Lundvall and Borrás [1998], Teubal [1998]) This notion underlines the importance of foresight programmes: more 'robust' policies can be devised when (i) alternative futures are considered, and (ii) participants with different background are actively involved in a decision-preparatory process, and thus bringing wide-ranging accumulated knowledge, experience, aspirations, and ideas in.

Some more instructive policy lessons can also be derived from evolutionary theorising: given the characteristics of the innovation process, public policies should be aimed at promoting learning in its widest possible sense, in other words competence building at individual, organisational and inter-organisational levels. Co-operation and networking among a host of actors, including not only researchers and producers but also users is a vital element in generating and disseminating knowledge. A system-approach is required, therefore, in policy-making, whereby "policies recognise the division of labour in the generation of innovation-relevant knowledge, that no individual firm is self-sufficient in its knowledge and skills and that there are corresponding gains from linking firms with the wider matrix of knowledge-generating institutions". (Metcalfe and Georghiou [1998], p. 84) Indeed, a recent trend in the STI policies of advanced countries is to shift from direct research and development (R&D) support to promoting linkages, communication and co-operation among

---

[6] Freeman [1991], [1994a] and [1995] provided a thorough literature survey on the importance of networks and the innovation system approach. See also Edquist [1997], Lundvall [1992], Lundvall and Borrás [1999], Nelson [1993], OECD [2001b], Tidd *et al.* [1997], as well as the October 1991 and February 2002 issues of *Research Policy* (Vol. 20, No. 5, and Vol. 31, No. 2, respectively).

the players in the innovation process and thus building an appropriate organisational and institutional infrastructure. (Dodgson and Bessant [1996]; Lundvall and Borrás [1999]; OECD [1998]); a special issue of *Research Policy* [Vol. 30, No. 6]; country reports on national innovation policies at http://trendchart.cordis.lu)

Certain types of foresight programmes (see Section 5.2) can take into account these broader issues, as opposed to focussing narrowly on advancing scientific research in specific fields of enquiry or developing particular technologies. It, therefore, can be a crucial policy tool, especially if it is explicitly aimed at strengthening – regional, sectoral, national or trans-border – innovation systems. (The network-building aspects of foresight programmes have already been discussed in Section 2.1.)

Another major policy implication of this analytical framework is that conscious, co-ordinated policy efforts are needed to promote knowledge-intensive activities in all sectors, with the explicit goal of upgrading firms' capabilities, and thus improving their overall competitiveness. In other words, despite of the wide-spread believes in the 'magic' and automatic impacts of the so-called high-tech industries on economic growth, policy-makers should be aware of the importance of knowledge-content in the low- and medium-technology (LMT) industries, too.[7]

A recent EC document also draws the attention of policy-makers to this conclusion in a balanced, succinct way: "The EIS [European Innovation Scoreboard – A.H.] has been designed with a strong focus on innovation in high-tech sectors. Although these sectors are very important engines of technological innovation, they are only a relatively small part of the economy as measured in their contribution to GDP and total employment. The larger share of low and medium-tech sectors in the economy and the fact that these sectors are important users of new technologies merits a closer look at their innovation performance. This could help national policy makers with focusing their innovation strategies on existing strength and overcome areas of weakness." (EC [2003], p. 20) Foresight programmes, therefore, need – and should – not be confined to the narrow field of high-tech sectors (or 'advanced' S&T topics).

2.3. Foresight, Innovation and STI Policies

To avoid some potential misinterpretation, finally it should be stressed that opting for this theoretical framework does not mean that foresight should be understood as a vehicle to support narrowly defined (technological) innovation processes or STI policies. (See more on the policy rationale of the different types of foresight programmes in Section 5.2.) A narrow understanding would exclude, for example a foresight programme to create visions for cancer treatment.[8] Two aspects need clarification: (i) the relationships between foresight and innovation; and (ii) the links between foresight programmes, STI and other policies.

First, it might be useful to repeat that innovation should be understood as the introduction (practical application) of new or significantly modified products, production processes, services, as well as organisational and managerial practices (techniques). Thus, visions for new cancer treatments are about innovation, too, following this widely accepted broad

---

[7] Just to prevent some potential misinterpretations, it should be stressed that this paper is not intended, of course, to advocate a 'low-tech development path' for emerging economies, or to 'relegate' them to the second or third 'technology division' with low competitiveness, and hence low living standards.

[8] These observations are prompted by a question of Göran Pagels-Fick: "Could we envisage a foresight programme to create visions for cancer treatment practices?"

definition: we should envisage not only new medicines (product innovations), but also new ways to 'provide services' in the health care system (service, process, organisational and managerial innovations).[9] Moreover, visions generated by a foresight process would certainly encompass prevention, too (concerning diet, drinking and smoking habits, doing sports, reducing stress, etc.). This is also a new approach in terms of addressing an issue, i.e. a policy and organisational innovation at a social level – requiring new habits at an individual level. Also, new cancer treatments are likely to contribute to socio-economic development in several ways. To mention just two of them here: (i) in a narrow economic sense they can be cheaper or more efficient than the old ones, i.e. more patients can be cured faster (losing less time, which can be used for 'productive' purposes) and at lower costs; (ii) more broadly, the quality of life is improved when less people suffer from cancer, and less people should fear of cancer, due to better treatments.

Second, so far it has only been emphasised that foresight is an important innovation policy tool. It should be added that it could be useful in other policy domains, too. The above example clearly shows that health policies also need to deal with – and promote – various types of innovations.[10]

In sum, the subject itself is not a decisive factor for being 'qualified' as a foresight programme; what matters is to meet the three criteria set in Section 4.

3. Policy Challenges: Why to Conduct Foresight

3.1. Policy Rationale for Running Foresight Programmes

A number of technological, economic, societal, political and environmental trends affect all countries and most areas of policy-making, thus a new *culture of future-oriented thinking* is needed. Foresight can assist policy processes in various ways. It stresses the possibility of different futures (or future states), as opposed to the assumption that there is an already given, pre-determined future, and hence highlights the opportunity of shaping our futures. Further, it can enhance flexibility in policy making and implementation, broaden perspectives, and encourage thinking outside the box ("think of the unthinkable").

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

- Globalisation, sweeping technological and organisational changes, as well as the ever-increasing importance of learning capabilities and application of knowledge have significantly altered the 'rules of the game'. Thus, policy-makers have to take on new responsibilities (as well as dropping some previous ones), while firms must find new strategies to remain, or become, competitive in this new environment.
- Given the above factors our future cannot be predicted by any sophisticated model. Planning or forecasting of our future becomes more and more ridiculed in light of

[9] This is a generally accepted definition of innovation by international organisations, such as the OECD and EU, shared by researchers and policy-makers, too. Quite often, however, other people, e.g. journalists and politicians still use the term in its narrow sense, i.e. they only refer to technological innovations.

[10] Ian Miles is among the pioneers to stress the importance of innovation in service sectors, and he has also written extensively on the role of innovation in services provided by the state, and thus on the need to devise appropriate policies in these fields to promote innovations.

rapid and fundamental changes. History also teaches us valuable lessons about the (im)possibilities of planning and predicting the future. Therefore, flexibility, open minds for and awareness of possible futures are inevitable. Diversity is a key word: diversity in scope (in terms of possible futures, differing analyses etc), as well as diversity in solutions or policy options.

- Decision-makers face *complex* challenges: socio-economic and technological factors interact in defining issues of strategic importance, e.g.
  - education and life-long learning (new demands on education systems; new, mainly IT-based tools and methods for teaching and learning; the growing need for interaction and co-operation with businesses);
  - environmental issues;
  - quality of life (health, education, demographic changes, especially the growing share and special needs of elderly people, living and working environment, social conflicts, crime prevention, etc.);
  - competitiveness (at national and EU-level for attracting talents and capital, at firm level maintaining and increasing market shares nationally and internationally, etc.);
  - regional[11] disparities, especially in large countries.
- Most policy problems no longer have 'self-evident' solutions. Governments are forced to make use of 'evidence-based policies', policies based on knowledge/insight into what works and what does not. This does not mean that values are no longer of importance. Values are still very important, but have to be considered in the context of a given issue.
- Policy-makers have to learn to cope with growing complexity and uncertainty of policy issues themselves. Thus the precautionary principle is of a growing significance.
- New skills and behaviour are required (e.g. problem-solving, communication and co-operation skills in multidisciplinary, multicultural teams meeting more often only "virtually", as well as creativity) if individuals or organisations are to prosper in this new setting. This, in turn, creates new demands on the education and training system (see above).
- Clusters, networks (business – academia, business – business, both at national, international levels) and other forms of co-operation have become a key factor in creating, diffusing and exploiting knowledge and new technologies, and therefore in satisfying social needs and achieving economic success.
- There is a widening gap between the speed of technological changes and the ability to formulate appropriate policies (which requires a sound understanding of the underlying causes and mechanisms at work.)
- Given the growing political and economic pressures, governments try hard to balance their budgets, while cutting taxes, and hence they need to reduce public spending relative to GDP. In the meantime accountability – why to spend taxpayers' money, on what – has become even more important in democratic societies. Public R&D expenditures are also subject to these demands.
- Policy-makers also have to deal with intensifying social concerns about new technologies (mainly ethical and safety concerns in the case of biotech or nuclear

[11] In this particular point, regional disparities are to be understood as intra-country ones.

technologies, and fears of unemployment and social exclusion caused by the rapid diffusion of information and communication technologies).

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

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

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

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

In sum, participative, transparent, forward-looking methods are needed when decision-makers are trying to find solutions for the above challenges. Foresight – as a systematic, participatory process, collecting future intelligence and building medium-to-long-term visions, aimed at influencing present-day decisions and mobilising joint actions – offers an essential tool for this endeavour. (EC DG Research, 2002) It helps in making choices in an ever more complex situation by discussing alternative options, bringing together different communities with their complementary knowledge and experience. In doing so, and discussing the various visions with a wide range of stakeholders, it also leads to a more transparent decision-making process, and hence provides a way to obtain public support. The process, in which stakeholders communicate and share ideas concentrating on longer-term issues, generate consensus, and co-operate with increased commitment in devising and

realising a national strategy,[12] has been deemed so crucial in several countries that it has become one of the explicit objectives of running a foresight programme. The foresight process can reduce uncertainty, too, because participants can align their endeavours once they arrive at shared visions. Many governments have already realised the importance of foresight activities, and thus this relatively new, and innovative, policy tool is spreading across continents.[13]

3.2. The Specific Needs of the CEE/NIS Countries

The above general considerations apply in catching-up countries in the CEE/NIS region, too.[14] Quite a few pressures – especially the need to change attitudes and norms, develop new skills, facilitate co-operation, balance budgets – are even stronger than in the case of advanced countries. Moreover, most of these countries also have to cope with additional challenges: the need to find new markets; fragile international competitiveness; relatively poor quality of life; brain drain. (Appendix 1) These all point to the need to devise a sound, appropriate innovation policy, and even more importantly, to strengthen their respective systems of innovation. Foresight can be an effective tool to embark upon these interrelated issues, too, if used deliberately in this broader context.

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

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

To conclude, foresight should not be conducted for its own sake – just because it is becoming "fashionable" throughout the world, and currently being promoted by international

---

[12] For the so-called process benefits, that is the 5 Cs, of foresight programmes – indicated by italicised 'c's in the above text –, see Martin [1996].

[13] 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.

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

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

4. Locating Foresight Programmes among Future-Oriented Analyses

Decision-makers, experts and laymen in different historical periods and in different socio-economic systems shared at least one 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.[15] Without going into details here, it is worth recalling some of the major methods/ approaches in order to locate – and distinguish – foresight programmes:

- visionary thinking (in ancient times by prophets, more recently mainly by consultancy services or individuals ['gurus'])
- forecasting (at different levels, using different methods, e.g. trend analysis, extrapolation)
- futures studies (for academic purposes)
- prospective analyses (for business or policy purposes, e.g. [technology] roadmapping, list of critical/ strategic/ key technologies)
- strategy formation (at firm, sectoral, regional or national levels)
- scenario planning (at a firm level; see e.g. Godet [2001])
- indicative national planning
- central planning (at a national level)
- foresight programmes.[16]

Obviously, the above approaches have a number of common characteristics. All of them (a) deal with the future(s) in one way or another; (b) collect and analyse various pieces of information, and (c) can apply a wide range of methods, mainly scientific ones. Three key features can be used to differentiate the above approaches, and thus distinguish foresight programmes from other methods. These approaches can:

- be action-oriented vs. 'contemplative' (passive)
- be participatory vs. non-participatory
- consider alternative futures vs. a single future state (already 'set' by external forces).

---

[15] Hence, a special chapter of the history of mankind can be devoted to these different attitudes, methods and approaches towards the future.

[16] The term 'foresight programme(s)' is used throughout this paper as an attempt to distinguish individual (personal) foresight and 'collective' foresight programmes, i.e. the ones launched (and sponsored) by an organisation (or several ones), and conducted by a number participants. Moreover, an increasing number of articles published by researchers working in the field of future studies, in which 'foresight' is used as a new label for their work (although still following the 'futures studies' or futurology paradigm), see e.g. the recent issues of *Futures*, especially Vol. 36, No. 2. It does not seem to be a productive, promising dispute trying to establish the 'real' meaning of foresight, and then attempting to 'enforce' it across various communities of practice.

Action-oriented endeavours aim at shaping/ influencing/ acting upon the future,[17] while passive ones are 'contemplating' about it (e.g. 'pure' futurologist studies, without any policy implications). In other words, the latter ones merely try to develop a better-informed anticipation of the future, e.g. for being better prepared by having more precise information.

Participatory future-oriented programmes/ projects meet all the three following criteria: they (i) involve participants from at least two different stakeholder groups (e.g. researchers and business people; experts and policy-makers; experts and laymen); (ii) disseminate their preliminary results (e.g. analyses, tentative conclusions and policy proposals) among interested 'non-participants',[18] e.g. face-to-face at workshops, electronically via the internet with free access for everyone, or in the form of printed documents, leaflets, newsletters; and (iii) seek feedback from this wider circle (again, either face-to-face or in a written form). Conversely, if any of these criteria is not met, that activity cannot be regarded a participatory programme or project.

Finally, certain approaches are based on the assumption that the future is not pre-determined yet; and thus the future can evolve in different directions, to some extent depending on the actions of various players and decisions taken 'today'. In other words, there is a certain degree of freedom in choosing among the alternative, feasible futures, and hence increasing the chance of arriving at the preferred (selected) future state. Clearly, there is a close link between being action-oriented and considering alternative futures.[19] Other approaches, on the contrary, can only think of a single future, already 'fixed' by certain factors, and thus the task is to explore (forecast, predict) 'the' future scientifically.[20]

In sum, foresight programmes are action-oriented, participatory and consider alternative futures.

5. A Typology of Foresight Programmes

The 'maturity' of foresight programmes has reached a point, at which they can be classified. (Barré [2001], [2002], Johnston [2002], Renn [2002]) In other words, although no 'optimal' approach or any form of 'best practice' can be identified, taxonomies can be developed to highlight 'good practices': what has worked in certain circumstances (level of socio-economic development, challenges and hence policy aims), and thus what approaches and set of tools are likely to be useful in different environments, for different purposes.

5.1. Simple Ways to Characterise Foresight Programmes

Foresight programmes can be conducted at a macro level (covering the entire socio-economic system), or at a level of particular technologies or some business sectors. They can have

---

[17] E.g. the slogan of the first UK Foresight Programme was: "Shaping our future".

[18] 'Non-participants' are those persons who have not been members of panels or working groups set up by the programme, and have not been involved directly in any other way, e.g. by answering (Delphi) questionnaires.

[19] Some foresight programmes, e.g. the second Swedish Technology Foresight Programme, consider alternative futures with the explicit aim of identifying key choices confronting their 'constituency' or 'target audience', but do not intend to single out any preferred future. In other words, these programmes do not follow a normative approach. (This approach, and the example, has been mentioned by Göran Pagels-Fick among his comments on an earlier draft.)

[20] Cuhls [2003] offers an excellent, comprehensive discussion on the differences between forecasting, prediction, planning and foresight. The possibility of a single future vs. "many" futures is a central element of her analysis.

different geographical scopes, too, i.e. they can be conducted at international (either as group of countries, or collaborating/ neighbouring regions across national borders), national, sub-national regional, local, sectoral or firm (individual firms or business groups) level.

Foresight programmes can have different clients or sponsors. In the case of national programmes, the clients/ sponsors are usually one or more of the following actors:the government (one or more ministries/ government agencies, or the government as a whole)

- business associations
- research and expert communities (e.g. associations of engineers)
- a coalition of some of these actors.

There is no theoretical reason to exclude NGOs or unions among the clients, but for practical reasons – e.g. to be able to influence major decisions – they are more likely to join a coalition, than launch a national foresight programme on their own.

At sub-national regional and local levels, the likely clients/ sponsors are policy-makers; yet, business associations (chambers of commerce) can also join as sponsors, or commission their own foresight programmes.

In principle, firms – individual (large) ones, their groups, entire sectors (chambers) – can also launch foresight programmes (meeting the criteria set in Section 4.1).[21]

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

Foresight programmes can be supported by a number of analytical and participatory methods ranging from desktop research, expert discussions and brainstorming, SWOT, STEEPV and trend analyses, scenario-building, Delphi-survey, to various forms of stakeholder involvement (workshops, consensus-building meetings). Some of them are exploratory in their nature (starting with the present situation and then identifying potential future states), while others are normative ones (describing desirable futures and asking what paths could lead there). In certain contexts, for certain purposes quantitative methods are more relevant, whereas in other cases qualitative ones can or should be used. (Cuhls *et al.* [2002], FOREN [2001])

[21] In practice, however, it is more likely that firms are not inclined to finance participatory programmes.

5.2. Focus of Foresight Programmes

Foresight programmes may have rather dissimilar foci, ranging from the identification of priorities in a strict S&T context to addressing broad societal/ socio-economic challenges.

Georghiou [2001] and [2002] identified three 'generations' of prospective/ strategic technological analyses. This classification is used here as point of departure to develop a typology of foresight programmes to analyse their potential and actual role in policy-making.

The first generation is the classical technological forecasting, aimed at predicting technological developments, based on extrapolation of perceptible trends.[22]

The main aim of a second-generation foresight programme is to improve competitiveness by strengthening academy-industry co-operation, correcting the so-called market failure[23] and trying to extend the usually too short time horizon of businesses.[24]

A third-generation foresight programme tackles broad/er/ socio-economic challenges, and hence besides researchers and business people government officials and social stakeholders are also involved.

Three 'ideal types' of foresight programmes can be defined as major 'reference points'. Identifying 'ideal types' is a long-established practice in social sciences (and somewhat similar to 'models' used in all fields of sciences): "The fact that none of these three ideal types (...) is usually to be found in historical cases in 'pure' form, is naturally not a valid objection to attempting their conceptual formulation is the sharpest possible form."[25] (Weber [1947])

Note, however, that all three ideal types of foresight programmes should meet the criteria defined above in Section 4: they should be action-oriented, participatory and should consider alternative futures. The underlying difference among them is their focus:

- S&T issues: type A foresight programmes
- techno-economic issues: type B foresight programmes
- broad societal/ socio-economic issues: type C foresight programmes.[26]

Their further characteristics, in terms of their aims, rationales and participants, are summarised in Table 1 below. One would notice immediately that these ideal types are not distinguished by their themes (topics): for example, they all deal with S&T issues, but by doing so, they pursue different aims, and follow different (policy) rationales. In other words,

---

[22] These predictions are produced by a relatively small group of experts: futurologists and/or technological experts (that is, other types of expertise or actors are not sought after in the process of forecasting). The main objective is to predict which S&T areas are likely to produce exploitable results. Forecast results, in turn, are used in economic planning, either at firm or macro level.

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

[24] Accordingly, a different set of actors is involved in these programmes: researchers working on various S&T fields and business people, bringing knowledge on markets into the process. These programmes are organised by following the structure of economic sectors (various industries and services).

[25] It is just a coincidence that Weber also talks of three ideal types when discussing legitimate authority.

[26] In short, the most important modification compared to the three generations identified by Georghiou is to replace technology forecasting with foresight programmes focussing on S&T issues. Technology forecasting projects usually do not consider alternative futures, and most of them are not participatory either (as defined above in Section 4). However, there is no reason to assume that S&T issues cannot be tackled in a participatory manner, considering alternative futures, and aiming at informing and influencing present actions. For example, the recent Turkish Foresight Programme – the Vision 2023 Project – has focussed on S&T issues. (Tümer [2004]

they address different challenges, ask different questions, use different approaches/ ways of thinking, and involve different participants. In other words, these ideal types should not be thought of as "Russian dolls": the biggest one, type C incorporating the middle one, i.e. type B, and, in turn, type B encompassing the smallest one (the 'core'), Type A.

Table 1: Foci of foresight programmes

	S&T focus (type A)	Techno-economic focus (type B)	Societal/ socio-economic focus (type C)
Aims	Identify S&T priorities (following the logic of scientific discovery)	Identify research topics in S&T, of which results are believed to be useful for businesses	Identify research topics in S&T, of which results are believed to contribute to addressing major societal/ socio-economic challenges Devise other policies – or identify policy domains, which are relevant – to tackle these societal/ socio-economic issues
Rationale	Boost national prestige, achieve S&T excellence; Following the linear model of innovation, socio-economic benefits might also be assumed; implicitly or explicitly	Business logic: improve competitiveness Correct market failures: strengthen academia-industry co-operation, extend the short time horizon of businesses	Improve quality of life (enhance competitiveness as a means for that) Correct systemic failures, strengthen the National Innovation System
Participants	Researchers, policy-makers (e.g. S&T and finance ministries)	Researchers, business people, (some) policy-makers	Researchers, business people, policy-makers, social stakeholders (lay persons?)

Potential users usually constitute a broader group than the actual participants; they might include e.g. funding organisations, other policy implementation bodies and public service providers (including 'quangos' [quasi-NGOs]), professional associations representing the interests of their members (and thus involving them to some extent in strategy and policy formation processes in various ways), venture capitalists, trade unions, etc. Depending on the focus of a foresight programme (the types of challenges/ issues considered), as well as the political culture of a given country or region, some of these potential users and stakeholders might become participants, too. In any case, it is not possible to establish a one-to-one relationship between an 'ideal type' of foresight and its participants beyond the 'typical' participants indicated in Table 1. The type and number of participants, the methods, channels and for a used their 'internal' and 'external' dialogues,[27] as well as the intensity, quality and impacts of these dialogues is obviously a question for the individual description, analysis or evaluation of actual foresight programmes.

Types A and B programmes have a longer tradition, and thus in general they are better known. Obvious examples are the Turkish Vision 2023 Project (type A) and the first UK Foresight Programme (Type B). (Tümer [2004] and Georghiou [1996], respectively)

Therefore, only type C programmes are explained here in some detail. The shift in focus is reflected in the structure, too: these programmes are organised along major societal/ socio-economic concerns (e.g. health, ageing population, crime prevention in the case of the Hungarian, the first Swedish or the second UK foresight programmes; see Boxes 1-2 in Section 4.3). A new element in the underlying rationale can also be discerned, the so-called systemic failure argument: the existing institutions (written and tacit codes of behaviour, rules and norms) and organisations are not sufficient to improve quality of life and enhance competitiveness, and thus new institutions should be 'designed' by intense communication and co-operation among the participants. In other words, the existing gaps should be bridged by new networks, appropriate policies aimed at correcting systemic failures, and establishing or strengthening relevant organisations. A foresight programme, based on this rationale, can deliver solutions in various forms: by strengthened, re-aligned networks as 'process' results of the programme, as well as by policy recommendations ('products').

An actual foresight programme is likely to combine certain elements from various types. In most cases, however, one type of rationale would be chosen as a principal one; it thus would underlie the more detailed objectives and structure of a programme, as well as the choice of its participants. Otherwise, it would likely to lead to an incoherent – even chaotic – exercise, characterised by tensions between (a) the various objectives, (b) elements of its structure, (c) the objectives and methods, (d) the participants and objectives, and/or (e) among the participants themselves. A certain level of tension, however, might be quite useful – or even essential – to produce creative, innovative ideas and solutions, of course, but too intense and too frequently occurring – structural, inherent – conflicts would most likely tear a foresight programme apart.

[27] Internal dialogues take place among the participants of a given programme, e.g. among panel members, between panels, between panels and the management team, between the steering group and panels – or any other internal groups of participants in case these ones have not existed. External dialogues are organised among the participants and other stakeholders, clients, target groups, etc., i.e. those, who have not participated in the programme in a direct way.

5.3. Coherence of Foresight Programmes

At a first glance, the focus of a foresight programme determines the themes to be discussed/ analysed to a large extent. For instance, as already alluded, typical themes for a technology forecast or a type A foresight programme would be specific fields of science and technology, such as microelectronics, communications, bioinformatics, energy technologies, new materials, bio- and nanotechnology. These topics have been dictated to a non-negligible extent by 'fashion' or fads, too: earlier much had been written on nuclear and space technologies, then came ICT to yield significance, and more recently the fields denoted by prefixes of 'bio-' and 'nano-' have taken the centre stage.

The time horizon can be driven by the dynamics of a given discipline or the imagination (agenda) of the futurists. For the latter, perhaps an extreme example is when Molitor [2000] predicts the weight and height of human beings in 3000. He has also published a book entitled *The Next 1000 Years*. It is not uncommon, however, to try to predict major events in a 50-100 years time horizon.

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

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

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

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

- in a critical (key) technologies programme the emphasis would be on specific technological terrains of this broad field, usually with a 3-5-year time horizon, and hardly any attention would be devoted to social issues (e.g. exclusion – inclusion of certain social groups; gaps between generations, or regions, cities and villages; e-democracy; regulations on, and incentives for, different types of content; etc.);
- a type A foresight programme would also put the emphasis on – the usually assumed positive – technical aspects (including perhaps also the overall impacts on the society in general, i.e. not differentiated/ elaborated by social strata; but not considering the potential impact the other way around, that is, how socio-economic needs and trends would shape technological developments). These programmes opt, however, usually for a significantly longer time horizon (say, 20-25 years) than the one used in a critical (key) technologies programme.
- a type B foresight programme is likely to focus on broader technological fields – as opposed to specific sub-fields analysed by the critical technologies approach.[28] It

[28] Yet, in the first UK programme, IT, electronics and communications were not integrated into a single panel.

would pay much more attention to the economic (market) aspects than the above ones, and perhaps would discuss some social factors, too, as they shape demand, but not much elaboration can be expected on social challenges (either dealing with the new ones caused/ accentuated by ICT or asking how ICT can contribute to tackle existing social challenges). The usual time horizon is around 10-15 years when this approach is chosen.

- a distinctive feature of a type C foresight programme is the marked, deliberate shift towards precisely to those societal/ socio-economic aspects which are neglected by all the other approaches, and thus mentioned above as "negative examples". Technical aspects, however, are not ignored by this approach, either, but discussed in a different context (also usually in a more integrated way, e.g. ICT and various types of media are understood as a complex, closely inter-related entity): other types of questions are asked, and new drivers and shapers come to the forefront. The time horizon, therefore, is also determined by the socio-economic issues identified by the programme: it would depend on the amount of time required to change the underlying settings, to influence the major shaping factors so as to achieve a certain (desirable) future state. (In other words, the time horizon cannot be shorter than the period of time needed for a change aspired by the programme.)

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

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

In sum, although there is a great deal of overlap in terms of broad themes discussed by various types of foresight programmes, a closer look clearly shows that these apparently same topics are dealt with in rather different manners. A different focus means that different approaches are applied when analysing seemingly similar issues: a different set of questions are asked, and hence various – social, technological, economic, environmental and political – factors and values are taken into account to a different degree (some of these factors not at all in certain foresight programmes) by a different set of participants (technology experts, business people, researchers, policy-makers, lay people). The time horizon, in turn, is determined to some extent by the inherent (technical, social, etc.) features of the various themes, but also by the focus (main objectives) of the programme, in which these topics are taken up.

6. Possibilities for International Co-operation

There is an obvious scope for co-operation in the CEE/NIS region. A large number of these countries are relatively small, and have not accumulated much experience with foresight, while facing a number of similar structural challenges. Thus, it can be extremely useful to exchange experiences on methods applied in various countries, as well as identifying success

and failure factors. Moreover, some analytical activities on issues going beyond national borders might also be harmonised if there is a mutual interest in doing so. In other words, co-operation cannot, and should not, be imposed upon the region (or group of countries in the region) by any national or international player. However, various international organisations, notably the EU and UNIDO, as well as national governments and professional associations might play a crucial role in facilitating this co-operation, contributing significantly to achieve synergies and economies of scale in a number of ways.

A well-designed co-operation among the players would assist local (national) capacity building and regional (trans-border) networking. It can take different forms, and the subject and degree of co-operation is likely to vary project by project. The overarching objective should be facilitating future co-operation among major players by establishing good, mutually beneficial working relations, i.e. building trust through actual co-operation during the national/ regional foresight programmes.

We can think of three broad types of international co-operation. The obvious possibilities for *methodological* co-operation are as follows:

- informal or semi-formal methodological co-operation: transfer of methodological experience/ expertise at face-to-face meetings, discussions, seminars organised for the clients, participants;
- formalised methodological co-operation: following the same set of methods, e.g. in the frame of a project, but not aligning the content/ substance of the programme.

In either case, the main objective should be to promote interactive learning through joint, tailored workshops (i.e. not a one-way flow of codified knowledge at traditional training seminars) to develop skills and generate shared tacit knowledge. The most important issues are the benefits and drawbacks of various foresight techniques (methods) in the context of catching-up.

A second type of regional co-operation would produce joint *background* analyses, in order to exploit economies of scale (compensating for insufficient intellectual resources in highly specialised fields, be they technical, socio-economic or policy expertise). Some possibilities to kick-off this type co-operation are:

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

The third type of international co-operation is the most ambitious one, when the themes/ issues of actual foresight programmes are 'aligned':

- jointly designed, simultaneously run national/ regional programmes, analysing the same or similar topics/ themes and applying the same methods, relying on nationally/ regionally organised panels, working groups, etc. In this case, comparative analysis of results might be conducted at the end of the programme (nationally and/or by a small, international group of experts).

- truly co-operative, jointly designed, organised and financed multi-country [or inter-regional] programmes, analysing one set of topics/ themes (at a multi-country 'regional' level, i.e. not for separate countries or 'intra-country' regions) and applying one set of methods, involving participants from a number of countries, who are working closely together, e.g. as members of the same panel, and producing and analysing the findings together, during programme as a core activity (as apposed to the above type, when this analysis is a separate, 'optional' activity).

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

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

International co-operation, however, poses a significant challenge, too: the broader the geographic scope of a programme is, the more difficult and costly is to maintain its participatory character. Moreover, when participants are coming from different countries – in terms of level of development, norms, ways of thinking, values, behavioural routines – it is not only a question of travel time and costs to organise and facilitate meaningful workshops. Potential communication problems should be taken into account carefully when preparing these meetings: possible gaps should be identified in advance, and efforts have to be made to bridge them as well as to remove other obstacles to fruitful discussions. Of course, not all the problems can be envisaged, i.e. some 'slack' (e.g. extra time for clarification, reconciliation, other means to exchange ideas) should be allowed for that.

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

7. Summary and Recommendations

7.1. Concluding Remarks

Decision-makers face increasingly complex issues, given that economic, technological environmental – and thus social – challenges are brought to any nation sate rather quickly, due the forces of globalisation, and these challenges are usually inherently inter-linked. Technological changes cause economic, environmental and social threats and opportunities; economic resources are required to finance public policies aimed at tackling these issues (e.g. harnessing technological change, preventing environmental crises, preventing social explosions, etc.); and government policies are under ultimate social control (in democratic

societies through a number of institutions, formal and direct, as well as informal and indirect ways, in other cases by more costly, more radical, yet, less frequently applied mechanisms).

Both theoretical considerations and actual cases clearly show that foresight can be a relevant decision-preparatory tool in a number of policy fields – well beyond science and technology. In other words, it is time to embrace this broader notion of foresight. This report has attempted to contribute to the diffusion of this new understanding by distinguishing and discussing three different foci of foresight programmes, namely pure S&T, techno-economic and societal/ socio-economic ones.

Foresight processes can assist decision-makers in this complex environment to reduce technological, economic or social uncertainties by identifying various futures and policy options, make better informed decisions by bringing together different communities with their complementary knowledge and experience, obtain public support by improving transparency, and thus improve overall efficiency of public spending.

It is crucial to prove the relevance of foresight for decision-making: its timing and relevance to major issues faced by societies, as well as the quality of its 'products' – reports and policy recommendations – are critical. Only substantive, yet carefully formulated proposals can grab the attention of opinion leaders and decision-makers, and then, in turn, the results are likely to be implemented. Otherwise all the time and efforts of participants put into a programme would be wasted, together with the public money spent to cover organisational and publication costs. The so-called process results – e.g. intensified networking, communication and co-operation among the participants – still might be significant even in this sad case, but they are less visible, and much more difficult to measure. Thus, the chances of a repeated programme – when it would be due again given the changes in the circumstances – are becoming really thin.

Besides Foresight, there are a number of other useful ways, techniques, and methods to assist strategic (long-term) policy processes and strategic decision-making (for businesses). The selection of methods should be based on the policy or strategy issue, i.e. none of these methods is superior to any other ones *a priori* – the context (challenges to be tackled, resources, competence and time available, etc.) should drive the decision as to what approaches and method(s) are adequate, and hence to be applied.

It is strongly recommended, however, to maintain a clear distinction among the various approaches, ways, methods and techniques aimed at analysing future developments. In other words, confusing foresight with other future-oriented analyses is likely to lead to ill-defined programmes, methodological deficiencies, erroneous analyses and flawed proposals. Clients, sponsors, and participants of foresight programmes, in turn, would be disappointed, disillusioned.

Foresight is a relevant decision-preparatory tool in emerging countries, too, not being in the forefront of technological development. A number of factors seem to contradict this conclusion at the first glance. Foresight is costly in terms of time and money, but even more so in terms of the participants' time required by meetings, workshops and surveys. Moreover, 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, 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.

CEE/NIS countries are faced a number of specific challenges, most importantly due to their transition processes (fundamental political, economic and social changes), as well as to major changes in their external environment. Given these specific factors, there are even stronger needs for strategic thinking in CEE/NIS than in the advanced countries. Yet, long-term thinking is discredited (due to the failure of central planning) in most of these countries. Policy-makers do not rely on modern decision-preparatory tools to a sufficient extent, and quite often do not realise the close interconnections between RTDI processes and socio-economic development. Thus, in many cases, they are only willing to spend on R&D when "we can afford" – although it should be the other way around: "we spend on promoting RTDI processes, because we want to foster wealth creation". Science, technology and innovation policies are isolated (often the latter one does not even exist as an explicit policy field), and major economic policies are not co-ordinated with STI policies.

For these reasons one cannot observe strong commitment for profound foresight programmes in CEE/NIS, that is, sound, in-depth consideration and determined implementation of policy recommendations, accepting/ introducing a new decision-preparatory and decision-making culture, along with a new way of thinking, with more emphasis on communication, co-operation, consensus, and joint commitments to take action.

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

7.2. Recommendations for the UNIDO Regional TF Initiative

On the basis of the above discussion and previous UNIDO documents, as well as relying on the results of the preparatory meetings held in Budapest and Vienna, the following recommendations are proposed concerning the overall approach (policy rationale) of the UNIDO Regional TF Initiative for the CEE/NIS regions, the components and activities of the Initiative, the division of labour among the focal points and the role and responsibilities of the service unit:

7.2.1. Immediate objectives

The immediate objectives of the UNIDO regional TF initiative are: (a) to raise awareness of (technology) foresight for enhancing competitiveness by exploiting emerging and future trends in science and technology, and thus contributing to improved quality of life; (b) to adopt and adapt methodologies and tools for technology foresight in the region, and develop/ test methods required by international co-operation; (c) to establish and strengthen national and regional knowledge as well as the capability of using technology foresight for designing policies and strategies that focus on innovation; (d) to initiate regional foresight projects on specific sectors or themes so as to demonstrate its relevance, as well as the practical use of various methods, programme design and execution, etc; and (e) to provide solutions to relevant problems in the region that can be addressed through the appropriate application of

technology. Special attention will be given to pre-accession and late-accession countries to the European Union.

7.2.2. The overall approach

Regional dimension

A special feature of the UNIDO Technology Foresight concept is the *regional dimension.* The core idea of all regional initiatives, including this one, is to use the foresight process as a tool for assisting strategic decision-preparatory processes, with a strong emphasis on RTDI issues.

Nevertheless, it has to be taken into account that many technology foresight programmes are undertaken with the assumption that specific technological developments take place within the borders of socio-economic systems, and its effects should be beneficial to the society. This means that final policy decisions will always have a national (or intra-country regional) character, since it is at this level that strategic political or business decisions are made.

As discussed above in Section 6, however, international co-operation can be highly beneficial in general, and for emerging economies, in particular. Thus, there are several reasons that justify the regional approach, understood here as co-operation among CEE/NIS countries (not necessarily all of them in the same project, though), or among regions located in these countries. In other words, the principle of *'variable geometry'* is to be followed: the geographic coverage of actual projects would depend on the nature of the issue to be tackled, the willingness of CEE/NIS countries to participate, their skills, financial and intellectual resources, and most importantly the perceived benefits of the project.

The major benefits of being engaged in regional foresight programmes are as follows:

- tackling issues of regional (trans-border) character jointly, and thus creating shared visions and opportunities for joining forces for strategic actions, including regional RTDI co-operation;
- compensating for underdeveloped or lacking methodological skills;
- creating synergies (both in terms of conducting actual foresight projects, and implementation of the policy recommendations);
- saving costs (by exploiting economies of scale, e.g. background analyses and preparatory activities relevant for a group of countries, regions, as well as common awareness building and training);
- capacity building (foresight and prospective analyses methods, decision-preparation, policy-making; policy implementation);
- promoting regional (trans-border) networking;
- reaching the necessary quality and size of experts when collecting their opinion.

Notwithstanding the advantages of the regional approach, as already stressed, it cannot be imposed upon the partners. It can only be applied in a demand-driven manner and when and where its implementation is feasible, and the socio-economic situations among the related countries are relatively comparable.

The regional dimension of the UNIDO TF initiative also facilitates catching up economies to be aware of global and regional trends, which could bring advantages and challenges for them.

The ultimate objective envisioned by UNIDO TF regional initiatives is to make a step forward by identifying regional consequences and uses based on the national foresight

programmes in progress, in such a manner that the experiences accumulated in a given region, along with the contributions brought in by international experiences, may facilitate a process of joint reflection on key issues that may affect several countries. For this purpose, certain productive chains and/or areas of knowledge, that present a common interest for more than one country in a region, can be selected for jointly run foresight programmes. The result to be achieved is the identification of the broad trends of technological evolution capable of influencing these production and innovation chains (networks) over the medium and long-term, and thereby to facilitate strategic decision-making in relation to these tendencies in each country. At present, UNIDO is supporting foresight studies at the regional level in the following production chains and sub-regions:

- fishery industry in the Pacific coast of South America;
- automotive industry in Central Europe;
- agri-food industry in Central and Eastern Europe.

In consequence, one of the greatest potential achievements of UNIDOO's regional foresight approach is its contribution to (re-)structure the sectoral systems of production and innovation in the target region, in this case in the CEE/NIS region.

Foresight in the broader policy context

As already emphasised throughout this report, Foresight should be understood and conducted as a decision-preparatory tool in the context of STI policies and broader socio-economic development strategies – or in the context of strategic planning, if run by/ for businesses. In other words, it should not be conducted just for the sake of running a foresight programme (because it is fashionable; promoted or even financed by international organisations; or 'peer' countries, regions have already conducted it, etc.) Thus, whenever it is possible and meaningful, the use of other elements of the policy tool box – such as, collection and analyses of relevant data; devising policies; evaluation of policy programmes; assessing and monitoring projects; technology assessment; etc. – should be stressed, e.g. at awareness raising events and training seminars.

Foresight and other prospective (analysis) techniques

It is recommended to focus on Foresight activities (as defined and explained in Sections 3-4), and thus keeping a clear distinction between Foresight and other prospective techniques (e.g. key or critical technologies, technology forecasting, technology road-mapping, etc.) However, when there is a well-defined need from the partner countries, to use some of these other prospective techniques, a thorough consideration should be given to those initiatives. In case of finding good reasons to co-operate in those types of projects because of the potential benefits, it would be sensible to embark upon these projects, too, although they are beyond the scope of Foresight.

Again, whenever it is possible and meaningful, these other prospective techniques/ approaches can be disseminated, e.g. at awareness raising events and training seminars.

7.2.3. Components

This regional TF initiative involves the promotion of the concept among the various stakeholders (policy-makers, businesses, researchers, other experts, NGOs, etc.); the development of capabilities by training and re-training (would-be) practitioners; and the co-ordination and implementation of foresight (prospective) projects in the regions, by offering hands-on experience with different methodologies. To support these activities, regional

facilities are already under development and further resources will be mobilised to develop and promote a foresight culture.

Over several years, this initiative has already organised training seminars and developed training materials, and set up a regional database of interested specialists. Regional and sub-regional steering groups and focal points have been established to co-ordinate and implement regionally conceived foresight projects. Promotional materials and events have been organised to familiarise stakeholders with the concept, the practice and the results of various foresight activities.

A) Awareness-building and creation of foresight culture in the CEE/NIS region

On the basis of a regional technology foresight network, UNIDO prepares and disseminates promotional and general information to demonstrate the use and relevance of foresight for CEE/NIS countries to policy-makers, businesses, R&D institutes, professional associations as well as representative organisations of the general public, e.g. NGOs. This is done through conferences, fora, publications, electronic books, the Internet and the mass media. Special attention has been given to motivating industry to participate in the initiative. In terms of the scope of the exercise, foresight programmes conducted in other regions are examined, summarised, and adapted to regional perspectives; promotional materials are produced; events are organised to familiarise stakeholders with the overall concept, the various approaches, the practice and the results of regional foresight activities; hands-on experience are disseminated to show how successful different approaches are, demonstrating the value of the results to stakeholders. The main target is to build the foresight culture into the thinking of present and future generations of decision-makers in all fields, and policy-makers, in particular.

B) Development of national and regional capabilities

The initiative supports the creation and strengthening of national and sub-regional centres of excellence on foresight process, which could be mobilised for the preparation of foresight programmes and studies on foresight methods. It develops a roster of regional and international experts on foresight and relevant areas of knowledge. Various activities are dedicated to enhance the skills of foresight practitioners through courses, workshops, seminars, fellowships and study tours. For this purpose, the UNIDO develops exchange programmes with regional centres and institutes in other regions. Special attention is given in conducting selected foresight projects to demonstrate the applicability of foresight approaches and their added value for the development of national and regional policies related to common issues or themes. A regional virtual "centre" (or network) has been established to function as a repository of foresight knowledge and experience to maintain these activities in the region for the long-term. The Regional Virtual Centre (RVC) on Foresight is composed of the focal points, the service unit, and it is guided by the Steering Committee and the Managing Board.

C) Co-ordination and implementation of foresight programmes and studies on foresight

Dedicated fund-raising is conducted to create appropriate financing mechanisms, such as a multi-partner funding. A regional Steering Committee should be established to co-ordinate regionally conceived foresight projects, to be implemented by the national focal points and other experts. Such co-ordinating bodies will initiate regional foresight activities with a view to motivating national actors to adopt shared foresight objectives, methodologies, infrastructure and management teams, and using foresight in the design of STI and other policies. Ideally, the national focal points will be equipped with the necessary human resources, organisational capacity, experience in the field, and have direct access to decision-

making bodies. The regional initiative makes strong use of information and communication technologies. UNIDO plays a role of overall co-ordination and the coordinating mechanism promotes contributions that are both creative and innovative from the members of the regional network of experts.

7.2.4. Activities

The above three main components consist of a number of activities:

A) Awareness-building and creation of foresight culture in the CEE/NIS region

- Management of information on Technology Foresight, Technology Forecasting, Technology Road-mapping, Critical Technologies, Technology Assessment, and Evaluation of prospective programmes (including TF projects and TF methods)
- Operating an Internet portal and database; as well as other IT facilities
- Organisation of Regional Technology Foresight & Prospective summits and the "Fair of Future" every three years
- National awareness-building seminars
- Marketing and dissemination of the various activities of the Regional TF Initiative (online and paper based, e.g. leaflets and brochures)
- Translation of documents to different languages

B) Development of national and regional capabilities

- Preparation of training materials on Technology Foresight, incl. other prospective techniques, when relevant (re-organising/updating existing materials, as well as addressing new topics)
- Organisation of education and training programmes on Technology Foresight (incl. other prospective techniques, when relevant)
- A closely related activity is to develop and test a new training, namely Module 5: Training of trainers; and then to organise it in several countries, in order to develop training materials in various languages
- Exploitation of existing training infrastructure (such as KPI and Forlearn e-books, on-line courses, EFMN case studies)
- Promotion of curriculum development in order to include TF and other prospective techniques in higher education courses in the region
- Promotion of the creation of prospective analysis units/teams at public agencies, industry associations and academia

C) Co-ordination and implementation of foresight programmes and studies on foresight

- Promotion of networking among experts and organisations in the field of TF and other prospective analyses
- Initiating/ commissioning studies on TF and other prospective analysis (methods, efficiency, implementation, etc.), incl. international comparative studies, and communication of the results to decision-makers, experts, and the general public
- Conducting studies on TF and other prospective analysis (methods, efficiency, implementation, etc.), incl. international comparative studies, and communication of the results to decision-makers, experts, and the general public

- Provision of advice and co-ordination of TF and other prospective programmes/ projects in the CEE/NIS region, with special emphasis upon the national TF centres of the region
- Conducting TF and other prospective programmes/ projects (at various levels) and communicate results to decision-makers, experts, and general public
- Fund raising for the above activities
- Establishment of management, co-ordination and monitoring of the above activities

7.2.5. Proposed division of work among the partners

Components	Activities	RVC			
		SU	FPs	SC	MB
Awareness-building and creation of Foresight culture	Management of information on TF, Technology Forecasting, Road-mapping, Critical Technologies, Technology Assessment, and Evaluation of prospective programmes		TC		
	Operating an Internet portal and database; other IT facilities		TC		
	Organisation of Regional TF & Prospective summits and the "Fair of Future" every three years	√			
	National awareness-building seminars		all		
	Marketing and dissemination of the various activities of the Regional TF Initiative (online and paper based)	√	all		
	Translation of documents to different languages		all		
Development of national and regional capabilities	Preparation of training materials on Technology Foresight, incl. other prospective techniques, when relevant (re-organising/updating existing materials, as well as addressing new topics)		PREST, IE HAS, host org.		
	Organisation of education and training programmes on TF (incl. other prospective) techniques		PREST, IE HAS, host org.		
	Development and test a new training, namely Module 5: Training of trainers; and then to organisation of it in several countries		PREST, IE HAS, host org.		
	Exploitation of existing training infrastructure (such as KPI and Forlearn e-books, e-courses, EFMN case studies)		all		
	Promotion of curriculum development in order to include TF and other prospective techniques in higher education courses in the region		all		
	Promotion of the creation of prospective analysis units/teams at public agencies, industry associations and academia		all		
Coordination and implementation	Promotion of networking among persons and organisations in the field of TF and other prospective studies	√	all		
	Initiating/ commissioning studies on TF and other prospective analysis, and communication of the results to decision-makers, experts, and the general public	case by case			
	Conducting studies on TF and other prospective analysis, and communication of the results to decision-makers, experts, and the general public	case by case			
	Provision of advice and co-ordination of TF and other prospective programmes/ projects in the CEE/NIS region, with special emphasis upon the national TF centres of the region	case by case			
	Conducting TF and other prospective programmes/ projects, and communication of the results to decision-makers, experts, and general public	case by case			
	Fund raising for the above activities		all	SC	
	Establishment of management, co-ordination and monitoring for the above activities activities			SC	MB

References

Acha, Virginia and Katalin Balázs [1999]: Transitions in thinking: changing the mindsets of policy makers about innovation, *Technovation*, Vol. 19, No. 6-7, pp. 355-64

Aichholzer, Georg [2001a]: Searching for leadership in innovation niches: Technology Foresight in Austria, Proceedings of International Conference on Technology Foresight, NISTEP, 7-8 March 2001, Tokyo, http://www.nistep.go.jp/achiev/ftx/eng/mat077e/html/mat077be.html

Aichholzer, Georg [2001b]: The Austrian foresight program: organization and expert profile, *International Journal of Technology Management*, Vol. 21, No. 7-8, pp. 739-755

Barré, Rémi [2001]: Synthesis of Technology Foresight, in: *Strategic Policy Intelligence: Current trends, the state of play and perspectives*, pp. 71-88, ESTO, IPTS Technical Report Series, EUR 20137 EN, Sevilla

Barré, Rémi [2002]: Foresights and Their Themes: Analysis, typology and perspectives, in: *The role of Foresight in the Selection of Research Policy Priorities*, 13-14 May, 2002, Conference papers, pp. 88-109

Blind, Knut, Kerstin Cuhls and Hariolf Grupp [1999]: Current Foresight Activities in Central Europe, *Technological Forecasting and Social Change*, Vol. 60, No. 1, pp. 15-35

Bucar, Maja and Metka Stare [2002]: Slovenian Innovation Policy: Underexploited Potential for Growth, *Journal of International Relations and Development*, Vol. 5, No. 4, pp. 427-448

Bush, Vannevar [1945]: *Science - the Endless Frontier*, http://www1.umn.edu/scitech/assign/vb/VBush1945.html (originally: Science - the Endless Frontier, A Report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development, July 1945, Wash. DC.: US Government Printing Office)

Cassingena Harper, Jenifer [2003]: EFORESEE Project report on Malta Foresight Pilot: Exploring knowledge futures in information and communications technologies and education in 2020, manuscript, Malta: MCST

Chataway, Joanna [1999]: Technology transfer and the restructuring of science and technology in central and eastern Europe, *Technovation*, Vol. 19, No. 6-7, pp. 345-53

Coates, Joseph F. [1985]: Foresight in Federal Government Policymaking, *Futures Research Quarterly*, Summer 1985, pp. 29-53

Cuhls, Kerstin [2003]: From forecasting to foresight processes: New participative foresight activities in Germany, *Journal of Forecasting*, Vol. 22, No. 2-3, pp. 93-111

Cuhls, Kerstin, Knut Blind and Hariolf Grupp [2002]: *Innovations for our Future, Delphi '98: New foresight on science and technology*, Physica-Verlag, Heidelberg, 2002.

DACCST [1999]: *Dawn of the African Century: A Nation at work through Science and Technology for a better future*, Department of Arts, Culture, Science and Technology: Pretoria

Dodgson, Mark and John Bessant [1996]: *Effective Innovation Policy: A new approach*, London: International Thomson

Dodgson, Mark and Roy Rothwell (eds) [1994]: *The Handbook of Industrial Innovation*, Cheltenham: Edward Elgar

Dosi, Giovanni [1988]: Sources, procedures and microeconomic effects of innovation, *Journal of Economic Literature*, Vol. 26, September, pp. 1120-1171

Dosi, Giovanni, Christopher Freeman and Silvia Fabiani [1994]: The process of economic development: Introducing some stylized facts and theories on technologies, firms and institutions, *Industrial and Corporate Change,* Vol. 3, No. 1, pp. 1-45

Dosi, Giovanni, Christopher Freeman, Richard R. Nelson, Gerald Silverberg, and Luc Soete (eds) [1988]: *Technical Change and Economic Theory*, London: Pinter

EC [2000]: *Innovation policy in a knowledge-based economy*, Luxembourg: Office for Official Publications of the European Communities, EUR 17023

EC [2003a]: *Investing in research: an action plan for Europe*, Luxembourg: Office for Official Publications of the European Communities

EC [2003b]: *European Innovation Scoreboard 2003*, CORDIS *focus* supplement, Luxembourg: European Commission, Enterprise Directorate-General

EC [2004]: *Innovation in Europe: Results for the EU, Iceland and Norway*, Luxembourg: Office for Official Publications of the European Communities

EC [2005]: *European Innovation Scoreboard 2005*, http://trendchart.cordis.lu/scoreboards/scoreboard2005/index.cfm

EC DG Research [2002]: *Thinking, debating and shaping the future: Foresight for Europe*, final report of the High Level Expert Group, Office for Official Publications of the European Communities, Luxembourg

Edquist, Charles (ed.) [1997]: *Systems of Innovations: Technologies, institutions and organizations*, London: Pinter

EP [2002]: Working Document on the state of research in applicant countries and measures needed to ensure their full participation in the framework programme, European Parliament, Committee on Industry, External Trade, Research and Energy, 2082/2002(INI), 27 June

Ergas, Henry [1987]: The importance of technology policy, in: Partha Dasgupta and Paul Stoneman (eds): *Economic Policy and Technological Performance,* Cambridge: Cambridge University Press, pp. 51-96

EURAB [2003]: Enlargement and ERA, European Research Advisory Board, EURAB 02.052 final, 22 January 2003

EUROFORE [2003]: European Foresight Competence Mapping (Pilot) Project, final report, Seville: JRC/IPTS-ESTO

Fageberg, Jan [2003]: The Potential of Benchmarking as a Tool for Policy Learning, *IPTS Report*, No. 71, pp. 13-19

Fagerberg, Jan, David C. Mowery and Richard R. Nelson (eds) [2004]: *The Oxford Handbook of Innovation*, Oxford: Oxford UP

Fleissner, Peter *et al.* [1998]: *Recent national foresight studies*, IPTS: Sevilla

FOREN [2001]: *A Practical Guide to Regional Foresight*, Foresight for Regional Development Network, European Commission, Research Directorate General, Strata Programme, Brussels (also at: http://foren.jrc.es)

Freeman, Christopher [1991]: Networks of innovators, a synthesis of research issues, *Research Policy*, Vol. 20, No. 5, pp.499-514

Freeman, Christopher [1994a]: The economics of technical change: A critical survey, *Cambridge Journal of Economics*, Vol. 18, No. 5, pp. 463-514

Freeman, Christopher [1994b]: Marching to the Sound of a Different Drum, paper presented at the EUNETIC Conference on "Evolutionary Economics of Technological Change: Assessment of results and new frontiers", Strasbourg, 6-8 October

Freeman, Christopher [1995]: The 'National System of Innovation' in historical perspective, *Cambridge Journal of Economics*, Vol. 19, No. 1, pp. 5-24

Freeman, Christopher and Luc Soete [1997]: *The Economics of Industrial Innovation* [3rd edn], London: Pinter

Garvin, David A. [1993]: Building a learning organisation, *Harvard Business Review*, Vol. 71, No. 4, pp. 78-91

Gavigan, James P. and Eamon Cahill [1997]: *Overview of recent European and non-European national technology foresight studies*, IPTS: Sevilla

Georghiou, Luke [1996]: The UK Technology Foresight Programme, *Futures*, Vol. 28, pp. 359-377

Georghiou, Luke [2001]: Third Generation Foresight: Integrating the Socio-economic Dimension, in: *Technology Foresight – the approach to and potential for New Technology Foresight*, Conference proceedings, NISTEP Research Material 77

Georghiou, Luke [2002]: Policy rationales, sponsors and objectives, presentation at the eFORESEE Workshop on *Foresight Basics*, Malta, 24-26 July 2002

Glatz, Ferenc [1998]: Tudománypolitika az ezredforduló Magyarországán (Science Policy at the Turn of the Millennium in Hungary), Budapest: MTA

Glatz, Ferenc [2002]: Akadémia és tudománypolitika a volt szocialista országokban 1922-1999 (Academy of Sciences and Science Policy in the Former Socialist Countries, 1922-1999), *Magyar Tudomány*, Vol. XLVIII, No. 4, pp. 494-506

Godet, Michel [2001]: *Creating Futures: Scenario planning as a strategic management tool*, London: Economica

Grupp, Hariolf [1996]: Foresight in Science and Technology: Selected methodologies and recent activities in Germany, *OECD STI Review*, Special Issue on Government Technology Foresight Exercises, No. 17, pp. 71-100

Grupp, Hariolf and Harold A. Linstone [1999]: National Technology Foresight Activities Around the Globe: Resurrection and New Paradigms, *Technological Forecasting and Social Change*, Vol. 60, No. 1, pp. 85-94

Havas, Attila [2000]: Changing Patterns of Inter- and Intra-Regional Division of Labour: Central Europe's long and winding road, in: J. Humphrey, Y. Lecler, M. Sergio Salerno (eds): *Global Strategies and Local Realities: The Auto Industry in Emerging Markets*, Basingstoke: Macmillan, 2000, pp. 234-262

Havas, Attila [2002]: Does Innovation Policy Matter in a Transition Country? The case of Hungary, *Journal of International Relations and Development*, Vol. 5, No. 4, pp. 380-402

Havas, Attila [2003a]: Evolving Foresight in a Small Transition Economy, *Journal of Forecasting*, Vol. 22, No. 2-3, pp. 179-201

Havas, Attila [2003b]: The Relevance of Foresight for Accession Countries and Possibilities for Co-operation, *IPTS Report*, No. 73, pp. 4-11

Havas, Attila [2004]: A nemzeti innovációs rendszer erősítése (Strengthening the Hungarian National Innovation System), mimeo, Institute of Economics, Hungarian Academy of Sciences

Johnston, Ron [2002]: The State and Contribution of International Foresight: New challenges, in: *The role of Foresight in the Selection of Research Policy Priorities*, 13-14 May, 2002, Conference papers, pp. 59-74

Joss, Simon and Sergio Belluci (eds) [2002]: *Participatory Technology Assessment: European perspectives*, London: Centre for the Study of Democracy, University of Westminster

Keenan, Michael [2003]: Strategic Framework for Scoping Technology Foresight, in: UNIDO [2003], pp. 34-52

Klusacek, Karel [2004]: Technology foresight in the Czech Republic, *Int. J. Foresight and Innovation Policy*, Vol. 1, No. 1-2, pp.89-105

KSH [2003]: Innováció 1999-2001 (Innovation 1999-2001), Budapest: Központi Statisztikai Hivatal (Central Statistical Office)

Kubielas, Stanislaw [2003]: Polish Macroeconomic and S&T Policies: Interlinkages for Growth and Decline, *Journal of International Relations and Development*, Vol. 6, No. 2, pp. 156-184

Kuwahara, Terutaka [1996]: Technology Foresight in Japan: A new approach in methodology and analysis, *OECD STI Review*, Special Issue on Government Technology Foresight Exercises, No. 17, pp. 52-70

Kuwahara, Terutaka [1999]: Technology Forecasting Activities in Japan, *Technological Forecasting and Social Change* Vol. 60, No. 1, pp. 5-14

Kuwahara, Terutaka [2004]: Technology Foresight in Japan, presentation at a UNIDO Seminar on *Technology Foresight Methods and Practices for Ukraine*, 31 August – 4 September, Kiev

Lipsey, Richard G. and Kenneth Carlaw [1998]: Technology policies in neo-classical and structuralist-evolutionary models, *STI Review*, No. 22, pp. 31-73

Lundvall, Bengt-Åke and Mark Tomlinson [2002]: International benchmarking as a policy learning tool, in: Maria João Rodrigues (ed.): *The New Knowledge Economy in Europe*, pp. 203-231, Cheltenham: Edward Elgar

Lundvall, Bengt-Åke and Susana Borrás [1999]: *The Globalising Learning Economy: Implications for Innovation Policy*, Luxembourg: Office for Official Publications of the European Communities

Lundvall, Bengt-Åke, Björn Johnson, Esben Sloth Andersen, Bent Dalum [2002]: National systems of production, innovation and competence building, *Research Policy*, Vol. 31, No. 2, pp. 213-231

Malerba, Franco [2002]: Sectoral systems of innovation and production, *Research Policy*, Vol. 31, No. 2, pp. 247-264

Martin, Ben [1996]: Technology Foresight: A review of recent government exercises, *OECD STI Review*, Special Issue on Government Technology Foresight Exercises, No. 17, pp. 15-50

Martin, Ben and John Irvine [1989]: *Research Foresight: Priority-setting in science*, Pinter Publishers: London and New York

Martin, Ben and Ron Johnston [1999]: Technology Foresight for Wiring up the National Innovation System: Experiences in Britain, Australia and New Zealand, *Technological Forecasting and Social Change*, Vol. 60, No. 1, pp. 37-54

Meske, Werner, Judit Mosoni-Fried, Henry Etzkowitz and Gennady A Nesvetailov (eds) [1998]: *Transforming Science and Technology Systems – The Endless Transition?*, NATO Science Series, Amsterdam: IOS Press

Metcalfe, Stanley J. and Luke Georghiou [1998]: Equilibrium and evolutionary foundations of technology policy, *STI Review*, No. 22, pp. 75-100

Molitor, Graham T.T. [2000]: Five Economic Activities Likely to Dominate the New Millennium: III Life Sciences Era, *Technological Forecasting and Social Change*, Vol. 65, No. 3, pp. 297-310

Müller, Karel [2002]: Innovation Policy in the Czech Republic: From Laissez Faire to State Activism, *Journal of International Relations and Development*, Vol. 5, No. 4, pp. 403-426

Nauwelaers, Claire and Alasdair Reid [2002]: Learning Innovation Policy in a Market-based Context: Process, Issues and Challenges for EU Candidate-countries, *Journal of International Relations & Development*, Vol. 5, No. 4, pp. 357-379

Nelson, Richard R. (ed.) [1993]: *National Innovation Systems: A comparative study*, New York: Oxford University Press

Nelson, Richard R. [1995]: Recent evolutionary theorizing about economic change, *Journal of Economic Literature*, Vol. 33, January, pp. 48-90

Nelson, Richard R. and Sidney G. Winter [1982]: *An Evolutionary Theory of Economic Change*, Cambridge, Mass.: The Belknap Press of Harvard University

Niosi, Jorge [2002]: National systems of innovation are "x-efficient" (and x-effective): Why some are slow learners, *Research Policy*, Vol. 31, No. 2, pp. 291-302

OECD [1992]: *TEP: The Key Relationships*, Paris: OECD

OECD [1997]: *Creativity, Innovation and Job Creation*, Paris: OECD

OECD [1998]: New Rationale and Approaches in Technology and Innovation Policy, *STI Review*, No. 22

OECD [2000]: *Science, Technology and Industry Outlook 2000*, Paris: OECD

OECD [2001a]: *OECD Science, Technology and Industry Scoreboard: Towards a knowledge-based economy*, 2001 edition, Paris: OECD

OECD [2001b]: *Innovative Networks: Co-operation in national innovation systems*, Paris: OECD

OECD [2002]: *Science, Technology and Industry Outlook 2002*, Paris: OECD

OST [1998]: *The Future in Focus: A summary of national foresight programmes*, HMSO: London

Pavitt, Keith [1984]: Patterns of technical change: Towards a taxonomy and theory, *Research Policy*, Vol. 13, No. 6, pp. 343-373

Pavitt, Keith [1991]: What makes basic research economically useful?, *Research Policy*, Vol. 20, No. 2, pp. 109-119

Pavitt, Keith [1998]: The social shaping of the national science base, *Research Policy*, Vol. 27, No. 8, pp. 793-805

Radosevic, Slavo [1994]: Strategic technology policy for eastern Europe, *Economic Systems*, Vol. 18, No. 2, pp. 87-116

Radosevic, Slavo [1998]: The transformation of national systems of innovation in Eastern Europe: Between restructuring and erosion, *Industrial and Corporate Change*, Vol. 7, pp. 77-108

Radosevic, Slavo [1999]: Restructuring and Reintegration of S&T Systems in Economies in Transition, final report, TSER project, Brighton: SPRU

Radosevic, Slavo [2002]: Introduction: Building the Basis for Future Growth - Innovation Policy as a Solution?, *Journal of International Relations & Development*, Vol. 5, No. 4, pp. 352-356

Reid, Alasdair, Slavo Radosevic and Claire Nauwelaers [2002]: *Innovation Policy in Six Applicant Countries: The challenges*, Luxembourg: European Commission, Innovation Papers No. 16, also available at http://www.cordis.lu/innovation-smes/src/studies.htm

Renn, Ortwin [2002]: Foresight and Multi-level Governance, in: *The role of Foresight in the Selection of Research Policy Priorities*, 13-14 May, 2002, Conference papers, pp. 35-45

Salo, Ahti and Kerstin Cuhls (eds) [2003]: Special Issue on Technology Foresight, *Journal of Forecasting*, Vol. 22, No. 2-3

Salter, Ammon J. and Ben R. Martin [2001]: The economic benefits of publicly funded basic research: a critical review, *Research Policy*, Vol. 30, No. 3, pp. 509-532

Shin, Taeyoung [1998]: Using Delphi for a Long-Range Technology Forecasting and Assessing Directions of Future R&D Activities in Korea, *Technological Forecasting and Social Change*, Vol. 58, No. 1-2, pp.125-154

Shin, Taeyoung [2004]: Korean Delphi for Technology Forecasting and S&T Planning, presentation at a UNIDO seminar on *Technology Foresight for Organizers*, 13-17 December, Gebze, Turkey

Smith, Keith [1997]: Economic Infrastructures and Innovation Systems, in: Edquist, Charles (ed.) [1997], pp. 86-106

Smith, Keith [2001]: Comparing economic performance in the presence of diversity, *Science and Public Policy*, Vol. 28, No. 4, pp. 267-276

Smith, Keith [2002]: What is the 'Knowledge Economy'? Knowledge intensity and distributed knowledge bases, *UNU/INTECH Discussion Paper Series*, 2002-6

Teubal, Morris [1998]: Enterprise restructuring and embeddedness: An innovation systems and policy perspective, paper presented at INTECH Conference on *The Economics of Industrial Structure and Innovation Dynamics*, Lisbon, 16-17 October

Tidd, Joe, John Bessant and Keith Pavitt [1997]: *Managing Innovation: Integrating technological, market and organizational change*, Chichester: John Wiley & Sons

TrendChart on Innovation, CEE country reports, http://trendchart.cordis.lu/

Tümer, Turgut [2004]: Technology Foresight in Turkey: Vision 2023 Project, presentation at a UNIDO seminar on *Technology Foresight for Organizers*, 13-17 December, Gebze, Turkey

UNIDO [2003]: Technology Foresight Methodologies, text book, Regional Initiative for Central and Eastern Europe (CEE) and the Newly Independent States (NIS), Capacity Building Component, Training Module 2, Vienna: UNIDO

Weber, Max [1947]: Legitimate Authority and Bureaucracy, in: *The Theory of Social and Economic Organisation* (translated and edited by A.M. Henderson and T. Parsons), pp. 328-340, Free Press {reprinted in D.S. Pugh (ed.) [1985]: *Organization Theory: Selected readings*, pp. 15-27, London: Penguin Group}

ESTABLISHMENT OF A TECHNOLOGY FORESIGHT (TF) REGIONAL VIRTUAL CENTRE (RVC) FOR THE CEE/NIS COUNTRIES: INTERNATIONAL ASPECTS

Scoping Report*

Prepared by Michael Keenan, PREST, University of Manchester
Vienna, September 2006

* This document has been produced without formal editing.

Acknowledgments

This paper was prepared by Michael Keenan, PREST, University of Manchester (UK) under the project on Regional Virtual Center on Technology Foresight for Central Easter Europe and Newly Independent States (RVC CEE/NIS), funded jointly by UNIDO and governments of Czech Republic, Hungary, Slovakia and Turkey under the supervision of Ricardo Seidl da Fonseca.

TABLE OF CONTENTS

1. INTRODUCTION

This report presents a scoping study in support of the launch of a Regional Virtual Centre (RVC) for Technology Foresight (TF) in the countries of Central and Eastern Europe and the Newly Independent States (CEE/NIS). As such, it is intended to feed into a strategy process that will shape the work programme of the RVC, which will in turn shape the UNIDO TF Programme for CEE/NIS countries over the coming 2-3 years.

1.1 Objectives

The RVC is intended to enable a CEE/NIS regional exchange of experiences and best practices on applying Technology Foresight efforts and programmes as important tools for governments, enterprises and research communities in the promotion of competitiveness, innovation and strategic decision making. Bearing this in mind, the objectives of this report are as follows:

1. Identification of areas to be covered by the 2006-2008 UNIDO TF Programme for CEE/NIS, with respect to the following items:
    - Needs and opportunities for support of TF programmes in the CEE/NIS
    - Compilation of ongoing and envisaged programmes promoted by other organisations/institutions
    - Identification of areas of interest for UNIDO
    - Indication of possible connections and coordination between UNIDO and other organisations/institutions
2. Identification of focal points on TF to participate in the RVC
3. Suggestions for funds mobilization, with identification of possible sources of funding

The report deliberately focuses upon international aspects of the proposed RVC.

1.2 Approach

The compilation of this report has relied upon three main sources of information:

a. Analysis of documents and reports gleaned largely from a wide range of web sites.

b. Consultation[1] with a select group of existing knowledgeable persons on TF in CEE/NIS countries. A list of those consulted is given below.

c. The author's existing knowledge and experience of foresight in the CEE/NIS region, as well as his familiarity with EC and UNIDO initiatives in the area of TF.

Country[2]	Interviewee	Affiliation
Bulgaria	Daniela Tchonkova	ARC Fund
Czech	Karel Klusacek	Technology Centre Prague, Czech Academy of Sciences

[1] Consultations have been conducted face-to-face, on the phone, and via an email survey during July 2006.
[2] For the time being, no suitable candidates for consultation have been identified in the Western Balkans, the Caucasus, and the Central Asian Republics.

Republic		
EC	Fabiana Scapolo	JRC-IPTS
Estonia	Rene Tonnisson	Institute of Baltic Studies
Hungary	Attila Havas	Institute of Economics, Hungarian Academy of Sciences
Latvia	Arturs Puga	Forward Studies Unit, Latvian Union of Scientists
Poland	Michal Miedzinski	Technopolis Group
Poland	Sylwia Melanowicz-Kielbiewska	Ministry of Science and Higher Education
Romania	Dan Grosu	National School for Political Studies and Administration
Russia	Alexander Sokolov	Institute for Statistical Studies and Economics of Knowledge, State University - Higher School of Economics
Turkey	Ozcan Saritas	Istanbul Technical University
Ukraine	Mihailo Zgurovsky	Kyiv Polytechnic Institute
Ukraine	Svetlana Demyanova	Donetsk National University

2. FORESIGHT NEEDS AND OPPORTUNITIES IN THE REGION

The need for foresight in the CEE/NIS region is substantial, yet opportunities for organising foresight exercises are few and far between. This is largely because the need for strategic futures-thinking is rarely appreciated, whilst at the same time, awareness of the available tools and approaches tends to be extremely low. Moreover, financial constraints often mean that strategic activities such as foresight are viewed as 'luxuries' that cannot be afforded. This picture is typically reproduced, irrespective of whether the scientific community, public policy makers, or the business community are considered.

Among the many orientations of foresight, Technology Foresight (TF) faces particular hurdles. Although the precise picture varies greatly from one country to another across the CEE/NIS region, common problems include low spending on R&D and innovation by the private sectors, out-dated and often decaying research and technological infrastructures, brain drains from east to west, an outstanding need for institutional reform and R&D selectivity in the public sector, and a misunderstanding on the nature of innovation. Together, these conditions instil a sense of perpetual crisis, certainly among scientific communities. Yet, this sense of crisis has largely failed to translate into a proactive and systematic search for alternatives (for example, through the use of TF).

A study carried out for the European Commission (Keenan and Scapolo, 2004) identified a number of potential barriers to the adoption of foresight in CEE countries that needed to be overcome. These barriers included:

- The current lack of coordination and consensus within fragmented innovation systems. In other words, some of the problems that foresight is said to be able to address are also thought to be significant barriers to the successful deployment of foresight;
- Unfamiliarity and lack of awareness of foresight as a concept within the wider society, but also specifically amongst policy makers;

- Scepticism or lack of understanding of foresight's uses amongst policy makers and other decision makers;
- Difficulty in relating foresight to existing national development programmes;
- Perceived lack of time to invest in activities like foresight;
- Perception that foresight is a too complex activity to undertake;
- Insufficient skills locally available to conduct foresight successfully; and
- Lack of financial resources.

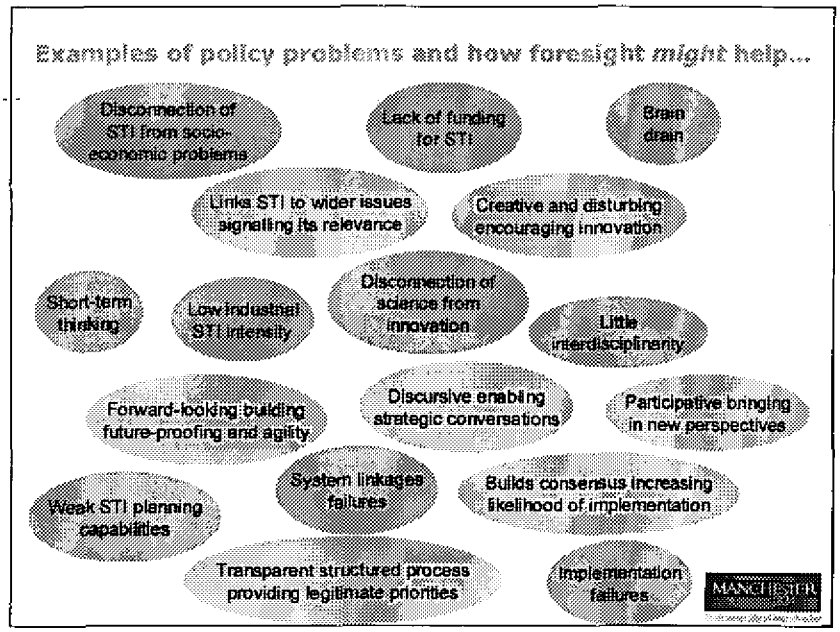
Despite these unfavourable conditions, there have already been national TF exercises conducted in several countries in the region, including Russia (1997, 2003, 2006), Hungary (1999), Czech Republic (2001), Turkey (2002), Poland (2005) and Ukraine (2006). Where little or no activity has occurred is in the Caucuses and Central Asian Republics. In some countries, interest in foresight has diffused to the sub-national regional level, often with the support of various European Commission (EC) programmes (e.g. RTD Framework Programme, Structural Funds, etc.). There has also been some international cross-border activity, although this has been relatively rare, with UNIDO, for example, funding some exercises in areas such as automotive and biotechnologies.

It is clear that much still needs to be done and that international organisations, such as the European Union (EU) and UNIDO, can play an important role in areas such as raising awareness, building interest, developing capacity, and even funding actual foresight exercises. However, at the end of the day, the onus rests with the actors in the region – governments, universities, enterprises, and so on – to take ownership of foresight and to use it for their own benefit. But first, they need to know about foresight, about its benefits and limitations, and about how it could be used in their context. There is some understanding of this among a few actors; for example, in a survey of policy makers from science and innovation ministries in several CEE countries (see Keenan and Scapolo, 2004), it was thought that foresight could be usefully deployed to:

- Involve stakeholders in policy decision making;
- Strengthen currently fragmented national (and regional) innovation systems;
- Bring technology and wider policy decisions into closer alignment;
- Reach greater consensus on development strategies and goals between research, business, education and policy communities; and
- Set strategic priorities and achievable goals.

Some of these ideas, along with others, are captured in the figure below, which shows some of the problems commonly found in innovation systems in CEE/NIS countries and the ways in which foresight might be used to address them. However, determining a focus for UNIDO activities based solely upon needs in the region would likely lead to an unfocused programme, on account of the wide range and variety of areas that could demonstrably benefit from foresight. For example, likely topic areas that would benefit

from the use of foresight in the region include agriculture and fisheries, energy, education, healthcare and social protection, manufacturing, services, transport, science and technology, regional policy, and so on. The list is, in fact, almost endless. It might therefore be better to focus upon existing and emerging opportunities. The challenge is on how to identify these and how to go on to exploit them. This report begins this process, but identification and exploitation of opportunities is a continuous activity and will be, without doubt, an important role for the RVC to play.



3. THE LANDSCAPE OF PLAYERS AND ACTIVITIES

In this chapter, the possibility for coordination with other agencies and initiatives is examined, essentially with a view to identify fund mobilisation opportunities. The European Commission (EC) perhaps offers one of the best opportunities in this regard, but as this represents a complex landscape, it is dealt with separately in the next chapter. In this chapter, the focus is confined to the following actors:

- National Governments
- Other UN Agencies
- Private Foundations
- Other International Agencies

3.1 National Governments

The main players in the region are the national governments. These typically present themselves in a wide panoply of assemblies, ministries and agencies and cover a very

wide range of topic areas. Much of this activity could benefit from the use of foresight. It is clearly impossible for a single report like this to review all of this activity across the various countries with a view to identifying opportunities for the use of foresight. This is, nevertheless, an important task that should be carried out early on by focal points of the RVC, and more will be said about this later in the report. In the meantime, a few generic remarks will be made instead:

- A few national governments are already playing an important role in the establishment of the RVC through the provision of sponsorship. This link needs to be nurtured and further extended to other governments, so that the RVC obtains some stability and certainty in its earliest days of operation. In this regard, the activities of the RVC should be sensitive to the needs of national governments – so that they get a sense of return in their investments. Moreover, a broad view should be taken, wherever possible, of clients across national governments, and certainly beyond the immediate interests of the sponsoring ministries (as was mentioned earlier, TF could be applied to almost any domain area, and it would be narrow-sighted of the RVC to focus only upon the interests of sponsor ministries).
- Beyond ministries, there are other important actors that constitute the state, including the legislature. In some Western Europe countries, parliaments have established foresight and technology assessment units with a view to informing parliamentarians of issues around technological developments. In some countries of the CEE/NIS region, similar initiatives also exist. These could potentially be very interested in the activities of the RVC, and it is recommended that links are made as soon as possible to scope their needs and the opportunities for engagement and collaboration.
- Also prominent at the national level are non-governmental groups, including business umbrella groups, individual enterprises, universities and academies, the media, and NGOs. These represent a rather disparate group, and are therefore difficult to target in a directed way. Moreover, in some countries, to reach such groups means going through national governments. It is recommended that, in the first instance at least, these groups are engaged as the opportunity arises but that no special effort is made to obtain full coverage (which would be near-impossible in any case). On the other hand, many of the RVC's focal points are likely to come from this group of actors – especially universities, academies of science, and business innovation support centres.

3.2 UN Agencies

Various UN agencies have, at different times, shown an interest in developing capacities for futures thinking by governments and others. UNESCO has perhaps been the most active, though its interest and activities today are barely discernible. The current science, technology and innovation programme of UNESCO proposes the use of technology forecasting and trend analysis, within a participative framework, which essentially amounts to technology foresight.

UNDP featured technology foresight is its Human Development Report in 2001 and went on to fund a team of experts to develop and implement a series of foresight and strategic thinking workshops in support of the Romanian National Strategy for Sustainable

Development in 2003. No trace of further work can be found, however. It is nevertheless recommended that UNDP is invited to participate in the RVC Steering Committee, with a view to encouraging the further use and diffusion of foresight methods in UNDP programmes.

Finally, the UNECE (United Nations Economic Commission for Europe) could offer possible opportunities for using foresight, given its new work programme. This includes a focus upon environment, transport, sustainable energy, and timber and forestry. In fact, the latter topic area has already seen some scoping work done on the use of foresight, though to date, no exercise seems yet to have been initiated. The small resource base available to the UNECE is an obvious barrier to collaboration with the RVC.

3.3 Private Foundations

Private foundations could offer another important source of funding, particularly in the NIS countries. With thousands of foundations in existence, it has been difficult to narrow down the focus of this search in an intelligent way. The situation has been further hampered by the author's general unfamiliarity with the workings of private foundations, and so a 'headline' approach has been followed, whereby a handful of well-known major foundations have been investigated. However, this approach has turned up few opportunities for the RVC, and it is recommended that UNIDO's fund mobilisation team is engaged to make a more effective search.

The following five foundations were examined:

- Ford Foundation – no obvious opportunities for the RVC to obtain funding support
- Rockefeller Foundation – no obvious opportunities for the RVC to obtain funding support
- Gates Foundation – no obvious opportunities for the RVC to obtain funding support
- Volkswagen Foundation – has programmes focused upon the Caucasus and Central Asian Republics. It basically funds mobility from academic organisations in the target regions to German institutes. It might therefore be possible to use the Foundation to fund mobilisation to German centres of excellence in foresight with a view to building foresight capacity in the target regions.
- Open Society Initiative – has programmes devoted to the spread of democracy and development of civil society in the CEE/NIS region. Foresight activities could be funded under this initiative, particularly given their participative nature, but further research is required to understand how such opportunities could be exploited.

3.4 Other International Agencies

There are lots of other international agencies active in the region, but few, if any, are likely to want to fund the RVC. As with the UN agencies, some may contribute to the funding of individual foresight exercises on a topic of their concern – these opportunities would need to be pursued on a case-by-case basis. Such agencies include NATO and its

Science Programme; the British Council; the World Bank (though this would generally be funding on a national basis), and ISTC in Moscow and STCU in Kyiv.

4. Opportunities from the European Commission (EC)

Without doubt, the main international player in the region is the European Union (EU) and specifically the European Commission (EC). The EC covers a wide range of policy domains (see the box below), and some of its programmes, including those in support of R&D policy and regional policy, make explicit reference to the EC's commitment to using foresight. These will be examined in more detail below. The EC also has units dedicated to conducting and supporting foresight activities, and again, these will be briefly described below.

Policy Domains of the European Commission

Policies
Agriculture and Rural Development
Competition
Economic and Financial Affairs
Education and Culture
Employment, Social Affairs and Equal Opportunities
Enterprise and Industry
Environment
Fisheries and Maritime Affairs
Communication
Health and Consumer Protection
Information Society and Media
Internal Market and Services
Joint Research Centre
Justice, Freedom and Security
Regional Policy
Research
Taxation and Customs Union
Transport and Energy

External Relations
Development
Enlargement
EuropeAid
External Relations
Humanitarian Aid
Trade

Whilst any of the policy domains covered by the EC could be potentially interested in supporting foresight activities, there are two areas where a commitment has been clearly made already. These are in research policy and regional policy. The budget lines for these two domain areas are huge: more than €300 billion for regional policy and a little under €50 billion for research policy in the period 2007-2013. Of course, only a fraction of this funding will be used to support foresight activities. But it could still be a considerable level of funding given that foresight has been mentioned in programming documentation.

So this is all good news for the RVC, since it is quite possible that funding will be available to pursue certain opportunities. However, on the negative side, much of the

programming around these areas has still to be fully worked out – the reader should note the 2007 start date for research, regional, and innovation programmes. This means that current programmes are due to expire at the end of 2006 whilst there is still considerable uncertainty on the details as to what will replace them and how any new initiatives will actually work in practice. The same is true of the EC's programmes directed at external relations – including its enlargement policy, neighbourhood policy, and development policy, all of which are relevant for the RVC – where new instruments are to be introduced for the 2007-2013 funding round. It might therefore be concluded that the timing of this scoping study is rather unfortunate, since at the time of writing, it is difficult to be very specific on the real opportunities that will exist from 2007 onwards. On the other hand, many groups are already beginning to organise and position themselves in readiness for 2007, and it is no doubt imperative that the RVC begins to do this as well as a matter of urgency.

In the following sections, a number of EC policy areas are introduced where it seems there will be opportunities to introduce foresight activities in the CEE/NIS countries. These include research policy, regional policy, innovation policy, and external relations policy.

4.1 Research Policy: Foresight in the 6th Framework Programme

Over the years as TF has become increasingly fashionable, its use has grown at the European level. For example, studies have been recently conducted in areas such as biotechnology, information society, and transport. This has been made possible since TF was mentioned in the regulations of the current Framework Programme (FP6 (2002-06)), and has again been highlighted in proposals for FP7 (2007-2013). However, one of the challenges for the EC is in operationalising these regulatory commitments: nobody is forced to use TF simply because it has been mentioned in the regulations, and since few people understand what TF is and how it can be used, they chose to ignore it. Thus, despite some successful uptake, the level of use of TF as an activity embedded in the main programme areas of FP6 has been disappointing.

The challenge of mainstreaming TF across the FP was never an easy one, and the EC was well aware of the problems it would face. With this in mind, a specific action line on foresight was included in FP6. A dedicated foresight unit (Unit K2) was set up in DG RTD to implement this action line (see the box below for more details). Much of its activities have only very recently produced results that are now available and so it is too early to assess its usefulness and impacts. Its main activities have focused upon the building of a Foresight Knowledge Sharing Platform, which has included the generation of guides (ForLearn – developed in collaboration with JRC-IPTS – see below) and the construction of a database profiling foresight activities that have been carried out in Europe and beyond (European Foresight Monitoring Network). Some of these activities are likely to remain in place during FP7. Already, they have generated resources that should prove invaluable to the RVC.

S&T Foresight Unit in DG RTD

Unit K2's mission is as follows:

- Promoting co-operation in European Foresight
- Monitoring and exploiting Foresight, informing European research policy developments and contributing to policy thinking in DG Research
- Implementing S&T Foresight activities under the 'Support for the coherent development of S&T policies' in FP6
- Promoting Foresight dissemination and experience sharing
- Preparing Foresight activities in FP7
- Preparing the Outlook Foresight Report for 2006

European Foresight Knowledge Sharing Platform
The European S&T Foresight Knowledge Sharing Platform diffuses and exploits information from forward-looking activities. These activities are aimed at informing policymakers dealing with research and innovation. Platform activities are implemented under three layers:

1. Monitoring Foresight activities in Europe and fostering their European dimension. This activity is implemented through the work of the European Foresight Monitoring Network (EFMN, www.efmn.eu).

2. Support to mutual learning between Foresight managers, practitioners, users and stakeholders of policy-making organisations in Europe: FOR-LEARN project (http://forlearn.jrc.es/index.htm).

3. Studies for the promotion of EU wide Foresight approaches:

- The future of R&D in services: implications for EU research and innovation policy
- Emerging science and technology priorities in public research policies of European countries, the US and Japan
- Perspectives of national and regional research and innovation systems in an enlarged EU 2015: specialisation, complementarity and competition
- The future of research and innovation policies in an enlarged EU: key issues 2015
- EU research and innovation policy and the future of the European Common Foreign and Security Policy
- Scenarios of future science and technology developments in emerging economies 2015
- Scenarios of future science and technology developments in developing countries 2015
- Professions with a science and technology dimension in Europe 2015: implications for education and training policies
- Improving the science/policy relationship with the help of Foresight: a European perspective

4.2 Research Policy: Foresight in the 7th Framework Programme

The proposed Seventh Framework Programme (2007-2013) will be organised in four programmes corresponding to four basic components of European research:

- **Cooperation**
  Support will be given to the whole range of research activities carried out in trans-

national cooperation, from collaborative projects and networks to the coordination of national research programmes. International cooperation between the EU and third countries is an integral part of this action (more on this below). This action is industry-driven and organised in four sub-programmes:

- **Collaborative research** will constitute the bulk and the core of EU research funding.
- **Joint Technology Initiatives** will mainly be created on the basis of the work undertaken by the European Technology Platforms.
- **Coordination of non-Community research programmes**
- **International Cooperation**

- **Ideas**
  This programme is intended to enhance the dynamism, creativity and excellence of European research at the frontier of knowledge in all scientific and technological fields, including engineering, socio-economic sciences and the humanities. This action will be overseen by a newly established European Research Council

- **People**
  This programme aims at quantitative and qualitative strengthening of human resources in research and technology in Europe by putting into place a coherent set of Marie Curie actions.

- **Capacities**
  The objective of this action is to support research infrastructures, research for the benefit of SMEs and the research potential of European regions (Regions of Knowledge) as well as to stimulate the realisation of the full research potential (Convergence Regions) of the enlarged Union and build an effective and democratic European Knowledge society.

Each of these programmes is the subject of a Specific Programme. In addition, a Specific Programme for the Joint Research Centre is being drafted and this will cover the foresight activities of JRC-IPTS (see below). With reference to foresight, each of the four Specific Programme texts contains the following quotation:

> "... considerations of the ethical, social, legal and wider cultural aspects of the research to be undertaken and its potential applications, as well as socio-economic impacts of scientific and technological development and **foresight**, will where relevant form a part of the activities under this Specific Programme".

In reality, this amounts to no more than an 'after-thought' in the general introduction to the Specific Programmes and should not be interpreted as a meaningful commitment to conducting foresight across FP7. It does indicate, however, that virtually any part of FP7 could potentially accommodate foresight activities – as was the case in FP6. At the same time, consideration of the Specific Programmes shows that two of them – Cooperation

and Capacities – make more detailed reference to foresight activities. Each is described in more detail below.

4.2.1 THE COOPERATION SPECIFIC PROGRAMME

FP7 presents strong elements of continuity with its predecessor, mainly as regards the themes which are covered in the Cooperation programme. The themes identified for this programme correspond to major fields in the progress of knowledge and technology, where research must be supported and strengthened to address European social, economic, environmental and industrial challenges. The overarching aim is to contribute to sustainable development. The nine high level themes proposed for EU action are the following:

1. Health
2. Food, agriculture and biotechnology
3. Information and communication technologies
4. Nanosciences, Nanotechnologies, Materials and new Production Technologies
5. Energy
6. Environment and Climate Change
7. Transport and Aeronautics
8. Socio-economic sciences and the humanities
9. Space and Security Research

Proposals for a **specific programme on foresight** have been drawn up as part of Theme 8 (Socio-economic sciences and humanities). The aim is to provide national, regional and Community policy-makers with foresight knowledge for the early identification of long term challenges and areas of common interest that can help them formulate policy. Accordingly, foresight activities in FP7 will be designed as horizontal activities and structured into four areas of activities:

- Area 1: Wide socio-economic foresight on a limited number of key challenges and opportunities for the EU, exploring issues such as the future and implications of ageing, migration, globalisation of knowledge, changes in crime and major risks.
- Area 2: More focused thematic foresight on the developments in emerging research domains or those cutting across existing domains, as well as on the future of scientific disciplines.
- Area 3: Foresight on research systems and policies in Europe and on the future of key actors involved.
- Area 4: Mutual learning and co-operation between national and/or regional foresight initiatives; co-operation between EU, third country and international foresight initiatives.

Each of the four Areas is expanded upon below. The RVC could most obviously be supported under Area 4, whilst TF activities in the focal points could easily be supported under any of the other Areas.

At the time of writing, it remains unclear how the foresight specific programme will be operationalised: Unit K2 is being abolished as part of an overall re-organisation of DG RTD. It seems likely that support for foresight will be moved into a new unit that also focuses upon economic analysis – the name of the new unit is rumoured to be "Economic and Prospective Analysis", but this will be confirmed later in the year, along with the unit's work programme. There remains considerable uncertainty surrounding the scale of resource commitment to a specific programme dedicated solely to foresight. In initial FP7 proposals from the EC, some €70 million were being proposed, but the latest information available to the author indicates that this figure has been cut back drastically – to around €20 million over seven years. This situation could improve, however, as the foresight mission is moved into the new directorate – it is simply impossible to say at the moment.

In addition to Theme 8, two further Themes explicitly mention foresight in their regulations (see the box below). But in fact, any of the Themes could accommodate foresight activities. It is simply a matter of the scientists and policy makers being aware of foresight and understanding its contribution to their fields. If this can be achieved more widely than at present, then there is every chance that many of the Themes will support TF studies. The foresight 'community' itself needs to be more active in this regard, and the RVC could play a critical role in the CEE/NIS region.

Theme 2: Food, Agriculture and Biotechnology
"Consideration of the social, ethical, gender, legal, environmental, economic and wider cultural aspects and potential risks and impacts (**foresight**) of the scientific and technological development will form a part of the activities, where relevant."

Theme 6: Environment (including climate change)
Specifically referring to the action, *Conservation and sustainable management of natural and man-made resources:* "The research will benefit from and contribute to the development of open, distributed, inter-operable data management and information systems and will underpin assessments, **foresight**, and services related to natural resources and their use."

Specifically referring to the action, *Assessment tools for sustainable development*: "The analysis of technology, socio-economic drivers, externalities and governance as well as **foresight** studies, will be included."

Proposed Areas in FP7 Foresight Specific Programme

Area 1. Early identification of long term challenges in science, technology, and innovation

Science and technology and innovation have a high impact on the future of the EU as indicated in the Lisbon agenda. This area will carry out studies in order to identify early long term challenges and opportunities for the socio-economic dimensions of Europe's future in relation to science and technology. Research topics could include:

Depletion of natural resources: e.g., socio-economic challenges to/from global environmental change, the tensions from accelerated consumption of scarce resources like energy, water and raw materials, the role of science and technology in the balanced sustainable development;

S&T industries and business systems: e.g., Europe's competitive industrial renewal including its service industries, dynamics of new industries in ICT, nanomaterials, service management and engineering, biotechnologies in food and health;

Security and Safety issues: e.g., vulnerability to natural or human caused disasters of technology dependent societies, interaction between internal safety and external security factors, threats perception and risk preparedness;

Health prospects: e.g., opportunities and threats derived from growing life expectancy and an ageing population, S&T prospects in health services developments; a sustainable knowledge-based bio-economy for human health.

Area 2. Focused thematic foresight

Thematic foresight activities will focus on developments in emerging research domains or on those cutting across existing S&T domains, as well as on the future of scientific disciplines. Research topics could include:

New fields of science and technology e.g., which disciplinary developments and apparent convergences are pointing to new RTD fields;

Global food issues: e.g., food security in its various aspects, bio-diversity preservation and the food chain, implications of climatic change, genetic engineering;

Rural development: e.g., which advances in S&T, education and innovation can foster sustained development in rural areas;

Greening of the transport system: e.g., what are the likely roles to be played by bio-fuels, fuel-cells, and the integration of renewable energies with transport systems.

Area 3. Research systems and research policies in Europe

These Foresight activities explore the long-term issues and factors influencing the future of European research systems. The studies will focus on the future of their architectures, interactions, drivers of change and key actors involved. Research topics could include:

The future of the European Research Area (ERA): e.g., dynamics and barriers for emergence of ERA between European and national research funding, dynamics of new European funding instruments and the role of multinational firms and philanthropic funding, optimal synergies with innovation and education;

Human resources in science and technology: e.g., demographic trends, ageing, and migration flows as well as on the attractiveness and capabilities of the education systems and labour markets; global sourcing for researchers;

The prospective role of Emerging Economies: e.g., prospective assessment of developments, opportunities and EU's capabilities, strategic cooperation and competition, evolution and preparedness of the EU RTDI systems;

Universities: e.g., identification of their role and functions in training and research in the knowledge society, the value of certification, universalism / specialisations in a growing service economy, the forms of operation, management and ownership/control.

Area 4. *Mutual learning and co-operation*

These activities will concentrate both on mutual learning and co-operation between national and/or regional foresight initiatives, their sponsors and practitioners and co-operation between EU Member States, third countries and international organisations. In several Member States Foresight programmes and initiatives have been set up to explore issues relevant to policy design needs. In order to provide added value to those activities at the European level, a platform for co-operation and the exchange of experiences and results will be established. The European Foresight platform will continue to support the exchange of foresight knowledge.

4.2.2 The Capacities Specific Programme

As with the other components of FP7, a general statement of commitment to using foresight is made in the Specific Programme on Capacities. However, the Capacities Specific Programme goes a stage further by outlining one possible way in which foresight will be integrated and that is through its Regions of Knowledge Programme. Regions of Knowledge was originally launched by DG RTD in 2003 at the request of the European Parliament, the aim being to promote the active involvement of local players in designing and shaping regional knowledge development models. Under FP6, 14 pilot projects were selected to take part in the Regions of Knowledge initiative, including the MetaForesight and SPIDER projects (see the box below for details).

Foresight projects funded under Regions of Knowledge Pilot Action in FP6

MetaForesight Project

MetaForesight is promoting intelligence processes in the participating regions through the application of information and communication technologies. The project aims to produce an integrated system that fosters regional knowledge-based capacities and policies, and supports regional business intelligence. It is sought to exploit the benefits of foresight models and IT systems that have already been created in various regions to enable them to operate in an intelligence-driven environment.

MetaForesight is integrating five fields of intelligence: regional foresight; R&D result databases; benchmarking of regional companies and regional innovation potential and development policies; technology and market watch; and regional technological competences and skills. In the long run, the project will help regional stakeholders adopt or develop the necessary technologies and systems to operate effectively in an intelligence-driven business environment. This will assist firms, industries and regions in dealing with increasingly informed global competitors.

SPIDER Project

SPIDER seeks to enhance regional competitiveness through the application of foresight techniques to explore the potential of emerging economic activities. It is aimed to find the best way of putting in place a self-renewing regional innovation system, which will focus on four essential elements: players, networks, knowledge management, and mastering time.

The project will develop foresight methodologies specifically for the regions by adapting national approaches. These new methodologies will not just be applicable for the participating regions but can also be adopted more widely. For this purpose, SPIDER is gathering future-oriented and foresight expertise. In order to raise awareness of foresight studies and to spur their future development, the project aims to plant the first seeds of a European Futures Academy.

Under FP7, the Regions of Knowledge Pilot Action will be transformed into a fully-fledged component of the Capacities Programme and will be substantially expanded. Moreover, Regions of Knowledge is viewed by the Commission as a potentially useful interface between the activities of DG RTD and those of DG Regio, particularly around the latter's Cohesion Policy (Structural Funds), which has been reoriented to take better account of the need to build innovation capacity in lagging regions (see below).

Box: REGIONS OF KNOWLEDGE IN FP7

Objectives

Strengthening the research potential of European regions, in particular by encouraging and supporting the development, across Europe, of regional "research-driven clusters" associating regional authorities, universities, research centres, enterprises and other relevant stakeholders.

Approach

Regions are increasingly recognised as important players in the EU's research and development landscape. At the same time evidence indicates that investment in R&D improves regional attractiveness while increasing competitiveness of local businesses. R&D intensive clusters rang among the best drivers of such investment activity resulting in direct gains in local competitive advantage with beneficial effects in terms of growth and jobs. The 2003 Pilot Action Regions of Knowledge confirmed the importance of such clusters and the interest to support and encourage their development.

This action will enable European regions to strengthen their capacity for investing in RTD, while maximising their potential for a successful involvement of their stakeholders in European research projects. Increased and more focused use of Structural Funds for R&D investment and activities will be also pursued by improving synergies between Regional and Research Policies primarily by producing regional research strategies which regional authorities can integrate into their economic development strategy.

"Regions of Knowledge" aims at supporting the definition and implementation of optimal policies and strategies for the development of R&D driven clusters. In particular it will improve the relevance and effectiveness of regional research agendas through mutual learning; promote and strengthen cooperation between clusters; and contribute to strengthening the sustainable development of existing R&D driven clusters as well as foster the creation of new ones. Support will be provided in particular for demand-driven and problem-oriented projects addressing specific technological areas or sectors. This action will apply to all regions, including Convergence ones.

Activities

Projects would normally involve regional authorities, regional development agencies, universities, research centres, and industry as well as where appropriate technology transfer, financial or civil society organisations. *Regions of Knowledge* projects will cover the following activities:

- **Analysis, development and implementation of research agendas** of regional clusters and cooperation between them. These will include analysis as well as an implementation plan focusing on R&D capacity and priorities. Projects shall use **foresight**, benchmarking or other methods, demonstrating expected benefits, such as strengthened links between clusters involved, optimised involvement in European research projects and higher impacts on regional development.
- **"Mentoring"** of regions with a less developed research profile by highly developed ones based on R&D focused cluster building. Transnational regional consortia will mobilise and associate research actors in academia, industry and government to deliver "guidance" solutions with and for technologically less developed regions.
- **Initiatives to improve integration** of research actors and institutions in regional economies, through their interactions at cluster level. These will include transnational activities to improve links between research stakeholders and the local business communities as well as relevant activities between clusters. Support will also be provided to activities to promote systematic mutual information exchange as well as interactions between similar projects and where appropriate, with actions of other relevant Community programmes (e.g. analysis and synthesis workshops, roundtables, publications).

4.2.3 International scientific co-operation in FP7

Participation in the main parts of the Framework Programme (FP) has traditionally been confined only to those countries that contribute funding: essentially the EU Member States. some of the Pre-Accession Countries and a few association states (e.g. Israel, Norway, etc.). Other countries, such as those from the NIS, have been allowed to participate in the FP in special initiatives that have been set aside from the main programmes. This picture changed in FP6 as all programmes were opened up to all countries in the world. On the face of it, this seemed like a positive development, but the reality was less than positive as third countries, such as those from the NIS, found it difficult to participate in the main programmes for a variety of reasons that will not be discussed here.

Much has been learnt from this experience and the expectation is that matters will improve significantly in FP7. It is claimed that a comprehensive EU strategy for international scientific co-operation will provide the context for the coordination of international co-operation activities under the different FP7 Specific Programmes. Again, the whole of the FP will remain open to third country participation, and the bulk of international co-operation activity, relating to the different themes, is to be accomplished in the Cooperation Specific Programme, connected to thematic priorities. As well as opening all thematic areas to international cooperation, a series of specific actions for international cooperation will be established in each area. The latter will cover activities dedicated to co-operation with third countries in the case of shared interest and mutual benefit, while meeting their specific needs. Many of the topics to be covered will have both global significance and significance for the EU itself.

The Capacities Specific Programme will provide input and set the research priorities for the "specific actions for international co-operation" of the Cooperation Specific Programme. This will be done through supporting bi-regional dialogue and networks. The Specific Programme will also focus on exploiting the potential of **bilateral S&T agreements** (for example, with countries like Russia and Ukraine), in order to improve their operation in a mutually beneficial way.

At the time of writing, many details must still be worked out and budgets decided upon. To illustrate this point: since 1993, the EC has funnelled much of its RTD support for countries in the NIS region through an organisation called INTAS (see the box below). However, the future of INTAS is now much in doubt, with the Commission wishing to close it down at the end of 2006, whilst the Parliament has indicated that it wishes to see it continue its work into FP7. These details, like many others concerning all EC programmes, are unlikely to be resolved until the autumn of 2006.

INTAS *is an independent association formed in 1993 by the European Community, the EU Member* States and like-minded countries. INTAS plays an important bridging role between the New Independent States (NIS) and the European Community, especially through activities relating to the EU Framework Programmes. INTAS promotes scientific co-operation with the twelve New Independent States (NIS) and strengthens their research potential to facilitate the long-term integration of the NIS scientific communities with those of the EU Member States and the FP6-associated countries.

4.3 Foresight in JRC-IPTS

The EC's Joint Research Centre (JRC) also has its own Institute for Prospective Technological Studies (IPTS) which carries out its own foresight studies for other parts of the EC. The JRC-IPTS has an action line dedicated to supporting foresight capacity, especially in the New Member States and Pre-Accession Countries. Known as FOR-ERA (Foresight for the European Research Area), the action has several components, the major one being FOR-LEARN. The aim of this activity is to consolidate European expertise on foresight through codification and to raise the quality of foresight practice by the exchange of knowledge between foresight practitioners, sponsors and other stakeholders. To achieve this, FOR- LEARN is composed of two main elements: the 'Foresight know-how' and the 'mutual learning pool':

- The 'foresight know how' has looked to contribute to the codification, assessment, and dissemination of existing foresight knowledge and know-how. It has sought to make practical knowledge on how to carry out foresight more accessible to foresight managers, users and stakeholders. It has essentially done this through the development of an online foresight guide, which was launched in 2006.
- The 'mutual learning pool' consists of a) bridging services (between newcomers in need of support – in particular in less favoured regions/Member States of the enlarged EU - and more experienced managers, practitioners and/or experts) and b) issue-related workshops and participative seminars to share, consolidate and transfer lessons between foresight programme managers and researchers. A service known as 'Foresight Answers' has been launched during 2006 under this element, whilst several issue-related workshops have been organised during 2005 and 2006.

There are many resources here that the RVC could make use of. Moreover, it is quite possible that the JRC-IPTS could look to the RVC to help it to roll out its services in the CEE region. However, as with the other EC programmes discussed here, there remains considerable uncertainty as to the continuation of this activity in FP7, particularly given the action line's partial dependence upon funding from Unit K2 in Brussels. This picture should hopefully become clearer during autumn 2006, and it is recommended that UNIDO continue to maintain personal contacts with the FOR-ERA action leader with a view to developing collaboration in FP7.

As well as a dedicated action line for building foresight capacity, JRC-IPTS also funds several 'prospective' studies around technologies each year, hence its name. Some of these studies are conducted by researchers in the JRC-IPTS, but many are contracted out, at least partially. Given that so much outsourcing occurs, JRC-IPTS has established the European Techno-Economic Policy Support (ETEPS) Network as a means of efficiently distributing much of its research work. Some of Europe's leading innovation research centres are members of ETEPS, which works through series of calls. Some of the stronger focal points who are not already members of ETEPS should seriously consider joining the Network. Moreover, ETEPS could be examined as a possible model of organization for the RVC to follow. Accordingly, more details on the Network are provided in the box below.

The ETEPS Network

The objectives of the ETEPS network are to provide intellectual services for carrying out techno-economic and policy-related studies in the context of EU policy-making. To this end, ETEPS is:

- Undertaking scientific research on the interdependencies between science, technology, economy and society, with a focus on foresight, policy analysis and technology assessment;
- Developing and using scientific models, data, and other related tools to improve the scientific understanding of European Science & Technology related policies; and
- Taking appropriate actions to disseminate the knowledge thus gained.

The ETEPS network is organised around the ETEPS AISBL (Non-profit making international association), and presently consists of 19 Effective members from 15 member states and 20 Associated members worldwide. The network is further supplemented by a number of external organisations.

Membership of ETEPS is in principle open to all public or private organisations, which undertake prospective science & technology, technological, techno-economic, socio-economic and societal research and analysis. Such organisations shall be legal entities, fully able to participate in the purposes and activities of ETEPS, and to undertake the responsibilities of membership. They may operate at international, European, national or regional level within any nation or combination of nations.

It is the aim to keep ETEPS Effective membership at a manageable size of not more than 20 to 25 organisations. The two key admission criteria for Effective membership are that the applicant covers a broad range of scientific research fields and adds significant value to the network in terms of covering geographic regions and research areas not covered sufficiently by present ETEPS members. The ETEPS AISBL General Assembly reviews all membership applications and decides on the admission of new members.

Membership categories, criteria, benefits and responsibilities
There are three levels of involvement in the ETEPS Network: ETEPS Effective members (EM), ETEPS Associates (AM), and external organisations (EO).

- ETEPS **Effective members** are signatories of the ETEPS AISBL statutes, established in an EU member state, major players in national / international S&T with high standing and a significant size of organisation, and cover all or most of ETEPS' activity areas. They must have access to relevant national science, research and technology data, possess analytical skills, as well as the capability and capacity to participate in a large number of ETEPS activities.
- ETEPS **Associates** are organisations that have expertise and the potential to contribute to ETEPS activities or at least to selected activities. They would normally meet the same criteria as Effective members, but could also be more specialised scientific institutes and/or smaller organisations. They may be established in any country worldwide.
- **External organisations** that support the ETEPS network are either organisations with a (highly) specified activity focus, which matches one of ETEPS' broad thematic activities, and which enables them to participate in some ETEPS activities, or organisations that wish to become ETEPS members.

Membership admission and review process
The process below describes how an organisation might migrate into and within the ETEPS membership scheme. The steps are:

- Database of privileged external organisations: ETEPS will on a case-by-case basis invite these external organisations to participate in selected ETEPS activities. Each organisation that wants to be listed in the database has to submit an application form (www.eteps.net), because this database is operated on the opt-in principle.
- Associated membership: after the satisfactory completion of at least one activity carried out for ETEPS, an organisation from the database may apply to be elevated to Associated member status. Preference will be given to applicants with credentials in areas not covered sufficiently by present ETEPS members.
- Effective membership: the key admission criterion for Effective membership is that the applicant must add value to the network in terms of covering research areas and geographic regions not covered sufficiently by present ETEPS members. After the satisfactory completion of at least one activity carried out as ETEPS Associate, an Associated member has the possibility to apply for ETEPS Effective membership.

4.4 Regional Policy

Regional policy, through the use of what are commonly referred to as Structural Funds, represents the second largest budget line of the EC (the first being the much-maligned Common Agricultural Policy), amounting to more than €300 billion over seven years. The aim of regional policies is centred (mostly) on promoting economic convergence between the regions of Europe with a view to achieving greater cohesion across the EU more generally. More than three-quarters of the regional policy budget is directed at this aim. However, there are two other aims for the EC's regional policy, namely to increase regional competitiveness and employment across a wider set of regions, and to nurture territorial cooperation between all regions of Europe. Some of the conditions of eligibility and priorities associated with these aims are shown in the table below.

Cohesion policy 2007–13 (EUR 336.1 billion)

Programmes and instruments	Eligibility	Priorities	Allocations
Convergence objective including the special programme for the outermost regions			**78.5 % (EUR 264 billion)**
National and regional programmes (ERDF, ESF)	Regions with per capita GDP < 75 % of EU-25 average	• Innovation • Environment/risk prevention • Accessibility • Infrastructures • Human resources • Administrative capacity	67.34 % = EUR 177.8 billion
	Statistical effect: regions with per capita GDP < 75 % of EU-15 and > 75 % of EU-25		8.38 % = EUR 22.14 billion
Cohesion Fund	Member States with per capita GNI < 90 % of Community average	• Transport networks (TEN-T) • Sustainable transport • Environment • Renewable energy	23.86 % = EUR 62.99 billion
Regional competitiveness and employment objective			**17.2 % (EUR 57.9 billion)**
Regional programmes (ERDF) and national programmes (ESF)	The Member States propose a list of regions (NUTS1 or NUTS2)	• Innovation • Environment/ risk prevention • Accessibility • European employment strategy	83.44 % = EUR 48.31 billion
	'Phasing in' regions covered by Objective 1 between 2000 and 2006 and not covered by the convergence objective		16.56 % = EUR 9.58 billion
European territorial cooperation objective			**3.94 % (EUR 13.2 billion)**
Cross-border and transnational programmes and networks (ERDF)	Border regions and large transnational cooperation regions	• Innovation • Environment/risk prevention • Accessibility • Culture, education	35.61 % cross-border cooperation 12.12 % European neighbourhood and partnership instrument 47.73 % transnational cooperation 4.54 % networks

Source: EC (2004), *Cohesion Policy: the 2007 Watershed*, DG Regio Factsheet, Brussels

As the table above shows, innovation is the top priority across virtually all areas – a reflection of the EC's renewed commitment to the Lisbon Strategy and its intention to reorient the Structural Funds to this end. Moreover, the sums of money involved are huge by any standard. The question is, what has any of this got to do with foresight? Well, the strategy guidelines for the Structural Funds already make reference to foresight, as highlighted in the box below. And the foresight community, in Western Europe at least, see the new Structural Funds as a major opportunity for initiating new regional foresight activities – see the table below. The challenge for the RVC will be to build the same sort of awareness in Central and Eastern Europe.

Community strategy guidelines reference to foresight

Improving knowledge and innovation for growth
The necessity to enhance national and regional RDT capacities (...) should be encouraged by regional **foresight** and other regional strategic planning methods, involving regular and systematic *dialogue with key stakeholders. (p17)*

Actions in RTD should be aligned with EU RTD policy and the needs of regions in question. In terms of method, these need be based on a sound analytical approach, such as **foresight**; as well as use of indicators, such as patents; human resources in RTD; location of private and public research institutions; and on the existence of clusters of innovative businesses. (p19)

More and better jobs
Support good policy and program design: monitoring, evaluation and impact assessment, through studies, statistics, expertise, and **foresight**, support for interdepartmental coordination and dialogue between relevant public and private bodies. (p28)

Table: Some suggestions on the use of foresight for the Structural Funds[3]

Structural funds process	Foresight answers
Community's strategic guidelines on cohesion	Foresight is quoted in the guidelines : - Enhance national and regional RDTcapacities by regional foresight (...) -Support good policy and program design by (...) foresight
National strategic reference framework	
Operational Programmes	-Foresight approach can provide priorities and strategic actions -Foresight approach can provide long term and shared SWOT (Evaluation ex-ante)
Programme management and project selection	Foresight approach can be a criteria of eligibility to access to the operational program / can be promoted by actions inside the program / can be a pilot action launched by the Commission (such as RITTS-RIS initiatives)
Strategic follow-up	Foresight approach can develop new indicators

[3] Taken from a presentation by Pascale van Doren, "Possibilities for Foresight-related activities in the new Structural Funds", MLP-Foresight Workshop, Stuttgart, 31 March 2006.

From the RVC's perspective, the really good news is that a significant share of the funding available through the Structural Funds is to be spent in the New Member States and those Pre-Accession Countries that are expected to accede to the EU within the next year or so (i.e. Bulgaria and Romania). The map below clearly shows this with regards to existing Member States.

EU-25: Convergence and Regional Competitiveness and Employment Regions 2007-2013

Source: EC (2006) *Regions for Economic Change*, DG Regio, Brussels

The EC has recently hired consultants to advise them on how the innovation agenda can be operationalised in the Structural Funds, and it is understood that the resulting report (to be delivered in late 2006) is likely to feature regional foresight as a key recommendation. This is good news for the RVC, since it is likely that many beneficiary countries and regions will seek support in trying to make sense of foresight. Such support is likely to include a demand for training and information, as well as consultancy support to run foresight exercises. However, at the same time, the news is not all good. The difficulty with the Structural Funds from an RVC perspective is the manner in which they are managed and allocated. Each Member State essentially manages their own allocation of funds and much responsibility is then further delegated to sub-national regions. There is no "one-stop shop" in the EC, for example, in which decisions are being taken. This makes reaching the 'target audience' for foresight less than straightforward for the RVC. It will require a good geographical spread and understanding of local conditions, as well as local contacts, for the most to be made of this significant opportunity. This points to an important role for the distributed focal points and the need to provide them with the necessary support to reach local target audiences. It also suggests that focal points should be established in all countries covered by the Structural Funds. The establishment of a dedicated 'chapter' for interacting with Structural Fund actors might therefore be considered, particularly given the scale of funding that could be available.

The European Territorial Cooperation Objective (shown as "cross border and transnational programmes and networks" in the table above) is the smallest component of the Structural Funds, but still amounts to over €3 billion over seven years. From an RVC perspective, this is an important funding line, since it is solely dedicated to funding transnational cooperation between regions. Significantly, it also includes a component that allows the participation of regions outside of the EU – in the so-called pre-accession countries (e.g. Turkey) and neighbourhood countries (e.g. Ukraine). The main policy instrument to be used under this Objective is the European Regional Development Fund (ERDF). The cross-border component of the Objective will concentrate on encouraging entrepreneurship, joint management of the environment and the sharing of infrastructures. The transnational component will include water conservation and management, access to major networks and the interoperability of systems, risk prevention and related research and technological development activities.

Up until now, inter-regional and transnational cooperation have faced many difficulties due to the many national laws and procedures that must be respected. To overcome such difficulties, the EC will allow the establishment of 'European Groupings of Cross-border Cooperation' (EGCCs), which will have their own legal statutes, organs and budgetary rules. Such groupings are intended to oversee the implementation of specific tasks as agreed by the member organisations. Consideration might be given to establishing an EGCC around the RVC if this will make transnational cooperation more straightforward.

4.5 Innovation Policy

From 2007, the Competitiveness and Innovation Framework Programme (CIP) will bring together into a common framework specific Community support programmes and relevant parts of other Community programmes in fields critical to boosting European productivity,

innovation capacity and sustainable growth, whilst simultaneously addressing complementary environmental concerns. It is proposed to be allocated a budget of €4.2 billion for the duration of 2007-2013.

The CIP will provide the legal basis for Community actions that share the overarching objectives of enhancing competitiveness and innovation, complementing the research-oriented activities promoted by FP7. It will be composed of specific sub-programmes:

- the Entrepreneurship and Innovation Programme,
- the ICT Policy Support Programme, and
- the Intelligent Energy-Europe Programme.

Significantly from an RVC perspective, the CIP will be open for participation to the members of the EU, candidate countries and countries of the Western Balkans. Other third countries, in particular neighbouring countries or countries interested in co-operating with the Community in relation to innovation activities can participate in the framework programme if bilateral agreements with them provide for this.

4.6 External Relations Policy

At present Community assistance and cooperation involving third countries is delivered through a range of regional instruments, for example CARDS, TACIS, and a substantial number of thematic instruments, for example the European Initiative for Democracy and Human Rights. However, as with the other EC policy areas outlined above, everything is also set to change in 2007 in the area of external relations policy. Instead of the current wide range of geographical and thematic instruments that has grown up in an ad-hoc manner over time, the new framework will comprise six instruments only, four of them new. The four new instruments are:

- An Instrument for Pre-Accession Assistance (IPA), covering Bulgaria, Romania, Turkey, and all countries of the Western Balkans;
- A European Neighbourhood and Partnership Instrument (ENPI), covering Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine, with Russia falling under a separate Partnership Agreement;
- A Development Cooperation and Economic Cooperation Instrument (DCECI), covering the Central Asian Republics; and
- An Instrument for stability.

Two existing instruments, for Humanitarian Aid, and for Macro Financial Assistance are being maintained. These and the Instrument for Stability are of little concern to the RVC and will not be discussed further. Instead, discussion will focus upon the IPA, ENIP, and DCECI. But before describing each in turn, it is perhaps worth remarking upon the similarities between these new instruments and the Structural Funds. This is not accidental, with the EC deliberately setting out to reproduce some of the support schemes offered in the Structural Funds, at least in the IPA and ENIP. In fact, both the IPA and ENIP will overlap with the Structural Funds around the European Territorial Cooperation Objective, whereby regions in EU Member States will be able to collaborate with bordering regions in

Pre-Accession and Neighbourhood Countries. This means that these new external relations instruments could potentially fund foresight activities and capacities in support of external relations policy aims. However, at the time of writing, it remains difficult to be precise about the actual opportunities that might exist, and again, the RVC will need to be alert to possibilities for funding.

4.6.1 IPA

At the junction between external assistance and internal policies, the IPA intends to facilitate the entry into the EU of candidate countries (Turkey, Croatia) and potential candidate countries (e.g. Western Balkans). The IPA will be an accession driven instrument, fulfilling all the requirements stemming from the accession process, notably in terms of priorities, monitoring and evaluation. It consists of five components:

1. Transition Assistance and Institution Building,
2. Regional and Cross-Border Cooperation,
3. Regional Development,
4. Human Resources Development, and
5. Rural Development

The first two components will apply to both potential candidate and candidate countries, the last three will apply to candidate countries only.

4.6.2 ENPI

ENPI is the financial instrument designed to support the European Neighbourhood Policy and the strategic partnership with Russia. As such, it replaces MEDA, Tacis and other existing instruments. The objectives of the European Neighbourhood Policy are as follows:

- to share the benefits of the EU's 2004 enlargement with neighbouring countries in strengthening stability, security and well-being for all concerned,
- to prevent the emergence of new dividing lines between the enlarged EU and its neighbours,
- to offer neighbouring countries the chance to participate in various EU activities, through greater political, security, economic and cultural co-operation, and
- to help build security in the EU's neighbourhood.

As already highlighted, there are six beneficiary countries within Europe: Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine. A special strategic partnership is being developed with Russia, focusing upon four 'common spaces':

1. **Economic (incl. environment and energy)** - promote integration via market opening, regulatory convergence, trade facilitation, infrastructure
2. **Freedom, security and justice** - Joint Home Affairs (JHA), human rights and fundamental freedoms
3. **External security** - partnership on security issues and crisis management

4. **Research and education** (incl. cultural) - capitalise on strong intellectual and cultural heritage

A specific and innovative feature of the ENPI is its cross-border cooperation component. Under this component, the ENPI will finance "joint programmes" bringing together regions of Members States and partner countries sharing a common border. It will use an approach largely modelled on "Structural Funds" principles such as multiannual programming, partnership and co-financing, adapted to take into account the specificities of external relations. The cross-border cooperation component of the ENPI will be co-financed by the European Regional Development Fund (ERDF).

4.6.3 DCECI

The DCECI covers all Countries, territories and regions not covered by the IPA and the ENPI. Its guiding principle is to contribute towards the general objective of developing and consolidating democracy and the rule of law and to that of respecting human rights and fundamental freedoms. Its primary aim is to reduce, and in the long term, eradicate poverty. Cooperation with developing countries will be in line with the Millennium Declaration adopted by the UN General Assembly in 2000, contributing to achieving the Millennium Development Goals and the objectives and principles agreed in the context of the United Nations Conferences and other competent international organisations in the field of development co-operation.

5. ACTIVITIES OF THE RVC

The stated aim of the RVC is to provide methodological and informational support on technology foresight to industry and innovation policy decision makers, with a view to developing a foresight culture in the CEE/NIS region. With this in mind, the RVC is anticipated to fulfil the following functions:

- Provide advice and professional coordination of TF activities in the CEE/NIS region, with special emphasis upon the national TF centres of the region;
- Network persons and national institutions in the field of TF;
- Commission studies and communicate results to decision makers and the general public;
- Organise and support international comparative studies;
- Organise education and training programmes;
- Collect and transmit information on TF;
- Operate an Internet portal and database;
- Provide an information service for corporate partners;
- Fulfil the secretariat functions of the Regional Operative Steering Committee; and
- Prepare and organise Regional TF Summits every three years.

These functions can be broadly summarised into four groups of activity: (1) networking of TF centres and coordination of activities; (2) delivery of TF training; (3) commissioning of TF studies; and (4) provision of TF information. More will be said on each of these in the sections that follow. In the meantime, the users of the RVC are anticipated to be the following:

- Relevant institutions from the CEE/NIS region, participating in the UNIDO Regional TF Initiative;
- Governmental and parliamentary administrations of the countries participating in the project through financing;
- Regional administrations of the countries participating in the project through financing;
- Governmental and parliamentary administrations of the countries not participating in the project through financing;
- Regional administrations of the countries not participating in the project through financing;
- Business companies;
- Professional and interest groups of SMEs and other companies; and
- Others.

These points will now be considered in the sections that follow.

5.1 Understanding Context and Conditions

When considering the areas of activity that the RVC should seek to cover, a number of aspects need to be considered at the outset, for example:

- Should the RVC give more focus to certain **geographical areas** over others? For example, given the presence of so many EC programmes in CEE countries, should the focus be mostly upon NIS countries, such as the Caucasus countries and Central Asian Republics, where fewer support programmes already exist? Or should the RVC position itself in such a way as to exploit as far as possible the funding opportunities that exist (mostly) in the CEE countries? Most probably the RVC will want to address both, but how to manage this dual focus?
- Should the RVC give more focus to certain **administrative levels** over others? In the initial proposals prepared by UNIDO, emphasis has been placed upon working with national TF centres. But there is also acknowledgement that the sub-national regional level is important in foresight terms, not least due to (a) the fact that much business innovation support programming is delivered at this level; and (b) the availability of EC funding to address aspects of regional innovation. Moreover, EC funding programmes allow for cross-border collaboration between sub-national regions in different countries, so that wider regional concerns can be addressed. There are therefore a lot of opportunities at the sub-national level that the RVC

should look to exploit, and focusing simply upon the national level is unlikely to be wise.

- Should the RVC give more focus to certain **domain areas** over others? The choice here will be mainly opportunity-led: if there are funding opportunities emerging from UNIDO or the EC covering particular sectors, for example, then the RVC will have to follow the money. But it might also be possible for the RVC to set the agenda too, though any pre-selection of domain area focus should be based upon both analysis and wide agreement among member organisations.
- Should the RVC give more focus to certain **activities** over others? From the list of functions provided in the previous section, it is apparent that the RVC will be engaged in a wide variety of tasks, namely (1) networking of TF centres and coordination of TF activities; (2) delivery of TF training; (3) commissioning of TF studies; and (4) provision of TF information. Inevitably, some of these will take precedence over others, at least in the short-term whilst the RVC seeks to establish itself. The question is, what range of activities will the RVC initially engage in and how will this be determined?
- Should the RVC give more focus to certain **actors** over others? Clearly, the answer to this question partly depends upon the answers to the previous points above. Nevertheless, the RVC might be expected to target all of the actors identified in the previous section, in one way or another, from the outset. But there will need to be acknowledgement that different actors require quite different services – assuming a one-size-fits-all approach is likely to produce only limited success. These services will take time to develop and it is likely to be difficult to pursue everything with the same vigour from the start. So again, some early choices will have to be made on which actors and targeted activities should constitute the initial emphasis of the RVC.

Below, each of the four types of activities identified above is considered in more detail. But before doing this, it is worth considering the following generic points, all of which have implications for the activities of the RVC:

- There is a great **variety** across the CEE/NIS region, in terms of socio-economic development, political culture, and S&T activities, not to mention awareness and experience of TF. Clearly, the onus will largely lay with the focal points to assess local needs and opportunities and to translate these into proposals for RVC activities. But it will remain a major challenge for the RVC to be sensitive to and to manage this variety.
- Foresight often works best when it is **linked** to other tools and/or activities. For example, when working with SMEs, foresight should be incorporated normally into their business planning activities rather than as a standalone exercise. In this way, foresight is given meaning and relevance. A similar position should probably be taken in the majority of situations, with the promotion of standalone foresight exercises more the exception than the rule. This is also in line with many of the funding opportunities emanating from the EC, where calls for foresight activities are likely to be embedded components of a wider policy instrument or programme. The

RVC will therefore need to give consideration to creating cognitive links between foresight and other (perhaps) better-known decision-making and/or business processes – for example, through the provision of guidelines and/or case studies. This will be important for potential users of foresight to understand how it links with some of the processes they may already be familiar with. The RVC will also need to look for opportunities that are often embedded (and even hidden) in funding calls for these wider processes.

- There are already significant foresight **resources** and support services offered by other actors, especially the EC. Whilst the RVC should not seek to duplicate these, it should look to exploit, adapt, and expand upon them where possible. For example, the EC has supported the writing of a number of foresight guides. One of these is even available as an online interactive guide (ForLearn). The RVC should utilise and build upon these guides rather than start from scratch. The EC has also supported the Foresight Knowledge Sharing Platform: as was seen earlier, this has not only funded several foresight projects, but has also supported the creation of the European Foresight Monitoring Network (EFMN). Again, the RVC should seek to exploit the EFMN as far as possible. Last, but by no means least, UNIDO itself has funded foresight guides, including a distance learning module (available in English and Russian), as well as several publications, all of which should be fully exploited by the RVC.
- The types of activities carried out by the RVC are likely to **evolve** over time. In the short-term, activities are likely to be focused upon consolidating existing training programmes and preparing for the Summit for the Future in 2007. However, focusing *solely* upon these activities over the coming 12 months runs the risk of missing out on some important opportunities, particularly those associated with the new funding programmes emanating from the EC in 2007. It will take time to prepare for these and to position the RVC and its focal points appropriately, something that will need to begin in earnest in the latter part of 2006. At the same time, consideration will need to be given to the make-up of the RVC, particularly with regards to the number of focal points in the early stages. There are certainly arguments for and against an expansive strategy at the outset – a 'Big Bang' versus a more gradualist strategy – and more will be said on this in later sections.

In the sub-sections that follow, each of the four proposed functions of the RVC – networking TF centres and coordinating TF activities; delivering TF training; commissioning TF studies; and providing TF information – are discussed in more detail.

5.2 Networking TF Centres and Coordinating TF Activities

Networking is often a stated aim of many programmes and policy initiatives. More often than not, however, the objectives of networking, its expected outcomes, and how it might be done remain rather nebulous and ill-defined. In such circumstances, networking is often viewed as an add-on (or side-effect) to some other substantive activity. But this cannot be the case for the RVC, since networking will be a core activity. Networking must therefore be defined at least in terms of what it means, who it will benefit, and how it will be done.

To begin, the purpose of networking between existing (and possibly 'latent') foresight centres in the region should be articulated. Rationales include at least the following:

- To allow knowledge exchange between centres based upon their accumulated experiences and practices
- To provide mutual support from like-minded centres across the CEE/NIS region where little support and understanding might be available within national borders
- To pool resources to create sufficient critical mass
- To encourage and nurture collaborative working on specific projects

Potential beneficiaries of such networking are the foresight centres (the 'focal points') and the communities they seek to serve. But the form that such networking might take, especially if it is to be effective in realising the points above, is less straightforward to determine. This issue was also of concern to the architects of the (yet-to-be-realised) European Foresight Academy (EFA), which concluded that:

> "There is much interest in the establishment of discussion forums for mutual learning between Foresight users and practitioners. These could be remotely convened through online discussion groups, or they could be physical meeting events, such as knowledge fairs and other conferences / workshops. They would be places where practitioners could share their knowledge and experiences for mutual gain. (...) However, if this were to be done, it would need to be framed and delivered carefully with appropriate focus. For example, it is well known that many online discussion groups generate disappointing levels of traffic, whilst conferences often fail to meet expectations" (Keenan & Scapolo, 2004: 57).

In the case of the RVC, the Summit of the Future offers an obvious forum for the various focal points to come together to exchange views and experiences and to discuss future pathways for mutually beneficial development. But the Summit alone is unlikely to be long enough or to occur with sufficient frequency for long-lasting bonds to develop between focal points. Instead, these will have to be formed through the other day-to-day activities being furnished by the RVC.

Coordinating TF activities in the various focal points via the RVC is likely to be especially difficult – other than where UNIDO or national governments provide funds directly to the RVC for this purpose. This is because focal points are likely to want to protect their sovereignty and independence, especially if they already have considerable experience in conducting foresight exercises. Of course, it might well be that focal points are conducting foresight exercises in similar areas and would like to exchange views and results, possibly through the RVC. But even here, it is possible that the focal points will prefer to deal with one another bilaterally. Therefore, it is likely that focal points will act through the RVC when it suits them, but at other times, they will act independently or in self-organised groupings that will exclude the RVC. Trying to prevent this from happening is likely to be futile and to cause resentment among the focal points. Instead, the RVC should look to maximise its activities in those areas where interventions are most likely to be welcomed and to add value.

5.3 DELIVERING TF TRAINING

UNIDO has already acquired around five years of experience in delivering TF training courses in the CEE/NIS region. At the current time, there are four types of courses being offered, as follows:

1. Module 1: TF for Organisers
2. Module 2: TF for Practitioners
3. Module 3: TF for Decision-Makers
4. Module 4: TF for Corporate Managers

In a review of the types of training courses that could be delivered by the European Foresight Academy (EFA), Keenan and Scapolo (2004) identified a number of different options (see the box below). Taking these into account, it is clear that the RVC could potentially seek to offer a wider variety of courses in a wider variety of settings and perhaps in a number of different languages. The latter point is especially important: serious consideration should be given to delivering some courses at least in Russian as well as in English. The development and piloting of the UNIDO-funded Russian language distance learning module on technology foresight is to be welcomed in this regard, though more work needs to be done to ensure its full implementation. The issue of language will be retuned to below.

The shape and scale of training courses and their intended beneficiaries should be kept under constant review, as has happened over the last five years. With new training needs possibly arising as a result of foresight's mention in the EC's Structural Funds programming regulations, for example, the demand for courses could grow significantly. At some point, consideration will have to be given to delivering courses on a commercial basis – though this is perhaps still some way off at the moment, unless training courses are opened up to participants from the rest of the world (in which case, a two-tier system might operate, with participants from Western countries paying a fee, whilst those from the CEE/NIS region still receive the training free-of-charge). In the shorter term, it is possible that the EC could decide to fund further TF training, at least in the New Member States, and that this funding could be funnelled through the RVC.

Box: Suggestions on types of training courses to be offered by the EFA

(Source: Keenan and Scapolo, 2004)

1. Awareness-raising workshops, directed primarily at policy makers, but also directed at scientists and EU project proposal writers, e.g. those intending to submit Integrated Project proposals under FP6
2. Foresight methods 'toolbox' training, covering some of the main methods
3. Training courses focused upon state-of-the-art Foresight methods, including use of ICTs in Foresight
4. Training in the management and organisation of Foresight exercises, similar to the courses offered by PREST and UNIDO
5. Courses on how to use (absorb) Foresight results for successful implementation outcomes

6. In addition, workshops where organisations can discuss the implications of Foresight results for their own policy areas, business sectors, etc.
7. Wider courses, for instance, directed at a particular domain area (e.g. urban regeneration) or issue (e.g. the new governance of science), with Foresight embedded within them
8. Courses for explicitly multiplying Foresight practice through the training of trainers (e.g. staff in business support programmes) and teachers (e.g. high school teachers)
9. University courses, ranging from individual modules embedded in other courses through to full Masters programmes
10. Incorporation into school and college curricula
11. Workshops, rather than training courses (or conferences, where there is rarely any intimacy), where practitioners and theoreticians can meet to share ideas and experiences

5.4 Commissioning TF Studies

The extent to which the RVC will be in a position to commission TF projects and/or international comparative studies of TF exercises remains unclear. It would seem that the funding for such studies would largely have to come from UNIDO or from the national governments supporting the RVC. Funding from elsewhere, such as the EC, for TF studies is more likely to be granted to individual focal points or to small groupings of centres rather than to a virtual network like the RVC. On the other hand, it could be possible that the EC will look to the RVC to organise comparative studies of foresight in the CEE/NIS region. The funding of the RVC and its focal points will be discussed further in Chapter 6.

5.5 Providing TF information

Last, but by no means least, the function of the RVC is to collect and disseminate information on TF to a host of actors using a variety of media. This is perhaps the most important function of the RVC, since it is through information dissemination that awareness of foresight will reach a wider audience, which in turn should lead to a mushrooming of foresight activity in the region. Much of this activity will be unaccountable to the RVC and may even be difficult to attribute to the services of the RVC. But providing the support for it to happen is absolutely critical if a foresight culture is to develop in the region in the medium-to-long term.

As with the other activities discussed above, fundamental questions also need to be asked of this activity. For instance, who are the host of actors that require information on TF? What sorts of information do they specifically need? To what use are they expected to put this information? What further information (and other support services) are they likely to need? How will TF information be mediated to the various actors? Who will be responsible for identifying, collecting, collating, analysing, synthesising, packaging, and disseminating TF information? And so on...

To begin at the beginning: who are the actors? These are likely to be focal points and their clients. As will be seen below, focal points are likely to include government ministries and agencies, business-oriented intermediaries, and academic centres. Their clients will include

politicians and senior policy makers, other policy actors, enterprises, NGOs, scientists and technologists, and students. It goes without saying that these are all very different groups with different traditions of acquiring knowledge.

Next, the sorts of TF information that these actors could need should be considered. Some will want to know the basics of foresight, just enough to be aware of its benefits and limitations. Others, on the other hand, will want to organise their own foresight exercises and will be hungry for as much detailed guidance on methods and organisational issues as they can obtain. Furthermore, between these two extremes lies a wide variety of informational needs. To complicate matters even further, different sorts of actors are likely to need similar sorts of information packaged in different ways. Whilst this may sound daunting, and to some extent it is, many guides and information booklets on foresight already exist. An initial task of the RVC might be to collect all of these together and to screen them for their suitability for recycling and adaptation for different audiences and different needs in the CEE/NIS region.

A further task will be to follow up on the use that is being made of the disseminated information. This is important not only to better tailor future informational outputs to the needs of clients, but also to get a measure of any further support that might be needed, e.g. in the shape of training courses. In other words, through a professional information campaign, the demand for other services to be offered by the RVC might be built.

The next question concerns the medium through which information is to be disseminated. Much use is made today of web sites, where web pages and downloadable guides and brochures can be easily accessed. But this alone is unlikely to be sufficient. A wider audience are unlikely to find out about such online resources on their own. An information campaign based upon leaflets, brochures, and possibly attendance at fairs and conferences will therefore be needed to raise awareness of foresight and the services being offered by the RVC and its focal points. As was already mentioned, the EC and UNIDO already provide a rich seam of material on TF that can be further exploited by the RVC and its focal points. Links to all of this material should be included in the RVC web site. Consideration should also be given to setting-up a mailing list, though traffic would need to be regulated and kept to a minimum to avoid being perceived as a nuisance.

The final question concerns responsibility for managing the information activities of the RVC. To some extent, this will need to be centralised in one or two centres (it has been suggested that TCP in Prague performs this function, but a Russian language information centre – possibly located at one of the existing foresight centres in Moscow or Kyiv – could also fulfil such a role). But all of the focal points will have responsibilities too: for distributing leaflets and brochures, for promoting foresight and the RVC at local events and meetings, and for translating the RVC web site into their native languages. This last point is absolutely critical, yet largely overlooked by international organisations seeking to promote foresight. There are some notable exceptions, for example, the EC's translation into EU15 Member State languages of the *Practical Guide to Regional Foresight* (2002) and UNIDO's translation into Russian of its distance learning course on TF (2004). But more of this sort of thing needs to be done, not least since many people in the CEE/NIS region who work in enterprises, in regional authorities, and in national agencies cannot

speak English. In this regard, UNIDO might make translation a minimum condition for centres to become focal points of the RVC. This would also have the added value of ensuring active commitment to the RVC by focal points – as opposed to joining yet another network without any responsibilities.

As a final remark in this sub-section, the discussion so far has been concerned with disseminating information about what foresight is and how it might be used. But an additional stated role of the RVC is to collect and disseminate information on the results of TF. This would see the RVC as a sort of scanning network, collecting and analysing data on foresight exercises and other future-oriented studies, presumably limited to those conducted within the region. Such an activity would probably need to involve the focal points as 'scanning nodes'. Such activities can be major undertakings and should not be attempted lightly. Fortunately, the European Foresight Monitoring Network (EFMN), which is funded by the EC, is already doing much of this work on a wider European scale. UNIDO should therefore consider to aim pooling the RVC's efforts in this area with those of the EFMN, which is much better resourced. With some negotiation, the RVC should be able to gain free access to the EFMN data and to use it for its own purposes.

6. ORGANISATION AND OPERATION OF THE RVC

Perhaps a useful place to start here is to consider the guiding principles drawn up for the construction of the European Foresight Academy (EFA) – see the box below. These are surely the sorts of principles that the RVC should also adopt. With these in mind, in this section, the overall structure and scale of the RVC, the relationships between focal points, how the activities of the RVC might be organised and managed, and, finally, how the RVC might grow and be sustained over the medium-long term are each considered.

Box: Guiding principles in the construction of the EFA

(Source: Keenan and Scapolo, 2004)

In designing a future European Foresight Academy, there are some essential features that should be observed:

- The EFA should be lean and non-bureaucratic, irrespective of the scope of its activities;
- The EFA should not seek to displace existing training or awareness-raising activities that are offered on a commercial basis;
- The EFA should be open to new ideas and new people, and not a 'closed shop' that harbours vested interests and/or narrow views on what Foresight is;
- The EFA should, wherever possible, develop linkages with existing relevant initiatives, so as not to "reinvent the wheel" (duplication);
- The EFA should observe the principle of subsidiarity, ensuring that training and capacity-building activities are devolved to Member States, if appropriate;
- The EFA should be a distributed Academy, its nodes spread across all parts of the EU28; and
- The EFA should be financially sustainable, meaning it will need to develop multiple sources of funding, both public and private.

6.1 Overall Structure and Scale of the RVC

The overall structure of the RVC sees the establishment of a Service Centre and the nomination of institutions with TF competence as distributed focal points. Already, a small number of institutions have been nominated as focal points – essentially those institutions in the region that have already been involved in the UNIDO TF programme over the last few. The expected number of focal points has still to be decided, but assuming that there should be at least one institution per country in the region, then a rather large RVC can be anticipated. At the same time, some of the larger countries, e.g. Poland, Russia, Turkey, and Ukraine, should probably have more than one focal point. A tentative list of possible focal points, drawn from the policy, academic, and business worlds, is provided in Chapter 8. Serious consideration should be given to including one institution from each 'world' in each country, though this might result in an overly large RVC that becomes too difficult to manage. It should nevertheless be considered, possibly along the lines of introducing different 'levels' or 'types' of membership to the RVC. Another option would be to introduce 'chapters' along functional lines. The timing of accession of focal points will be an issue – should the RVC go for a 'Big Bang', with scores of focal points joining at the outset? Or should a more cautious and gradualist approach be followed with successive waves of accession as the RVC matures? The pros and cons of both approaches will be further discussed in Chapter 8.

It has already been determined that the RVC will be advised by a Steering Committee made up of country representatives and foresight experts. In addition, representatives of the selected focal points will establish a Management Board for the RVC in order to prepare proposals of activities and to implement them after evaluation and approval by the Steering Committee. This paper has little to say about these structures, other than to recommend the inclusion of representatives from the EC and other UN agencies in the Steering Committee, with a view to (a) raising awareness of the RVC and (b) keeping up-to-date with developments and opportunities emanating from these international institutions.

6.2 Relations between Focal Points

The likely relationships between focal points have already been touched upon in earlier parts of this chapter, and it is clear that there are some fundamental issues here that will need to be addressed:

- What will be the main role of the Service Centre vis-à-vis the focal points, particularly if a fully distributed model of the RVC is to be implemented? For instance, will a set of pre-packaged services be assembled at the Service Centre for reproduction in the focal points? To what extent will the Service Centre operate as a centre of exchange for the focal points to share experiences and materials?
- What should be the division of labour between focal points? There is a variety of competences between focal points, meaning some will be better placed to do certain things than others. Perhaps some sort of competence-profiling of focal points could be carried out early on, not only to discern strengths, but also to identify weaknesses that could be tackled through the activities of the RVC.
- Some organisations are expected to be more active than others in the core activities of the RVC. Multiple levels/types of membership could allow a greater number of

organisations to join the RVC without the hassle of having to manage, on a day-to-day basis, a huge and disparate network. There are a variety of possibilities for introducing levels or types of membership: for example, membership level/type could be based upon (i) the payment of membership fees, or (ii) the TF competences of an organisation, or (iii) the nature of the organisation (government, academic, intermediary), or (iv) by geographical region (possibly following the EC's four-way programme coverage: New EU Member States, Pre-Accession Countries, Neighbourhood and Partnership Countries, and Central Asian Republics), or (v) by some other principle.

- Focal points will rightly ask what benefits they can expect from the RVC, particularly in the absence of any significant funding, and are unlikely to fully appreciate the intangibles that might accrue from participation. Some of the arguments that have been made in this report, along with others, will need to be mustered in order to convince centres to become focal points. However, arguments alone are unlikely to be sufficient, so that incentives will have to be thought about. For intermediaries, the possibility of offering to their clients a new set of services based upon foresight may be sufficient incentive. But the prospect of being able to use the UNIDO logo is probably a stronger incentive, though care will be required here for some obvious reasons. In other words, the RVC should attempt to become a brand that draws upon the reputation of UNIDO, thereby attracting centres to join.
- But benefits cannot flow only one-way, and the focal points should also be aware of their responsibilities to the RVC. Responsibilities essentially take the form of being active in some way or another over a given period. As has been proposed already, focal points could commit themselves to translation and dissemination tasks as conditions for their participation in the RVC, and other conditions could also be applied. The RVC may consider introducing Service Level Agreements (SLAs) for focal points, which sets out their duties for a given period. On the other hand, SLAs will be difficult to enforce without incentives and sanctions for non-compliance. Inactive focal points will be a fact of life and decisions will have to be taken on what to do about these. One option would be to introduce memberships that expire after a certain period, say 2-3 years. Focal points would then have to actively seek re-admittance to the RVC once their membership had lapsed, and this would provide an opportunity to review their past and future commitment.
- Nevertheless, probably the greatest threat to the RVC is that it will become an empty gesture, with few, if any, active focal points. This may be one argument for appointing a great many focal points at the outset, since a few amongst the many are likely to be active. This point will be returned to below.
- Regarding the level at which activities should be coordinated, the principle of subsidiarity will need to be applied by the RVC. What this means is that those activities that can be done more efficiently and effectively within the individual focal points should remain at that level without any need to involve the RVC in any coordinating role. This is likely to happen by default anyway: whilst focal points will be pooling their sovereignty to some extent, established foresight centres in particular will not want to have the RVC as the gatekeeper for their foresight

activities. As was highlighted earlier, focal points are likely to use the RVC when it suits them.

- As a final point, UNIDO might consider drawing up an "RVC Charter" that serves to clarify many of the issues raised above. As well as being aspirational, this could set out the respective roles and responsibilities of the various actors, and need not be long.

6.3 Organising and Managing the Activities of the RVC

The need for subsidiarity has been already highlighted, which means that many activities will be organised and managed locally by focal points and need not directly concern the RVC. Nevertheless, a great amount of activity will need to be coordinated at the level of the RVC, and how this will be done and by who needs to be considered.

Not everyone will be able to be involved in everything in an extensive RVC. So an important issue will concern the selection of focal points to participate in any given activity: some activities might require all to participate, but others will require just a few. This is not so much of an issue if the number of focal points is kept small. But if an expansive strategy is followed, then selection is inevitable. Self-selection is probably the best option initially, based upon existing competences and resources – this is how ETEPS operates. But there still remains the delicate matter of selecting the final list of participants.

Returning to the issue of language, the RVC should give serious consideration to using two working languages: English and Russian. Dedicated training and guides should be prepared in both languages, and where possible in native languages too (as has been already suggested, this might be a commitment from focal points – that they must translate materials and distribute them – in return for the services and status they will receive from the RVC). Russian is almost universally understood in the NIS countries. If the RVC is to be useful in this part of the world, it will probably have to use Russian.

6.4 Growth and Sustainability of the RVC

In the short-to-medium term, a pressing concern for the RVC is its survival. It has secured modest funding for two years until 2008, based upon monies from UNIDO and a handful of national governments. However, these sources of funding could be relied upon after 2008. This means other sources of funding will need to be sought. In fact, other sources of funding need to be sought from the outset, since many of the ambitions set for the RVC are dependent upon further financial backing. One of the purposes of this report has been to identify other international organisations that might act as funders of the RVC and/or its focal points. It is clear that the EC offers the best opportunities for securing further support, and the following section will discuss how the RVC might best position itself to meet the criteria for obtaining EC funding. As for the other agencies, the RVC should keep in close contact with these. This can be done by inviting them to participate in the RVC Steering Committee and to encourage them to attend training courses and the Summit of the Future.

In the meantime, it is perhaps worth opening Pandora's Box by asking why the long-term growth and sustainability of the RVC should be of concern. To do this, it is once again worth revisiting the functions/activities of the RVC, namely to network TF centres and to coordinate TF activities in the region; to deliver TF training; to commission TF studies; and to provide TF information. These activities are supposed to contribute to a set of general aims, which might be summarised as follows:

- To raise awareness of foresight amongst policy makers, business people, scientists and technologists, and civil society in the region;
- To nurture and strengthen a set of fledgling focal points across the region that will grow into internationally recognised centres of excellence in TF;
- To encourage and nurture collaborative working on specific TF projects that deal with issues transcending national boundaries; and
- To develop a foresight 'culture' in the region

These aims could no doubt be achieved in many different ways, some of which might not feature an organisation like the RVC. If this is taken as a starting premise, the issue of growth and sustainability might therefore be reframed: concern need not necessarily be with the growth and sustainability of the RVC as an institution, but might rather be refocused upon the growth and sustainability of foresight in the CEE/NIS region. In the short-term, the two are inextricably linked, with the former constituting the means for achieving the latter. But what if the RVC cannot be sustained beyond 2008? What if it fails to fulfil current expectations in the short-to-medium term? In such circumstances, it may be necessary to decouple the sustainability of the RVC with that of the growth of foresight in the region.

Given the uncertainty surrounding the long-term sustainability of the RVC, at least in its current proposed form, options should be considered for a world without the RVC or at least for a world with a rather limited RVC in operation post-2008. With this as a starting point, the immediate mandate of the RVC becomes clear: there should be a dash for 'expansion' and 'deepening' of focal points – they have the reach, they are potentially numerous, and they have a greater chance of survival. Under this scenario, there should be at least one focal point set up in each of the countries in the region as a minimum. Moreover, at least some of the focal points should have their TF capacities strengthened as far as possible – for example, by becoming training centres and/or leading foresight exercises. Focal points should also be well integrated into TF activities in other parts of the world, especially in Western Europe. In fact, the guiding principle for the RVC should be to create across the region as many effective foresight 'multipliers' as possible through measures like training trainers, generating promotional materials and guides for wider dissemination, and aiding focal points to obtain funding for foresight exercises (for example, from the EC). By nurturing well-developed and numerous focal points, the RVC will provide the best chance for its future survival.

6.5 Exploiting EC Funding Opportunities

Whilst other international players may provide support for TF activities in the region, these are likely to be dwarfed by the potential opportunities offered by the EC. However, as Chapter 4 has shown, the EC provides a complex and somewhat messy landscape, with lots of overlaps in programmes, as well as major changes planned for 2007. Making connections with the various EC programmes is therefore complicated: there is no simple one-stop location from where all foresight activities will be funded or coordinated. This is even the case in the same DG (e.g. DG RTD), where the potential for funding foresight activities is often spread across several administrative units and sub-programmes.

Taken together, these conditions create a significant level of uncertainty around the possibilities to exploit funding opportunities from the EC. The possibilities are clearly there, but what is the likelihood of them being realised? If left to itself, the chances are that the EC would fail to make the most of these opportunities – history has certainly proven this to be the case. Even where units and teams have been established that are dedicated to the promotion of foresight, as in DG RTD (Unit K2) and JRC-IPTS, they have largely failed to connect to foresight opportunities that might exist outside of their immediate environs. As this situation is unlikely to improve in the coming years, there is much scope for 'external' actors, such as the RVC, to begin to make more of these connections.

But what chance is there that the EC will provide funding for a network like RVC as opposed to simply funding a few of the focal points to participate in individual projects? The EC is likely to fund the RVC only through budget lines dedicated to dissemination of foresight results and practice, i.e. through the activities of Unit K2 and JRC-IPTS (or their successors), or possibly through the establishment of an EEGC under the Structural Funds and ENIP. Other funding for TF will only be accessible by focal points rather than the RVC as a whole. Thus, for virtually all EC funding, the individual focal points of the RVC will have to tender for bids in their own capacity. It will be important for them to keep abreast of these opportunities, hopefully through the RVC, but also by staying in close contact with the EC Delegations in their countries.

But could the EC be convinced to fund such a centre, or at least some of the activities it will carry out? Here, questions of credibility and coverage (geographical and policy domain) prevail. If the major foresight centres in the region sign up to the RVC, then it has a chance. On a more positive note, many measures that are intended to support the development of foresight capacity are likely to be focused upon New Member States and Pre-Accession Countries.

7. Learning from other Foresight Centres

The RVC for CEE/NIS is not the first attempt to network foresight resources on a regional basis. In this section, three examples of other international initiatives that have tried to do just that are examined:

- The Nordic Foresight Forum
- APEC Technology Foresight Centre

- UNU Millennium Project

7.1 The Nordic Foresight Forum

Over the last decade or more, all Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) have had some experience in using foresight, but they have used rather different approaches in doing so. In addition, a transnational body known as the Nordic Innovation Centre (NICe) has launched three foresight projects (on Hydrogen, Bio-medical sensors and ICT) covering the whole Nordic region. These national and Nordic level activities create opportunities for mutual exchange, learning and identifying 'good practices'. Moreover, the countries in the region share a common set of social values to a large extent and there are significant areas of overlap where there are common interests. This creates the potential for economies of scale and scope in carrying out foresight projects.

With this in mind, NICe has set up the Nordic Foresight Forum (NFF) as a meeting place where Nordic foresight practitioners can exchange, learn and identify good practices for prioritising in science and technology. Currently, it is a pilot project with a two-year duration (2005-06), but there are hopes that it will become firmly established on a more long-term basis. The work packages associated with the project are outlined below as an indicator of the sorts of activities that an early-phase RVC might consider conducting.

NFF Work Packages

The work to be carried out in NFF is summarised in five work packages:

WP 1. Nordic Foresight Forum: Secretariat and Meetings. The objective of the Nordic Foresight Forum for practitioners and researchers is to facilitate the exchange of experience and learning.

WP 2. Mapping of Nordic Foresight Actors and an Analysis of Recent Nordic Foresight Activities. The objective here is an updated mapping of Nordic foresight actors and description of foresight activities in the Nordic countries including the two ongoing and one finalized foresight projects sponsored by NICe.

WP 3. Mapping of Nordic national research and innovation council system and analysis of the needs for foresight and similar strategic intelligence. It is the objective to describe national (and Nordic) research and innovation councils and similar system and organisations. Description and analysis of current use of foresight with the five national research and innovation council systems – and interaction between national actors and on the Nordic and the EU level.

WP 4. Identifying fields of science and technology for possible future Nordic (NICe) initiatives. The objective is to identify systematic processes for ways of identifying possible future fields of technology and knowledge based on available Nordic and national information (Nordic Strengths and Weaknesses). This WP will also identify good practices in matching future fields of technology to national preconditions: Current capabilities in science and technology, industry structure, socio-economic demand factors etc. Finally it

will be discussed and analysed how different actors in the innovation system can implement results from foresight studies.

WP 5. Nordic Foresight Conference and final report: A Nordic foresight and "priority setting in research councils" conference will be arranged by NICe in 2006 where a report of Nordic foresight activities will be presented.

For further information, contact Kristian Borch (web: http://nff.risoe.dk/About%20NFF.htm; e-mail: kristian.borch@risoe.dk)

7.2 APEC Centre for Technology Foresight

The APEC Centre for Technology Foresight was launched in 1998 with the support of the Thai Government. The Centre's office is in Bangkok but it operates as a virtual Centre, serving and involving all APEC member countries. Its establishment follows a comprehensive two-year feasibility study, initiated by Thailand.

The Centre is well-known for building foresight capacity across APEC countries and for conducting transnational regional foresight exercises. Capacity-building takes the form of annual training workshops, similar to those already run by PREST and UNIDO, with other shorter training events also held throughout the year (for example, there are dedicated sessions on technology road mapping, whilst in September 2006, a course was run on using futures studies in policymaking). It is possible that from 2007, the APEC and PREST training courses will enter into alliance. Concerning region-wide foresight exercises, among the topics covered are the future of water supplies and management, sustainable transport, technologies for learning and culture, nanotechnology, and healthy futures in mega cities.

A recent project undertaken under contract to the Japan-ASEAN Exchange Programme (JAEP) has sought to overtly combine the project-based work with capacity-building. Known as the ASEAN Technology Foresight and Scan project, it looked to develop capability in technology foresight amongst ASEAN member countries by building up expertise through workshops and a pilot ASEAN foresight project. In a similar vein to the UNIDO production chain foresight exercises, the regional exercise was largely constituted by supporting sub-projects from each member country. The project has also aimed to establish a regional network of "foresight champions" who have been regularly updated about foresight developments worldwide through a bi-monthly newsletter and through attendance at three project workshops. The project ran for two years, finishing in 2005. The status of any follow-up activities remains unclear.

Use of the web site has been important for disseminating information about training workshops and reports. However, beyond this, it does not seem to have any other roles. At some point, it was decided to establish a Technology Foresight Network (TFN), which was essentially open to anyone to join from the APEC region and beyond. Its stated purpose has been to

- facilitate the exchange of information, ideas and expertise about foresight;
- improve access to reports of foresight activities and projects;

- enhance communication amongst foresight practitioners in order to stimulate collaboration, development of foresight techniques and best practices.

Looking at the traffic across the network, at least as evidenced by the web site, the TFN appears to be inactive at the current time.

For further information, contact Ron Johnston (http://www.apec.org)

7.3 AC/UNU Millennium Project

The Millennium Project of the American Council for the United Nations University (AC/UNU) is a global participatory futures research think tank of futurists, scholars, business planners, and policy makers who work for international organisations, governments, corporations, NGOs, and universities. Set up in 1993/94 with seed-funding from UNESCO and UNDP, the purpose of the Millennium Project is to be an international utility to assist in organising futures research by continuously updating and improving humanity's thinking about the future and making that thinking available for feedback as a geographically and institutionally dispersed think tank. The Project is not a one-time study of the future, but provides an on-going capacity as a geographically and institutionally dispersed think tank. It works by connecting local and global perspectives via regional Nodes (groups of individuals and institutions) in several countries across the globe – in the RVC region, there are nodes in Moscow and Prague.

The Millennium Project's primary products include:

- On-going assessment of what are the most significant long-range issues and opportunities, as well as focused analysis of policies and agencies to address them;
- Communications network of futurists and scholars with an international information system of futures research that provides public access;
- The annual State of the Future report (based on an integration of others' forecasts and the Project's own work, and built on the foundation of the previous year's reports);
- Special studies such as Future Issues of Science and Technology, Futures Research Methodology, Middle-East Peace Scenarios, Environmental Security, Future Global Ethical Issues, Lessons and Questions from History, and Future of Africa;
- Advanced training in the methodology and analysis of critical issues, opportunities, and challenges of the future.

Sponsors for the operational programme over the years have included the following: Alan F. Kay & Hazel Henderson Foundation for Social Innovation; Amana Institute (Brazil); Applied Materials; U.S. Army Environmental Policy Institute (AEPI); Dar Almashora for Consulting, Kuwait; Deloitte & Touche LLP; Ford Motor Company; Foundation for the Future; General Motors; Hughes Space and Communications; Monsanto Company; Motorola Corporation; Pioneer Hi-Bred International; Shell International, (Royal Dutch Shell Petroleum Company); UNU; U.S. Environmental Protection Agency (EPA); U.S. Department of Energy; Foresight and Governance Project of the Woodrow Wilson International Center for Scholars.

For further information, contact Jerome Glenn (jglenn@igc.org and http://www.acunu.org/)

7.4 Lessons for the RVC?

The first lesson from these case studies is the feasibility of a centre like the RVC – all three case examples are virtual centres to some extent, networking existing geographically dispersed organisations across international boundaries. All three centres also conduct their own foresight studies on issues of concern of member countries. One centre, i.e. the APEC TF Centre, conducts training courses, in common with the RVC. A couple of recommendations emerge from this brief review:

1. The architects of the RVC should make urgent contact with the managers of the networks described above with a view to capturing relevant lessons in a more directed way than has been possible to do in this report.
2. Contact should also be made with other networks in the area, e.g. the European regional foresight college operated by DIACT in France, the European Futures Academy coordinated by the Finland Futures Research Centre, etc. to learn any lessons for the RVC and to investigate opportunities for possible collaboration.

8. Possible Focal Points for the RVC

According to existing proposals, institutions with TF competences will be nominated as focal points of the RVC. These proposals also highlight an emphasis upon national technology foresight centres in the region, no doubt on account of their accumulated experience and their linkage to national funding streams. Many countries in the region, particularly in Central Europe, Russia, Turkey, and Ukraine already have such national centres that could be networked in the RVC. However, the same cannot be said for the Central Asian Republics, the Western Balkans, or the Caucasus countries. There will therefore be a need to identify 'latent' foresight centres to 'complete' the network. These may include government ministries, universities, institutes of academies of sciences, or NGOs. They should be centres that offer the potential to champion foresight in the future and to become practitioners, sponsors, or users of exercises. But 'latent' centres will also need to be built in most countries, since existing centres tend to have a narrow focus (this is true in Western Europe as well). For example, foresight has much potential in sub-national regional development, but national science ministries are rarely well-placed to realise this potential. Instead, regional actors, such as regional development agencies, need to become active foresight champions and users. Clearly, focal points will need to have different profiles if they are to reach out to different communities of actors.

Thus, focal points will need to be identified intelligently, which will be a major challenge for UNIDO, on account of the following factors:

- As already stated, in many instances, only latent potential may be present and will need to be nurtured and developed. Identifying such potential is extremely difficult to do as

an international organisation and will require extensive local knowledge to be successful.

- There is the requirement that UNIDO work through national delegations to identify appropriate focal points. This will almost certainly lead to problems, since, for one reason or another (e.g. a tendency for clientelism and cronyism in the region), it is likely that organisations will be proposed that are not best suited to act as focal points. This is a fact of life, and whilst unfortunate, will have to be accommodated but also circumvented somehow (e.g. through the appointment of multiple focal points in countries, particularly the larger ones).

As for the profiles and numbers of focal points to involve, much depends upon the way the RVC will work and the extent of its intended coverage. A "fully-fledged" RVC would have multiple focal points in many countries, possibly arranged into 'chapters' to reflect their functions and communities (for example, there could be a government chapter, consisting of ministries; an academic chapter, consisting of universities and academy institutes; and a business-oriented regional development chapter, consisting of regional development agencies, innovation-support centres (e.g. Innovation Relay Centres), and so on). Scores of focal points would be set up under this scenario. A fully-fledged RVC along these lines might be too ambitious to establish in the first instance, in which case, a more piecemeal and incremental approach could be followed. But a fully-fledged RVC should be set as the ultimate vision towards which to work.

There have also been discussions about the shape of the RVC itself since the first draft of this report was submitted in July. During this time, a 'distributed' RVC has been proposed that de-centres the network from the Service Centre in Budapest and sees essential network services distributed across focal points. The latter already includes information management services, but such a model could be extended to all parts of the RVC, particularly given the need to translate some materials.

On a final note, consideration should be given to including centres from outside of the region to participate in the RVC. It has already been proposed that PREST (UK) and OPTI (Spain) should be included, given their existing arrangements with UNIDO. However, other organisations might also be considered, for example, JRC-IPTS (Seville) and possibly even NISTEP (Japan).

In the table below, around fifty organisations are proposed as possible focal points for the RVC. For several countries, no proposals have been made – more research will be required to identify suitable candidates. For others, more than one organisation is suggested. This is usually in the larger countries and fits with the principle of having multiple focal points focused upon different topic areas and constituencies.

Table: List of Possible RVC Focal Points

Country	Organisation Name	Type	TF Experience
Albania			
Armenia			

Azerbaijan			
Belarus	The Republican Centre for Technology Transfer (RCTT)	Intermediary	Supported by UNIDO; offer TF as one of their support services
Bosnia			
Bulgaria	ARC Fund	Intermediary	Participation in EC ForeTech pilot foresight project and EC ForeIntegra project
Bulgaria	Ministry of Education and Science	Government	Co-organised TF training with UNIDO in 2004; dept head, Albena Vutsova, formerly of JRC-IPTS
Croatia			
Cyprus			Participation in EC eFORESEE pilot foresight action
Cyprus	Middle Eastern Technical University	Academic	Headed by Turgut Tumer, former programme manager for Turkey 2023 Vision project
Czech Rep	Technology Centre Prague, Czech Academy of Sciences	Intermediary	Organisers of Czech national Foresight; existing TF training collaborators of UNIDO
Czech Rep	Dept for Futures Studies, Charles University	Academic	
Estonia	Institute of Baltic Studies	Intermediary	Participation in EC eFORESEE pilot foresight action
Estonia	Praxis Centre for Policy Studies	Intermediary	Members of ETEPS
Georgia			
Hungary	Institute of Economics, Hungarian Academy of Sciences	Academic	Attila Havas, leading Foresight practitioner and analyst in Europe
Hungary	Dept for Futures Studies, Cornivus University, Budapest	Academic	30 years experience with futures studies, working with govt and business; run biennial training course for young futurists with the support of UNESCO; deliver courses to students in Cornivus and have PhD programme
Kazakhstan			
Kosovo			
Kyrgyzstan			
Latvia	Forward Studies Unit, Latvian Union of Scientists	Academic	Member of ETEPS
Latvia	Latvian Technological Centre	Intermediary	IRC; organised awareness workshop on TF in 2004
Lithuania			
Macedonia			

Moldova			
Montenegro			
Poland	Ministry of Science and Higher Education	Government	Sponsors and organisers of national TF programme
Poland	Institute of Fundamental Technological Research, Polish Academy of Sciences	Academic	Members of ETEPS
Poland	OPI Information Processing Centre	Intermediary	Unknown; IRC Central Poland
Poland	Warsaw University	Intermediary	Unknown; IRC North-East Poland
Poland	Krakow University of Technology	Intermediary	Unknown; IRC South Poland
Poland	Wroclaw Centre for Technology Transfer	Intermediary	Unknown; IRC West Poland
Romania	National University Research Council, Executive Agency for Higher Education and Research Funding	Government	Organisers of Romanian national foresight exercise
Russia	Institute for Statistical Studies and Economics of Knowledge, State University - Higher School of Economics	Academic	Collaborator with UNIDO on training courses; responsible for conducting national and regional foresight in Russia; will establish a Foresight Centre in Moscow in late 2006
Russia	International Science and Technology Centre (ISTC), Moscow	International	Unknown; funders of R&D projects in Russia
Serbia	Science and Technology Policy Research Centre of the "Mihajlo Pupin" Institute	Academic?	Foresight champion, Djuro Kutlaca, has been active in promoting TF in Serbia
Slovakia	BIC Group Bratislava	Intermediary	Collaborators with UNIDO on TF training; currently organising pilot foresight exercises in regions
Slovenia	Slovenian Research Agency	Government	Conducted pilot foresight projects; organisers of Bled Forum; employ Blas Golob, formerly of JRC-IPTS
Slovenia	Josef Stefan Institute	Intermediary	IRC; co-organised with EFA an awareness workshop on regional foresight in 2003
Tajikistan			
Turkey	Istanbul Technical University	Academic	Ozcan Saritas, leading Foresight practitioner and analyst in Europe
Turkey	TUBITAK	Government	Organisers of Turkey Vision 2023; collaborators with UNIDO on TF training
Turkey	METU-Technopolis, Ankara	Intermediary	Unknown; IRC Anatolia
Turkey	TUSSIDE	Government	Collaborators with UNIDO on TF training

Turkmenistan			
Ukraine	Kyiv Polytechnic Institute	Academic	Collaborators with UNIDO on TF training; responsible for UNIDO TF Distance Learning project
Ukraine	Dobrov Centre, Ukrainian Academy of Sciences	Academic	Managers and organisers of national TF programme in Ukraine
Ukraine	Science and Technology Centre of Ukraine (STCU)	International	Unknown; major funders of R&D in Ukraine and other NIS countries
Uzbekistan			

Besides approaching individual centres to join the RVC, consideration should be given to enlisting existing networks. This has the advantage of reaching many more centres in an efficient way, without the hassle of having to deal with each of them individually. There are countless such networks across the region, and it will remain a task of the RVC in its early days to identify the most appropriate to involve. In the course of the research for this report, one network was identified that could be activated to work for the RVC. This is the Central and Eastern European Virtual University (CEEVU), which has already been used by KPI (Ukraine) to pilot the UNIDO technology foresight distance learning course in English (Tallinn University) and Russian (Donetsk National Technical University). Details of the CEEVU are provided below.

Central and Eastern European Virtual University (CEEVU)

Its mission is to combine the efforts of e-learning centres of technological and engineering universities of Central and Eastern Europe. By implementing the main principles of information society – lifelong and limitless learning, it will ensure the training of new formation specialists able to speed up economic and social development of the region due to efficient and productive application of the latest achievements in the field of natural, abstract, and engineering science, as well as informational and communication technologies, in their practical work. Member universities are as follows:

- State Engineering University of Armenia
- Technical University of Sofia
- Budapest University of Technology and Economics
- Kaunas University of Technology
- Warsaw University of Technology
- University Politehnica of Bucharest
- Donetsk National Technical University
- National Taras Shevchenko University of Kyiv
- National Technical University of Ukraine "Kyiv Polytechnic Institute" (KPI)
- International University of Finance, Ukraine
- Lviv Polytechnic National University
- National Technical University "Kharkiv Polytechnic Institute"
- Brno University of Technology
- Tallinn University of Technology

ANNEX: REGIONAL EXPERTS QUESTIONNAIRE SURVEY

Name:

Organisation:

1. In your opinion, where could foresight be deployed most usefully in your country over the coming five years?

2. What sorts of opportunities exist in your country for the conduct of foresight exercises at the moment?

3. What are the main barriers to the wider use of foresight in your country?

4. What centres of (a) foresight competence and (b) foresight understanding/awareness already exist in your country?

5. In your opinion, what competences are still missing and/or remain weak? And where could understanding/awareness be realistically improved for maximum benefit?

6. What sorts of activities and support measures do you think the RVC should provide?

7. What would be the likely benefits and limitations of these activities and support measures in your country and in the CEE/NIS region as a whole? Please explain your answer.

8. What organisations in your country do you think should be involved in the RVC, for example, as focal points?

9. If you were asked to provide a mission statement for the RVC (in less than 50 words), what would it be?

10. Do you have any further comments or suggestions?

Thank you! Please e-mail completed forms to Michael.Keenan@manchester.ac.uk

UNIDO TF REGIONAL PROGRAMME 2006-2008 FOR THE CENTRAL EASTERN EUROPE AND NEWLY INDEPENDENT STATES (CEE/NIS)

Draft* **Version 1**
20 October 2006

* This document has been produced without formal editing.

Content

BACKGROUND

On the basis of recommendations from regional gatherings, UNIDO is implementing the Regional Programme for Technology Foresight in CEE and NIS*.

This regional initiative aims at responding to the Central and Eastern Europe and NIS need for a mid- and long-term development vision of the region as well as for bringing a more technology-oriented focus into the relevant national and regional knowledge-based institutions. The regional initiative is instrumental to provide assistance to economies in transition for a more sustainable and innovative development aiming at fostering economical, environmental and social benefits at national and regional levels. An overall picture of the activities of the Regional Initiative can be found in the dedicated web page: www.unido.org/foresight-cee-nis.

JUSTIFICATION

Decision-makers face increasingly complex issues, given that economic, technological environmental – and thus social – challenges are brought to any nation sate rather quickly, due the forces of globalisation, and these challenges are usually inherently inter-linked. Technological changes cause economic, environmental and social threats and opportunities; economic resources are required to finance public policies aimed at tackling these issues (e.g. harnessing technological change, preventing environmental crises, preventing social explosions, etc.); and government policies are under ultimate social control.

Foresight processes can assist decision-makers in this complex environment to reduce technological, economic or social uncertainties by identifying various futures and policy options, make better informed decisions by bringing together different communities with their complementary knowledge and experience, obtain public support by improving transparency, and thus improve overall efficiency of public spending.

Besides Technology Foresight, there are a number of other useful ways, techniques, and methods to assist strategic (long-term) policy processes and strategic decision-making (for businesses). The selection of methods should be based on the policy or strategy issue, i.e. none of these methods is superior to any other ones *a priori* – the context (challenges to be tackled, resources, competence and time available, etc.) should drive the decision as to what approaches and method(s) are adequate, and hence to be applied.

Foresight is a relevant decision-preparatory tool in emerging economies, too, not being in the forefront of technological development. CEE/NIS countries are faced a number of specific challenges, most importantly due to their transition processes (fundamental political, economic and social changes), as well as to major changes in their external environment. Given these specific factors, there are even stronger needs for strategic thinking in CEE/NIS than in the advance countries. Yet, one cannot observe strong commitment for profound foresight programmes in CEE/NIS, that is,

---

* This programme is prepared on the basis of the following documents: *Establishment of a Technology Foresight (TF) Regional Virtual Centre (RVC) for the CEE/NIS Countries: International Aspects* by Michael Keenan (Manchester University, UK) and *Developing UNIDO TF Programme for CEE/NIS: Report* by Attila Havas (Hungarian Academy of Science).

sound, in-depth consideration and determined implementation of policy recommendations, accepting/ introducing a new decision-preparatory and decision-making culture, along with a new way of thinking, with more emphasis on communication, co-operation, consensus, and joint commitments to take action.

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

RECOMMENDATIONS FOR THE UNIDO REGIONAL TF PROGRAMME FOR CEE/NIS

On the basis of the above discussion and previous UNIDO initiatives, the following recommendations are proposed concerning the overall approach (policy rationale) of the UNIDO Regional TF Programme for the CEE/NIS and its components and activities. Further, taking into consideration the launching of the Regional Virtual Centre for Technology Foresight in the CEE/NIS, is also presented basic recommendation for the role and responsibilities, as well as a division of labour among the focal points, the service unit, the decision making organs and UNIDO to implement the Programme.

Development objectives

The regional technology foresight initiative will provide assistance on developing capability for strategic decision-making on science, technology and innovation (STI). The aim is to provide more sustainable and competitive development, fostering economic, environmental and social benefits at national and regional levels. Main target outcome of the regional programme is to develop policies and R&D programmes that deal with innovation, industrial growth and competitiveness.

Immediate objectives

The immediate objectives of the UNIDO regional TF initiative are: (a) to raise awareness of (technology) foresight for enhancing the competitiveness of industry by exploiting emerging and future trends in science and technology, and thus contributing to improved quality of life; (b) to and adapt methodologies and tools for technology foresight in the region, and develop/ test methods required by international co-operation; (c) to establish and strengthen national and regional knowledge as well as the capability of using technology foresight for designing policies and strategies that focus on innovation; (d) to initiate regional foresight projects on specific sectors or themes so as to demonstrate its relevance, as well as the practical use of various methods, programme design and execution, etc; and (e) to provide solutions to

relevant problems in the region that can be addressed through the appropriate application of technology. Special attention will be given to pre-accession and late-accession countries to the European Union.

The overall approach

Regional dimension

A special feature of the UNIDO Technology Foresight concept is the *regional dimension*. The core idea of all regional initiatives, including this one, is to use the foresight process as a tool for assisting strategic decision-preparatory processes, with a strong emphasis on RTDI issues.

Nevertheless, it has to be taken into account that many technology foresight programmes are undertaken with the assumption that specific technological developments take place within the borders of socio-economic systems, and its effects should be beneficial to the society. This means that final policy decisions will always have a national (or intra-country regional) character, since it is at this level that strategic political or business decisions are made.

Moreover, international co-operation can be highly beneficial in general, and for emerging economies, in particular. Thus, there are several reasons that justify the regional approach, understood here as co-operation among CIS/NIS countries (not necessarily all of them in the same project, though), or among regions located in these countries. In other words, the principle of *'variable geometry'* is to be followed: the geographic coverage of actual projects would depend on the nature of the issue to be tackled, the willingness of CIS/NIS countries to participate, their skills, financial and intellectual resources, and most importantly the perceived benefits of the project.

The major benefits of being engaged in regional foresight programmes are as follows:

- tackling issues of regional (trans-border) character jointly, and thus creating shared visions and opportunities for joining forces for strategic actions, including regional RTDI co-operation;
- compensating for underdeveloped or lacking methodological skills;
- creating synergies (both in terms of conducting actual foresight projects, and implementation of the policy recommendations);
- saving costs (by exploiting economies of scale, e.g. background analyses and preparatory activities relevant for a group of countries, regions, as well as common awareness building and training);
- capacity building (foresight and prospective analyses methods, decision-preparation, policy-making; policy implementation);
- promoting regional (trans-border) networking;
- reaching the necessary quality and size of experts when collecting their opinion.

Notwithstanding the advantages of the regional approach, as already stressed, it cannot be imposed upon the partners. It can only be applied in a demand-driven manner and when and where its implementation is feasible, and the socio-economic situations among the related countries are relatively comparable.

The regional dimension of the UNIDO TF initiative also facilitates catching up economies to be aware of global and regional trends, which could bring advantages and challenges for them.

The ultimate objective envisioned by UNIDO TF regional initiatives is to make a step forward by identifying regional consequences and uses based on the national foresight programmes in progress, in such a manner that the experiences accumulated in a given region, along with the contributions brought in by international experiences, may facilitate a process of joint reflection on key issues that may affect several countries. For this purpose, certain productive chains and/or areas of knowledge, that present a common interest for more than one country in a region, can be selected for jointly run foresight programmes. The result to be achieved is the identification of the broad trends of technological evolution capable of influencing these production and innovation chains (networks) over the medium and long-term, and thereby to facilitate strategic decision-making in relation to these tendencies in each country. At present, UNIDO is supporting foresight studies at the regional level in the following production chains and sub-regions:

- fishery industry in the Pacific coast of South America;
- products of the Andean High Plateau;
- food industry in Central and Eastern Europe.

In consequence, one of the greatest potential achievements of UNIDO's regional foresight approach is its contribution to (re-)structure the sectoral systems of production and innovation in the target region, in this case in the CIS/NIS region.

Foresight in the broader policy context

As already emphasised throughout this report, Foresight should be understood and conducted as a decision-preparatory tool in the context of STI policies and broader socio-economic development strategies – or in the context of strategic planning, if run by/ for businesses. In other words, it should not be conducted just for the sake of running a foresight programme (because it is fashionable; promoted or even financed by international organisations; or 'peer' countries, regions have already conducted it, etc.) Thus, whenever it is possible and meaningful, the use of other elements of the policy tool box – such as, collection and analyses of relevant data; devising policies; evaluation of policy programmes; assessing and monitoring projects; technology assessment; etc. – should be stressed, e.g. at awareness raising events and training seminars.

Foresight and other prospective (analysis) techniques

It is recommended to focus the UNIDO regional initiative on Technology Foresight activities, and thus keeping a clear distinction between Foresight and other prospective techniques (e.g. key or critical technologies, technology forecasting, technology road-mapping, etc.) However, when there is a well-defined need from the partner countries, to use some of these other prospective techniques, a thorough consideration should be given to those initiatives. In case of finding good reasons to co-operate in those types of projects because of the potential benefits, it would be sensible to embark upon these projects, too, although they are beyond the scope of Foresight.

Again, whenever it is possible and meaningful, these other prospective techniques/ approaches can be disseminated, e.g. at awareness raising events and training seminars.

Components

This regional TF initiative involves the promotion of the concept among the various stakeholders (policy-makers, businesses, researchers, other experts, NGOs, etc.); the development of capabilities by training and re-training (would-be) practitioners; and the co-ordination and implementation of foresight (prospective) projects in the region, by offering hands-on experience with different methodologies. To support these activities, regional facilities are already under development and further resources will be mobilized to develop and promote a foresight culture.

Over several years, this initiative has already organised training seminars and developed training materials, and set up a regional database of interested specialists. Regional and sub-regional steering groups and focal points have been established to co-ordinate and implement regionally conceived foresight projects. Promotional materials and events have been organised to familiarise stakeholders with the concept, the practice and the results of various foresight activities.

A) Awareness-building and creation of foresight culture in the CEE/NIS region

On the basis of a regional technology foresight network, UNIDO prepares and disseminates promotional and general information to demonstrate the use and relevance of foresight for CEE/NIS countries to policy-makers, businesses, R&D institutes, professional associations as well as representative organisations of the general public, e.g. NGOs. This is done through conferences, fora, publications, electronic books, the Internet and the mass media. Special attention has been given to motivating industry to participate in the initiative. In terms of the scope of the exercise, foresight programmes conducted in other regions are examined, summarised, and adapted to regional perspectives; promotional materials are produced; events are organised to familiarise stakeholders with the overall concept, the various approaches, the practice and the results of regional foresight activities; hands-on experience are disseminated to show how successful different approaches are, demonstrating the value of the results to stakeholders. The main target is to build the foresight culture into the thinking of present and future generations of decision-makers in all fields, and policy-makers, in particular.

B) Development of national and regional capabilities

The initiative supports the creation and strengthening of national and sub-regional centres of excellence on foresight process, which could be mobilised for the preparation of foresight programmes and studies on foresight methods. It develops a roster of regional and international experts on foresight and relevant areas of knowledge. Various activities are dedicated to enhance the skills of foresight practitioners through courses, workshops, seminars, fellowships and study tours. For this purpose, the UNIDO develops exchange programmes with regional centres and institutes in other regions. Special attention is given in conducting selected foresight projects to demonstrate the applicability of foresight approaches and their added value for the development of national and regional policies related to common issues or themes. A regional virtual "centre" (or network) has been established to function as a repository of foresight knowledge and experience to maintain these activities in the region for the long-term. The Regional Virtual Centre (RVC) on Technology Foresight is composed of the focal points, the service unit, and it is guided by the Steering Committee and the Managing Board.

C) Co-ordination and implementation of foresight programmes and studies on foresight

Dedicated fund-raising is conducted to create appropriate financing mechanisms, such as a multi-partner funding. A regional Steering Committee should be established to co-ordinate regionally conceived foresight projects, to be implemented by the national focal points and other experts. Such co-ordinating bodies will initiate regional foresight activities with a view to motivating national actors to adopt shared foresight objectives, methodologies, infrastructure and management teams, and using foresight in the design of STI and other policies. Ideally, the national focal points will be equipped with the necessary human resources, organisational capacity, experience in the field, and have direct access to decision-making bodies. The regional initiative makes strong use of information and communication technologies. UNIDO plays a role of overall co-ordination and the coordinating mechanism promotes contributions that are both creative and innovative from the members of the regional network of experts.

Activities

The above three main components consist of a number of activities:

A) Awareness-building and creation of foresight culture in the CEE/NIS region

- Management of information on Technology Foresight, Technology Forecasting, Technology Road-mapping, Critical Technologies, Technology Assessment, and Evaluation of prospective programmes (including TF projects and TF methods)
- Operating an Internet portal and database; as well as other IT facilities
- Organization of regular Regional Technology Foresight & Prospective summits and the "Fair of Future"
- National awareness-building seminars
- Marketing and dissemination of the various activities of the Regional TF Initiative (online and paper based, e.g. leaflets and brochures)
- Translation of documents to different languages

B) Development of national and regional capabilities

- Preparation of training materials on Technology Foresight, incl. other prospective techniques, when relevant (re-organizing/updating existing materials, as well as addressing new topics)
- Organization of education and training programmes on Technology Foresight (incl. other prospective techniques, when relevant)
- A closely related activity is to develop and test a new training, namely Module 5: Training of trainers; and then to organize it in several countries, in order to develop training materials in various languages
- Exploitation of existing training infrastructure (such as KPI and Forlearn e-books, on-line courses, EFMN case studies)
- Promotion of curriculum development in order to include TF and other prospective techniques in higher education courses in the region

- Promotion of the creation of prospective analysis units/teams at public agencies, industry associations and academia

C) Co-ordination and implementation of foresight programmes and studies on foresight

- Promotion of networking among experts and organizations in the field of TF and other prospective analyses
- Initiating/ commissioning studies on TF and other prospective analysis (methods, efficiency, implementation, etc.), incl. international comparative studies, and communication of the results to decision-makers, experts, and the general public
- Conducting studies on TF and other prospective analysis (methods, efficiency, implementation, etc.), incl. international comparative studies, and communication of the results to decision-makers, experts, and the general public
- Provision of advice and co-ordination of TF and other prospective programmes/ projects in the CEE/NIS region, with special emphasis upon the national TF centers of the region
- Conducting TF and other prospective programmes/ projects (at various levels) and communicate results to decision-makers, experts, and general public
- Fund raising for the above activities
- Establishment of management, co-ordination and monitoring of the above activities.

REGIONAL VIRTUAL CENTER FOR TECHNOLOGY FORESIGHT –

Implementation of the Regional Programme on Technology Foresight for CEE/NIS

Draft* **Version 1**
20 October 2006

* This document has been produced without formal editing.

Content

1. Summary:

In 2005, UNIDO, in cooperation with the Hungarian and Czech governments has started a preparatory phase to launch the establishment of a Regional Virtual Centre on Technology Foresight (RVC) for the Central and Eastern European region (CEE) and Newly Independent Countries (NIS). This exercise aims at preparing the basic concept and support documents for consideration and decision by the interested countries. The RVC is proposed to act as a facilitator to the implementation of the Regional Initiative on Technology Foresight for the CEE/NIS. In this context, the virtual centre will have the functions of coordinating the regular Technology Foresight Summits for the CEE/NIS, promoting studies, organizing training programmes, collecting and disseminating information and keeping data-base in an internet portal. The focal points and service unit of the virtual centre will be hosted by selected institutions and will be organized as a network of institutions and persons, using intensive modern information and telecommunications technology. The participants and beneficiaries of the network will be decision makers from high policy level institutions, officials and managers responsible for technology development in CEE/NIS and other selected regions, as well as decision makers of enterprises working in these regions. The network will particularly target strong involvement of the business sector. This virtual centre, mobilizing the above mentioned network, will be a fundamental operational basis of the UNIDO Regional Initiative on Technology Foresight for the CEE/NIS, as a major exercise dedicated to consolidate concrete contributions of foresight to the creation of new visions and policy making process addressing regional and national issues, awareness building and developing foresight culture in the region. The main outcome of the virtual center will be methodological and information support for governments and industry for innovation policy decision making process, as well as the development of the technology foresight culture in the region.

The regional virtual center will represent an important effort of UNIDO to guarantee the establishment of a sustainable institutional, coordinating and funding framework for the regional initiative as well as the necessary ownership by the regional stakeholders.

2. Functions of RVC:

The stated aim of the RVC is to provide methodological and informational support on technology foresight to industry and innovation policy decision makers, with a view to developing a foresight culture in the CEE/NIS region. With this in mind, the RVC is anticipated to fulfill the following functions:

- Provide advice and professional coordination of TF activities in the CEE/NIS region, with special emphasis upon the national TF centers of the region;
- Network persons and national institutions in the field of TF;
- Commission studies and communicate results to decision makers and the general public;
- Organize and support international comparative studies;
- Organize education and training programmes;
- Collect, manage, transmit and publish information on TF;
- Operate an Internet portal and database;
- Provide an information service for corporate partners;
- Fulfill the secretariat functions of the Regional Operative Steering Committee; and
- Prepare and organize regular Regional TF Summits.

3. Users of the RVC services

The users of the RVC are anticipated to be the following:

- Relevant institutions from the CEE/NIS region, participating in the UNIDO Regional TF Initiative;

- Governmental and parliamentary administrations of the countries participating in the project through financing;
- Regional administrations of the countries participating in the project through financing;
- Governmental and parliamentary administrations of the countries not participating in the project through financing;
- Regional administrations of the countries not participating in the project through financing;
- Business companies; and
- Professional and interest groups of SMEs and other companies.

4. The definition of RVC and its legal entity

Regional Virtual Centre (RVC) is an operational element of the UNIDO's Technology Foresight initiatives. The centre is expected to act as a facilitator for the implementation of the Regional Initiative on Technology Foresight for the CEE/NIS. being responsible from three main components of UNIDO's TF initiative in the region including (1) building awareness of TF in the region and creating a Foresight culture; (2) developing national and regional capabilities of TF; and (3) coordination and implementation of TF activities in the region.

RVC will be a UNIDO project during the implementation phase. Each host institution joining the RCV will form a focal point of the RVC and will establish a unit to deal with the activities related to the RVC work plan. Also the service unit will be a separated unit of a selected host organization

By its nature the RVC does not have a legal entity as a 'Virtual' organisation. Nevertheless it is an entity which can be easily identified by the target groups, participants and moreover by the larger public. That is why the RVC has (should have) its own image represented by a logo to be used for instance in promotional materials. This image should reflect the RVC's mission and also its relation to UNIDO, which is necessary to increase its recognition and to strengthen the effect of the initiative.

5. Structure and components of the RVC

The RVC is proposed to be a regional network of organizations and experts enabling regional exchange of information, experience and good practices on applying TF efforts and programmes as important tool for governments, enterprises and research community to promote competitiveness, innovation and strategic decision-making. In this context, the RVC will be a part of UNIDO's TF Programme for the CEE/NIS and will be responsible from undertaking the programme activities (studies, training, summit etc.) in the region. *Figure 1* illustrates the organisational structure of the RVC.

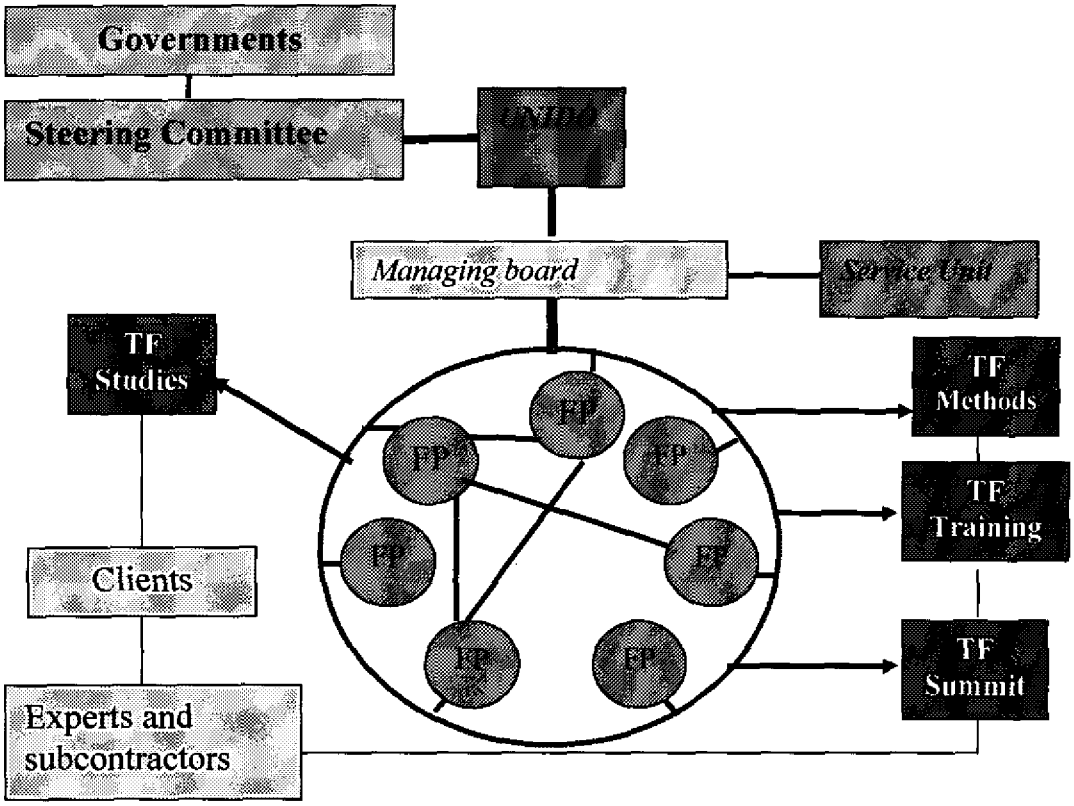


Figure 1: Scheme of the RVC

Basic operational element of the RVC is a group of **Focal Points** (FP) located in respective countries and hosted by selected organizations. There could be more than one FP per country (for example, large countries or countries with a complex RDTI-related infrastructure). By the joint decision of UINDO and Management Committee some fps may be responsible for a specific network agenda. As an example, one of FPs could establish an Information Management Unit (IMU) responsible for networking internal and external information flows. Each FP is not necessarily responsible for agenda servicing to the whole network (like the IMU). Most of Focal Points are supposed to be responsible for their national or sub-regional agendas.

The whole system is supervised and coordinated by **UNIDO** which is provides international coverage and mandate, helps in fund raising, initiates conducting foresight programmes/projects or studies on foresight and plays a role of independent authority when needed.

The **Management Board** (MB) is established for collective executive management of the virtual center and the individual FP, as well as for an effective communication with UNIDO. Members of MB are typically CEOs of individual FP or persons with delegated responsibility for participation of particular FPs in the RVC.

Important component of the system is the **Steering Committee** (SC). The main role of the Steering Committee is to evaluate the activities of the RVC and provide links to governmental structures of individual countries. Positive recommendation of a national representative sitting in the SC should be significant for governmental decision to provide funding for the RVC.

The network agenda could be rather complex due to the number of countries involved and different conditions for applying foresight at the national and regional levels. This is why a **Service Unit** (SU) is established to help UNIDO accomplish necessary management, coordination and organizational tasks. The SU is also responsible for organization of regular Technology Foresight Summits. If needed the SU provides specific services to the network or to individual FP.

The scheme illustrated in Figure 1 is completed by **Subcontracted Experts and Organizations** and **Clients**.

6. Activities and proposed division of work among the RVC members

As indicated above, the Regional Virtual Center for Technology Foresight in the CEE/NIS, has as its main function the implementation of the UNIDO TF Programme for the region. The table below indicates how the activities related to the Programme could be distributed among the different focal points, the service unit and the decision-making organs.

Figure 1. Actors and Activities of RVC

Components	Activities	RVC			
		SU	FPs	SC	MB
Awareness-building and creation of Foresight culture	Management of information on TF, Technology Forecasting, *Road-mapping, Critical Technologies, Technology* Assessment, and Evaluation of prospective programmes		TC		
	Operating an Internet portal and database; other IT facilities		TC		
	Organization of regular Regional TF & Prospective summits and the "Fair of Future"	√			
	National awareness-building seminars		all		
	Marketing and dissemination of the various activities of the Regional TF Initiative (online and paper based)	√	all		
	Translation of documents to different languages		all		
Development of national and regional capabilities	Preparation of training materials on Technology Foresight, incl. other prospective techniques, when relevant (re-organizing/updating existing materials, as well as addressing new topics)		PREST, IE HAS, host org.		
	Organization of education and training programmes on TF (incl. other prospective) techniques		PREST, IE HAS, host org.		
	Development and test a new training, namely Module 5: *Training of trainers; and then to organization of it in several* countries		PREST, IE HAS, host org.		
	Exploitation of existing training infrastructure (such as KPI and Forlearn e-books, e-courses, EFMN case studies)		all		
	Promotion of curriculum development in order to include TF and other prospective techniques in higher education courses in the region		all		
	Promotion of the creation of prospective analysis units/teams at public agencies, industry associations and academia		all		
Coordination and implementation	Promotion of networking among persons and organizations in the field of TF and other prospective studies	√	all		
	Initiating/ commissioning studies on TF and other prospective analysis, and communication of the results to decision-makers, experts, and the general public	case by case			
	Conducting studies on TF and other prospective analysis, and communication of the results to decision-makers, experts, and the general public	case by case			
	Provision of advice and co-ordination of TF and other prospective programmes/ projects in the CEE/NIS region, with special emphasis upon the national TF centres of the region	case by case			
	Conducting TF and other prospective programmes/ projects, and communication of the results to decision-makers, experts, and general public	case by case			
	Fund raising for the above activities		all	SC	
	Establishment of management, co-ordination and monitoring for the above activities			SC	MB

SU = Service unit
FPs = Focal points

While implementing these tasks RVC will adopt an approach which supports the strong relationship between the STI Policy and Technology Foresight and does not exclude other Prospective techniques (e.g. Technology Assessment, Road mapping).

6.1. The actors in the organisational structure of the RVC

As indicated earlier in Figure 1, the RVC has the following actors/bodies in its organisational structure:

1. Steering Committee
2. Focal Points
3. Managing Board
4. Service Unit

In addition to these actors, the organisations and individuals which have expertise in the fields are also expected to be to be involved through consultation where necessary.

6.1.1. Steering Committee

The Steering Committee (SC) will ensure the successful continuity of the RVC by supporting the efforts of the centre both technically and financially. The SC will advise the RVC for the development of general and component related concepts, will assess and approve the projects produced by the Managing Board, and identify institutional and funding support for the RVC. During its work, the SC is expected to reflect the opinions of all stakeholders in the region.

The member countries of the RVC nominate a representative from a relevant decision making institution to be appointed as a member of the SC. The SC elect a chairperson for one year period. The chairmanship will be rotated among the representatives of the participant countries.

6.1.2. Focal Points

Focal points are policy, decision makers and practitioners in technology development and innovation in the CEE/NIS region including the ministries and institutions involved in the preparation and implementation of TF programmes and projects. In this respect, a focal point is not a single person, but an organisation. The organisation is represented by an individual from the unit, who should have background knowledge on TF or is willing to acquire it.

It is expected that each participating country in the region will be represented by minimum one focal point. According to the national set up, the inclusion of two focal points is possible. One of these would be from a public organisation and the other would be from a national association or a chamber (e.g. industrialists' association, the chamber of commerce etc.) or from a private organisation, which is embedded in the business sector and is capable of using TF for sectoral activities and creating financial support for the initiative through its networks.

6.1.3. Managing Board

Representatives of the participating focal points will constitute the Managing Board (MB) to prepare proposals of activities and to implement them after the assessment and approval of the SC. They will make sure that the content of the programme is up-to-date and meets the requirements of the beneficiaries of the regional initiative

6.1.4. Service Unit

Initially, the Service Unit (SU) has been undertaking a set of preparatory tasks necessary for the establishment of the RVC. Following the establishment of the RVC the SU will be given specific functions, which can support the members of RVC. Briefly, the SU could be responsible for

mobilising support and funding from identified donors and sponsors. SU will have the following tasks related to the Networking, coordination and administration of the RVC (these tasks will be detailed in the following sections):

1. Mobilisation of funds
2. Promotion and marketing
3. Administration and continuity of the network of participant organisations and individuals
4. Administration of the database (Information and knowledge management)
5. Hosting training courses (e.g. Module 5: Training of trainers)
6. Hosting the RVC meetings (e.g. meetings of the SC, MB, FPs and other projects under the umbrella of the RVC)
7. Organisation of TF summits
8. Fulfilment of secretariat function for the Steering Committee, Managing Board

SU is currently hosted by Infopark Co. in Budapest.

6.1.5. Foresight Experts

Furthermore, in addition to its administrative units, the RVC will also benefit from associate organisations / experts (FE), who have knowledge on TF, can teach in training courses and can play an advisory role for the activities of the RVC. The FEs can be members of the FPs.

6.2. Description of the RVC activities and the division of labour among the parts of the RVC

This section details a proposal for the activities of the RVC, which were grouped under the three main components of the UNIDO TF initiative in Table 1. The details would also include the responsible bodies in the RVC, which then will make it possible to indicate the division of labour among the parts of the RVC.

1-1 Management of information on TF, Forecasting, Roadmapping, Critical Technologies, Technology Assessment and Evaluation of prospective programmes - (TF projects and TF methods)

One of the basic functions of the RVC is to collect, process and disseminate information on TF to a host of actors using a variety of media. This might be considered as the most important function, since it is through the dissemination of the information that awareness of foresight will be increased in CEE/NIS. This, in turn, should lead to a mushrooming of TF activities in the region.

Responsibles:
Collect information on the TF (FP)[1]
Collect, process and disseminate information via on-line and paper based (SU*)
Help to process information to provide for the use of countries in the region (FE)

1-2 Operate a web site, an Internet portal and a database; other IT facilities

By taking the UNIDO exchange facility and ICS's Information Centre on TF as platforms, a web site (an internet portal) and a database will be established, maintained and updated. The electronic sources will contribute to the creation of a continuous information and knowledge-sharing platform within the RVC and between the RVC and the rest of the world.

Responsibles:
Design and administrate a web site, an internal portal, a database and other IT facilities (e.g. online management tools)

1-3 Prepare and organise regular Regional TF & Prospective summits and the fair of future

[1] Proposed resposible bodies are in brackets.

This activity concerns the organisation of regular TF summit, and the fair of the future as part of summit, to enable regional exchange of experience and the best practices of TF efforts; and to promote TF as a useful tool for governments, enterprises and research communities for policy making. The summit should be considered as the most important platform for the implementation of the TF programme and the dissemination of its results. In this respect the continuity of the summit and the fair should be provided.

Responsibles:
UNIDO – Determine the theme for the summit and the fair, encourage governments and industry to participate in the summit and the fair with high level representation,
SC – Raise funding for the summit and the fair, participate in the summit, provide participation of high level representatives from governments and industry,
FP – Promote the participation of the public organisations, industry, academia and wider society to the events
Promote the summit and the fair, organise venues and infrastructure, administrate participation to the events, provide/organise logistics (SU).

1-4 Organise national seminars

By request from the FPs for awareness-raising purposes.

1-5 Marketing and dissemination (online and paper based - e.g. leaflets and brochures) - promotion
This activity is concerned with the use of online and paper based tools to gain interest and mobilise support for the RVC. It is a concentrated effort to disseminate information and knowledge on activities, programmes and their results and announce various events such as TF trainings; TF summit and other TF related activities. In order to increase the recognition of the RVC, it would be useful to design a logo indicating its relationship with TF and UNIDO. This logo can then be used in the marketing and other promotional activities.

Responsibles:
FP – Support for the marketing and dissemination of the materials at the national level.
Preparation of on-line and paper based materials, publish on-line materials on the Internet, and other electronic materials like CDs, and disseminate paper based materials in different events by participating to relevant meetings, conferences and fairs to promote and market general activities and events (SU).

2-1 Translation of documents to different language
The usefulness of providing information in the native languages of the countries is obvious. For this purpose the representatives of the countries (FPs) are expected to translate at least some documents to their languages. Besides that, the use of Russian is common in some parts of the region. It is considered to that those countries which speak or are more familiar with Russian can be provided TF training in that language.

Responsibles:
FP – Translate the documents into their native languages
SU – Prepare multi language materials once the documents are translated by the FPs

2-2 Organisation of TF training programmes (incl. other prospective techniques)
UNIDO has already acquired around five years of experience in delivering TF training courses in the CEE/NIS region. These training courses have constituted the backbone of the UNIDO TF initiative and will remain the same for the RVC for development of TF capabilities in the region.

Responsibles:

MB – Make proposals for the training course programme, plan the training activities (determine the date and place of the courses)
FP – Select participants in cooperation with the SU (by using the online database), host the training activities
Contribute to the database of potential participants, select participants in cooperation with the FPs, review the previous courses and participants constantly
FE – Contribute to the planning of the course content, deliver courses and give presentations

2-3 Exploitation of existing training infrastructure (such as KPI, Forlearn, EFMN case studies)

There are a number of sources where information on TF can be obtained. One of the most important activities of the RVC will be to look for such sources and to organise and transmit them based on the requirements of the region.

Responsibles:
UNIDO – Make the information and database accessible for the RVC
SU – Present necessary links to the existing training infrastructure
FP - Present necessary links to the existing training infrastructure and disseminate this information further to their clients
FE – Inform and update the RVC with new information sources

2-4 Promotion of curriculum development in order to include TF and other prospective techniques in higher education in the region

The awareness and skills for use of TF and prospective technologies should be a part of the higher education in relevant university departments in the region.

Responsibles:
FP – Lead for the design and delivery of courses on TF and other prospective techniques in higher education in the region
SU – Provide information on TF for the academic institutions

2-5 Promotion of the creation of TF and prospective analysis units/teams in administration, corporations and academia

To provide an immediate contribution to TF-based decision-making in the region, establishment of TF teams/units will be promoted in Focal Points (in case they do not such a team/unit in their organisation) and in their client organisations such as in industry, academia or NGOs.

Responsibles:
FP – Promote the creation of TF and prospective analysis units/teams, encourage them to be connected to the RVC

2-6 Preparation of training materials (re-organising/updating existing materials + addressing new topics)

Production of up to date and fit for purpose training materials is vital for the development of training materials for the CEE/NIS region.

Responsibles:
FE – Tailor training materials by considering the requirements of the region. Prepare training materials
SU – Dissemination of training materials via online and paper-based tools

2-7 Module 5: Training of trainers

As the activities of the RVC cover a large geographical area with a diverse level of development, with various requirements, and finally with a different level of TF knowledge the trainers who will take part in the training courses will need to be trained.

Responsibles:
MB – Identify possible trainers and trainees (who will be the trainers in the future)
FE – Prepare train materials and train the trainers based on the requirements of the region

3-1 Provision of advice and professional coordination of TF and other prospective programmes and projects in the CEE/NIS region, with special emphasis upon the national TF centres of the region

3-2 Promotion of networking in the field of TF and other prospective studies
For the improvement of the activities of the RVC such as the development of capabilities in the region, a network of individualsand organisations, which have a considerable knowledge accumulation on TF and other prospective studies, would be beneficial. Mobilisation of young researchers and fellows can be a good opportunity for networking between the RVC and academia and research organisations.

Responsibles:
MB – Identify individuals and organisations in the field of TF and other prospective studies
SU – Access to individuals and organisations, promote networking and create communication channels to facilitate networking, accommodate the researchers and fellows working for the RVC
FE – Update the RVC with the developments in the field, propose new individuals and organisations in the field

3-3 Initiating / Commissioning studies on TF and other prospective analysis (methods, efficiency, etc.), incl. international comparative studies and communicate results to decision makers and general public
Initiating / communicating studies is one of the key activities of the RVC to synthesise the TF related activities in the region, to benefit from the experience gained from those activities, to support these practical applications with a theoretical background, and to give suggestions on their improvement.

Responsibles:
UNIDO – Encourage participants of the RVC to initiate joint studies
SC – Take decisions on the joint initiatives among the participant countries / members
FP – Carry out the studies, provide necessary input for the studies, and communicate with their clients and wider public
SU – Provide necessary communication channels and information exchange for the studies, disseminate results via online and published tools

3-4 Conducting studies on TF and other prospective analysis (methods, efficiency, etc.), incl. international comparative studies and communicate results to decision makers and general public
Following the initiation, the main task is conducting joint studies among the participants of the RVC. Besides improving the partnership among the participants, the study carried out will have scientific value. The aim should also be to produce publications in the form of books, journal papers and/or articles to be presented in international conferences.

Responsibles:
MB – Define the areas for studies

FP – Carry out the studies, provide necessary input for the studies, and communicate with their clients and wider public
FE – Carry out studies, communicate the results with a wider audience (e.g. in conferences, seminars and training activities)

3-5 Conducting TF and other prospective programmes/projects (at various levels) and communicate results to decision makers and general public
This is one of the basic components of the UNIDO's TF initiative and one of the basic rationales for the establishment of the RVC. TF programmes will be conducted at various levels such as international, national, regional (among national regions and/or regions of neighbour countries), sectoral levels.

Responsibles:
UNIDO – Encourage participants/members for new programmes and projects
SC – Lead to new programmes and projects
MB – Define the content and scope of the programmes/projects
FP – Collaborate with other FPs and carry out the programme/project activities
SU –administrate online channels for information flow, coordinate and support project activities via project management tools, monitor the progress and communicate the results
FE – Take part when their consultation is needed in the design, organisation and implementation of the programmes

3-6 Fund raising
Detailed strategies for funding the initiative will be developed, using UNIDO funds, national and individual donor contributions, and financial support from industry. Countries in the region are expected to be committed in order to create the necessary strong support for the initiative as a built-in capacity for them as well as for the region.

Responsibiles:
- SC – raising funds
- FP – raising funds
- SU – searching for new funding sources
- (UNIDO & SU) – managing funds and cash flows

3-7 Establishment of management, coordination and monitoring activities*
The initial task here is establishment of the RVC itself. The components of the RVC need to be put together to work as a mechanism to implement the regional TF initiative. Following the establishment of the RVC, a number of institutions, companies, experts and other involved partners from different parts of the region are expected to cooperate in the scope of the TF initiative. For the facilitation of the RVC, there expected to be a number of project management, coordination and monitoring activities in the RVC and among the participants. Although following the establishment of the RVC, the internal management, coordination and monitoring activities would be carried out on a regular basis, when it comes to the joint programmes, projects and studies new and more dynamic management, coordination and monitoring activities will be needed.

Responsibiles:
SC – Monitor and analyse reports (e.g. monthly/mid year/yearly) provided by the FPs and the SU
MB – Monitor the activities of the FPs and SU
FP – Produce regular reports on the activities (e.g. monthly/mid year/yearly)
SU – Provides administrative support to the network and database, fulfil secretariat function for the Steering Committee, Managing Board, and create reports (monthly/mid year/yearly)

Annex I. Technology

TF Database

- Description

Containing experts and participants of the Technology Foresight activities in the Region (training courses, Summit, fair, etc.)

- Operated by:

Central Unit's "Information Manager" (?), server located in CU

- Legal background

Content property of UNIDO. Software (UNIDO – RVC ?)

Website

- Description

Support the three main functions of the TF initiative (like provide information on TF, useful links to other TF information sources and partners)

- Operated by:

Central Unit's "Information Manager" (?), server located in CU

- Legal background

Content property of UNIDO (?). Software (UNIDO – RVC ?)

Newsletter

- Description

Regularly updated information source edited by CU, Foresight Experts, etc. Sent out through the TF database and published on the website.

- Operated by:

Central Unit's "Information Manager" (?), server located in CU

- Legal background

Content property of UNIDO (?). Software (UNIDO – RVC ?)

Forum

- Description

Continuously moderated forum for TF interested parties. (working time ?)

- Operated by:

Central Unit's "Information Manager" (?), server located in CU

- Legal background

Software (UNIDO – RVC ?)

Online Management Tool

- Description

Possibilities of managing projects (trainings, foresight programmes and studies, organisational and administrative tasks, etc.) online:

- Day-to-day management of projects
- create time plans
- manage project membership
- share project information and data through bulletin board
- upload documents
- project based forums
- create personal messages

- Operated by:

Central Unit's Secretariat and "Information Manager" (?), server located in CU

- Legal background

Software (e.g. 'Webasyst')

Online Training Tool

- Description

A tool for organizing and executing online TF trainings:

- Live training possibilities

- Use of visual training materials (videos and power point presentations)
- Upload training documents
- Monitoring trainers and trainees
- Online exams

- Operated by:
Central Unit's Secretariat, "Information Manager" (?), Foresight Experts, server located in CU (financial questions to be cleared: organizer FP <-> CU)
- Legal background
Software (e.g. "Coospace")

Future services

– RVC's functions can be expanded as follows:

- Centre for prospective studies
- Centre for STI policies

Version 2, 1/11/06

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Draft Project Note - UNIDO TF Summit-2007

Distribution: RESTRICT
October 2006

UNIDO TECHNOLOGY FORESIGHT SUMMIT-2007

Project note*
October, 2006

* This document has been produced without formal editing.

Project title: Technology Foresight Summit 2007
– Highlight area: -Water Productivity in the industry of the future

Country: Regional Europe

Origin of proposal: The recommendation for a regular Technology Foresight Summit was expressed by the first Technology Foresight Summit held in Budapest 27-29 March 2003 where a great number of government representatives participated from the region of Central and Eastern Europe and the Newly Independent States.

Problem to be addressed:
In the era of globalization, the key to economic success lies in continuous innovation to achieve higher productivity and thus enhanced competitiveness. Higher productivity calls for new technologies. Thus, technology innovation is decisive for increased competitiveness and economic and social development. There is corresponding concern about the interaction between economic competitiveness and a number of social factors such as unemployment and working conditions, inequality and social cohesion, environment and sustainability and risks associated with new technologies. Therefore there is a need for new technology and industrial policies that balance competitiveness against unemployment, inequality, sustainability and risk.

This requires new policy-making tools and technology foresight is prominent among them. Economic transition will only be completed when the region is competitive in the global market, which can only be achieved through enhanced innovation efforts and application of new technologies.

As a response to such requirements in Central and Eastern Europe and the Newly Independent States (CEE/NIS), UNIDO in 2001 has launched a Regional Technology Foresight Programme for this region that combines UNIDO's technical assistance with its global forum function by implementing capacity building projects, organizing awareness building and policy forming events, and preparing technology foresight studies. The regular summit is the most important platform for the implementation of the technology foresight programme and the dissemination of its results.

Brief description:

The project aims at the organization of the second regular summit to enable regional exchange of experience and best practices of Technology Foresight efforts and programme as useful tool for governments, enterprises and research communities policy making and means of promoting competitiveness, innovation and strategic planning.
The Technology Foresight Summit 2007 is the second of its kind after the summit in March 2003. This flagship event is an important component of the UNIDO Regional Technology Foresight Programme for the CEE/NIS region, as a major exercise dedicated to present concrete contributions of foresight to the creation of new visions and policy making process addressing regional and national issues, awareness building and developing foresight culture in the region. This regional programme is responding to the CEE/NIS needs for a mid-and long-term development vision of the region as well as

for bringing a more technology-oriented focus into the relevant national and regional decision-making process. The programme is instrumental in providing assistance to economies in transition for a sustainable and innovative development aiming at fostering economical, environmental and social benefits at national and regional levels.

Regarding the content of the summit, it will dedicate special emphasis to water productivity addressing industry-related technologies. This issue is taken as UNIDO contribution to the protection of the water resources, through a more rational and sustainable use of water by the industry. The summit will also address key technologies, which can contribute to respond to main challenges for industrial development in the region. The participants of the summit will be high policy level officials and managers responsible for technology development in CEE/NIS and other selected regions, as well as decision makers of enterprises working in these regions. The summit will particularly target strong involvement of the business sector in the discussions and deliberations.

Expected Target Beneficiaries:
High-level policy and decision-making representatives of governments, CEOs and senior representatives from industry, NGOs, the research community and academia from the CEE/NIS region, in particular those who are engaged in technology development policy and activities in their countries.

Counterpart:
The Technology Foresight Summit 2007 will be co-organized with the Ministry of Economy and Transport of Hungary in Budapest.

Project purpose:

The main purpose of the summit is to present a balance of good practices on using technology foresight for strategic decision-making and to flag key areas for foresight exercises in the region. To raise the interest of the different stakeholders, the summit gives special attention to a selected highlight area to discuss, on the basis of technology foresight studies, its innovation potential to promote knowledge-based industrial growth and competitiveness.

The 2007 Summit will have as highlight area the future of Water Productivity by industry and is divided into the four components the Water Productivity Forum, the Fair of the Future, the Ministerial Round Table and the Technology Foresight Thematic Panels.

The **Forum on Water Productivity in the industry of the future**, will stress the highlight of the 2007 Summit. The four forum sessions will give an overview of the foresighted development in:

(1) Strategies for saving water and increasing industrial water productivity,
(2) Matching water quality to use requirements;
(3) Water recycling and on-site reuse;
(4) Using reclaimed water (direct and indirect water reuse);

The plenary session will be devoted to cross-cutting issues in water availability and quality, stressing main tendencies, barriers and visions for reaching sustainable industrial development. The Foresight Exercise on avoiding water discharge by industry

in the future - towards a zero discharge – will be presented and discussed in this plenary session.

The **Water Technology Fair of Future** consists of exhibitions and discussions presenting industry-led future trends and perspectives, prototypes, products, processes and markets regarding sustainable use of water by industry. In this context, the industry are invited to present their solutions to reduce or avoid pollution of water resources in a long run. As the Summit particularly targets strong involvement of the industrial sector, CEO's and industrial decision makers will further discuss and present their vision of future trends, strengths, weaknesses, opportunities and threats of their industrial branches in the other components of the Summit.

The **Ministerial Round Table** will focus on the future of sustainable water availability and quality in the region. The ministerial consultations will address the preparation of a draft resolution promoting a zero discharge agreement and incentives at the international level. At a Working Lunch, key-note addresses will open discussions on the impacts of industrial development on water demand and virtual water trade.

The **Technology Foresight thematic panels** will focus on selected experiences and proposals using it as a tool for decision-making and consensus building for creating knowledge-based society and enhancing innovation in countries in transition. The panels will also present and discuss critical technologies, which could address the challenges envisaged in the next twenty years in CEE/NIS.

The project will support not only the organization and conducting of the 2007 Summit but also the following core preparation and follow up activities:

- Preparation of papers, publications, electronic documentation and reports;
- Preparation of a foresight exercise on avoiding water discharge by industry in the future - towards a zero discharge (with additional funds);
- Evaluation and recommendations for follow up actions.

Immediate objectives:

(a) to organize a regular summit to enable regional exchange of experience and best practices on applying Technology Foresight efforts and programmes as important tool for governments, enterprises and research community to promoting competitiveness, innovation and strategic decision making;

(b) to address regularly a selected highlight area through undertaking regional and cross-regional discussions of its innovation potentials on the basis of Technology Foresight studies;

(c) to enable high policy level representatives of the governments, business and research communities to interact on the results of Technology Foresight exercises providing support and environment for building up national and regional technology capability and capacity.

Expected Outputs:

(a) Strengthened and sustained awareness of the critical importance of technology foresight among decision makers of the region in order to foster competitiveness and innovation.

(b) Recommendations for high-level decision-makers to initiate and implement national foresight exercises comparable, as much as possible at the regional level.

(c) Recommendations to encourage technology foresight programmes at the supra- and sub-national levels.

(d) Application of results of foresight studies for selected Highlighted Areas.

(e) Identification of relevant problems in the region that can be addressed through technology and knowledge based approaches.

Involvement of other agencies/organizations:
Cooperation will be invited from the IAEA, UNESCO, EC and UNECE.

Millennium Development Goal (MDG):
The project will contribute towards the efforts to realize the following MDGs:

- Ensure environment sustainability
- Develop a global partnership for development

Tentative Agenda

<table>
<tr><td colspan="2">Day 1</td><td colspan="3">Day 2</td><td colspan="2">Day 3</td></tr>
<tr><td>Plenary session</td><td>Fair of the Future</td><td>Water Forum</td><td>TF Panels</td><td>Fair of the Future</td><td>Ministerial Round Table</td><td>Fair for the future</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td>9:00 – 10:30
W1: Saving water and increasing industrial water productivity</td><td rowspan="2">9:30 – 12:00
TF1: Experiences and good practices of TF in the CEE/NIS (national and regional levels)</td><td rowspan="6">9:30 – 18:00
Exhibitions and presentations by companies and R&D institutes</td><td>9:00 –10:00:
Presentation of conclusions and recommendations of the Summit</td><td rowspan="5">9:30 – 15:00
Exhibitions and presentations by companies and R&D institutes</td></tr>
<tr><td>10:30 – 12:00
W2: Matching water quality to use requirements</td><td>10:00 – 12:00
Ministerial consultations</td></tr>
<tr><td></td><td></td><td>12:00 – 13:30
Lunch</td><td>12:00 – 13:30
Lunch</td><td>12:00 – 13:30
Working Lunch</td></tr>
<tr><td></td><td>13:00 – 14:00
Opening ceremony of the Fair</td><td>13:30 – 15:00
W3: Water recycling and on-site reuse</td><td rowspan="2">13:30 – 16:30
TF2: Priority setting for future critical and key industrial technologies as driving forces for economic development</td><td>13:30 – 14:00
Rapport on resolutions</td></tr>
<tr><td>15:00 – 15:30
Opening ceremony of the Summit</td><td rowspan="2">14:00 – 18:00
Exhibitions and presentations by companies and R&D institutes</td><td>15:00 – 16:30
W4: Using reclaimed water</td><td>14:00 – 14:30
Closing ceremony</td></tr>
<tr><td>16:00 – 17:30
Plenary session: Foresighting the future of water in the industry</td><td colspan="2">16:30 – 18:00
Plenary session:
Foresight exercise on zero discharge</td><td>15:00 – 16:00
Press conference</td><td></td></tr>
<tr><td>18:00 – 20:00
Welcome reception</td><td></td><td colspan="3">18:00 – 20:00 Official reception</td><td></td><td></td></tr>
</table>

Commented Agenda

Day 1

Plenary session

15:00 – 15:30 Opening ceremony of the Summit
Chairperson:

16:00 – 17:30 Plenary session: Foresighting the future of water in the industry
Issues:
Chairperson:
Key speaker:

Fair of the Future

13:00 – 14:00 Opening ceremony of the Fair
Chairperson:

14:00 – 18:00 Exhibitions and presentations by companies and R&D institutes

Day 2

Water Forum

9:00 – 10:30 W1: Saving water and increasing industrial water productivity
Issues:
Chairperson:
Key speaker:
Commentators:
Rapporteur:

10:30 – 12:00 W2: Matching water quality to use requirements
Issues:
Chairperson:
Key speaker:
Commentators:
Rapporteur:

12:00 – 13:30 Lunch

13:30 – 15:00 W3: Water recycling and on-site reuse
Issues:
Chairperson:
Key speaker:
Commentators:
Rapporteur:

15:00 – 16:30 W4: Using reclaimed water
Issues:

Chairperson:
Key speaker:
Commentators:
Rapporteur:

Technology Foresight Panels

9:30 – 12:00 TF1: Experiences and good practices of TF in the CEE/NIS (national and regional levels)
Issues:
Chairperson:
Key speaker:
Commentators:
Rapporteur:

12:00 – 13:30 Lunch

13:30 – 16:30 TF2: Priority setting for future critical and key industrial technologies as driving forces for economic development
Issues:
Chairperson:
Key speaker:
Commentators:
Rapporteur:

Fair of the Future

9:30 – 18:00 Exhibitions and presentations by companies and R&D institutes

Plenary session:

16:30 – 18:00 Foresight exercise on zero discharge
Issues:
Speaker:
Rapporteur:

18:00 – 20:00 Official reception

Day 3

Ministerial Round Table

9:00 –10:00: Presentation of conclusions and recommendations of the Summit
Speaker (main rapporteur)

10:00 – 12:00 Ministerial consultations
Chairperson:
Rapporteur:

12:00 – 13:30 Working Lunch

13:30 – 14:00 Rapport on resolutions
Speaker (MRT Rapporteur)

14:00 – 14:30 Closing ceremony
Chairperson:

15:00 – 16:00 Press conference

Fair for the future

9:30 – 15:00 Exhibitions and presentations by companies and R&D institutes

CyberDelphi

A Web-based survey software for more efficient technology foresight exercise

Summary

The CyberDelphi is a Web-based generic application which enables standardization of questionnaire creation process, simplifies editing and modifying of questions and enables automated data processing to get the statistical results.

Background

A technology foresight is a comprehensive overview of future society as seen through the eyes of experts involved in research and development of various fields. Most leading industrial countries now apply foresight exercises of one type or another, using a wide variety of methods. The most widely used Technology Foresight methodology is well-known Delphi Survey, which involves building a consensus forecast based on the opinion, insight and experience of a number of subject matter experts. The Delphi method utilizes repeated rounds of questioning, including feedback of earlier-round responses, to take advantage of group input while avoiding the biasing effects possible in face-to-face panel deliberations.

However, the process in which these experts with different backgrounds communicate and share ideas about longer term issues, generate consensus, and collaborate with increased commitment in devising and realising a national strategy, seems to be time and resource demanding. Therefore, technology foresight exercises of one type or another have been undertaken mostly by the leading industrial countries, whilst the developing countries have been left outside of the process. To remedy this situation, the ICS - UNIDO has opted for the development of a software tool, which will help its target beneficiaries (coming mostly from the underdeveloped regions) to perform the exercise in a more cost effective and less time consuming manner, using fast and cheap Web-based technologies. CyberDelphi software offers an attractive alternative to conventional Delphi survey, where time is a significant issue and the cost of assembling panelists could be prohibitive in the third world countries, where the most ICSUNIDO target beneficiaries come from.

The specific objectives of our Internet interviewing software package, CyberDelphi, were:

- to access the wider business and science and technology communities' views on future developments in markets and technologies;
- to assist in facilitation and moderation, i.e. in achievement of consensus on developments; and
- to increase the efficiency and to lower the cost in comparison with standard paper-and-pencil postal Delphi survey.
- To disseminate the results to all sorts of stakeholders interested in future technology developments

As well as the most obvious function of gathering opinions for the Panels, the CyberDelphi also aims to involve large numbers of experts who would otherwise be excluded, and hence to widen significantly the constituency of participants feeling ownership of the results and a consequent commitment to their implementation. The fourth objective relates to dissemination. Receipt of the questions gives the respondents early feedback on the topics deemed to be of interest by their peers on the Panels.

How it works

The CyberDelphi application helps expert panels in the Technology Foresight exercise to design a questionnaire incorporating various mechanisms for feedback, such as multiple choice, rating scales and text fields. Panels identify the question type, key in the question text and specify the acceptable answers. When the panels are satisfied with the questionnaire, they make the survey available to respondents via a Web site. As facilitators collect data, they can evaluate the results with built-in statistical tools, create graphs, or export the data to a spreadsheet or database..

The CyberDelphi application enables Internet presentation of the Delphi questionnaires, accessible to the Internet users as regular HTML forms. Respondents can fill in the questionnaire and submit it to the server where data from the questionnaire are archived (i.e. written into the database), or ask for the statistical analysis of the results of previously submitted questionnaires. The results of the statistical processing are presented in tabular form within a standard HTML page.

The CyberDelphi application is implemented intentionally as a generic software tool that can be used also for different scientific analysis and statistics, where it is very important to get opinion from a huge number of experts. Or, it can be used for questionnaires-based customer satisfaction surveys in beneficiaries' SMEs or for beneficiary satisfaction surveys that could be organized by ICS-UNIDO itself.