Paper 1 : Xtreme EUFORIA: Combining Foresight Methods

Rafael Popper – **Rafael.Popper@man.ac.uk**
Research Associate at PREST, Institute of Innovation Research
The University of Manchester, Manchester, United Kingdom

Werner B. Korte – **Werner.Korte@empirica.com**
empirica Gesellschaft für Kommunikations- und Technologieforschung mbH, Bonn, Germany

Keywords: Foresight methods, Knowledge Society, Europe and the Lisbon objectives.

1. Abstract

The EUFORIA project was launched to explore the Knowledge Society and new ways of organising, designing and managing foresight activities. The combination of several 'hard' (performance indicators, critical influences analysis) and 'soft' (literature review, brainstorming, panels, workshops, Delphi and scenario building) techniques was carried out in a multi-cultural and cross-regional setting to achieve further insights and gain experiences with respect to the strengths and weaknesses of different individual and combined approaches for goal achievement as part of foresight activities. In this paper we present some lessons related to the methodological approach of the project.



1. Introduction

In the context of its four-year work programme, Analysing and Anticipating Change to Support Socio-Economic Progress 2001-2004, the European Foundation for the Improvement of Living and Working Conditions undertook a foresight project (EUFORIA) concerning the European Knowledge Society. Two contracts were designed by the Foundation: The first contract aimed to produce a Handbook on Knowledge Society Foresight. The second contract was to (1) test methods in practice, (2) set up three national foresight points, (3) produce indicator analysis on advancement of KS, (4) find KS drivers, and (5) analyse the drivers' impacts on living conditions, working conditions and industrial relations in EU15 countries by 2015. Within this context, EUFORIA was also linked to the Lisbon objectives for the EU to become 'the most competitive and dynamic knowledge-based economy, capable of sustained economic growth with more and better jobs and greater social cohesion. The Foundation also set up an Advisory Group for the project which discussed the project's phases and guided the process to concentrate politically relevant issues. The project was coordinated and led by PREST at the University of Manchester, and the process was jointly managed with project partners in Finland (Futures Research Centre), Germany (Empirica) and Greece (Atlantis).'

Of course, EUFORIA was not designed to provide predictions of the future: it was merely envisaged that the project should be able to illuminate important dynamics and dilemmas associated with a KS, to a greater degree than previously possible. In so doing, it should demonstrate the effectiveness of the Foresight process in providing policy-relevant orientations to these issues[1]. The multi-cultural and cross-regional setting of the project allowed the project team to explore new ways of organising, designing and managing foresight activities. In this paper we present some lessons related to the methodological approach of the project. First we discuss the main challenges and benefits of carrying out multi-method foresight activities, in which integrative, explorative, experimental, developmental, and forward-looking approaches are combined. Second, we focus on the co-operationalisation and merging

of several 'hard' and 'soft' techniques. Then we share lessons about combining experts' judgements with formal analytical methods, and combing face-to-face data collection with virtual approaches. To conclude, we present some of the impacts and lessons of EUFORIA.

2. Combining integrative, explorative, experimental, developmental, and forward-looking activities



In most recent large-scale or cross-national foresight projects (such as EUFORIA) activities are strongly based on informal cooperation. That is, cooperation undertaken by scientists as they travel, communicate and exchange ideas and materials without embodying the relationship in a contract[2]. Such cooperation, especially between social scientists and policy makers can smooth the progress of social change when (1) awareness and sharing of goals, and (2) commitment of social networks are part of the process.

The EUFORIA project benefited from there being a large number of social scientists and policy makers interested in the central theme of the study; i.e. 'The Knowledge Society'. For this reason, it is important to recognise that the level of attractiveness of a thematic foresight project can strongly influence the design of its methodological framework. The Knowledge Society theme provided us with blissful freedom to combine integrative, explorative, experimental, developmental and forward-looking activities without jeopardising either our capacity to manage the ambitious Workplan or our ability to maintain the interest of social scientists and policy makers. Here we present a brief description of the chosen approach.

Integrative – EUFORIA activities involved social scientists and policy-makers from a total of 25 countries: The three pilot counties (Finland, Germany and Greece), 15 European and 7 non-European countries. Such open international participation, together with coordinated cross-national and national workshops, created some challenges but also provided valuable benefits. The main challenge was to use limited resources to create attractive ways to promote activities to different stakeholders from the private, public, research, and NGO sectors.

Explorative – EUFORIA used 10 different foresight methods to study the complex topic of Knowledge Society. The main challenge of the approach was to dedicate sufficient time for reflection, i.e. deep absorption the knowledge produced at each stage. This ambitious approach helped us (1) to compare the usefulness of each method, in terms of its effectiveness in providing a better understating of Knowledge Society, and its amenability to mixing with other methods; and (2) to explore different ways of managing and implementing various methods (i.e. face-to-face and virtual activities).

Experimental – EUFORIA activities tried new approaches by modifying existing foresight methods (using an innovative version of the cross-impact analysis labelled CIA – Critical Influences Analysis) and testing the usefulness of multilingual tools. Our main challenges were: (1) to reach faithful translations in four languages, and (2) to allocate researcher time to the management of multilingual results. Among the benefits we should highlight the richness of interdisciplinary and multi-cultural views as well as the learning curve and skills that the project team acquired from the experimental process.

Developmental – The project activities used the outcome from each method as inputs to following stages, thus providing a dynamic development of the methodological framework. Similarly to Havas's remark on the methodological framework of the Hungarian Foresight programme, a more rigorous approach in EUFORIA, where all the details are planned well in advance, might have produced more elegant and more orderly results. However, this would probably have been achieved at expense of reduced commitment from participants[3].

Forward-looking – The time horizon in all EUFORIA activities, methods and workshops was set at 2015. The selected timeframe ensured that the work was closely related to the long-term European policy strategy (Lisbon objectives).

3. Combining 'hard' and 'soft' methods

In this section we first present a table describing some relationships between the 10 (soft & hard) foresight methods used in EUFORIA. We then show how the project team actually designed the combination of methods followed by a more detailed description of each method and a short account of its effectiveness in the project.

Foresight methods	Enhanced by	Used by	Combined
Environmental scanning	Cross-national workshop	Performance indicators Brainstorming (STEEP) National panels Delphi Scenarios	6 methods
Performance indicators	Cross-national workshop National panels	Brainstorming (STEEP) National panels SWOT analysis Scenarios	6 methods
Cross-national workshop	Environmental scanning Performance indicators	Brainstorming (STEEP) CIA Prioritisation	5 methods
Brainstorming (STEEP)	Environmental scanning Cross-national workshop Performance indicators National panels	CIA SWOT analysis Prioritisation Delphi survey Scenarios	9 methods
Critical Influence Analysis (CIA)	Environmental scanning Cross-national workshop Brainstorming (STEEP)	Prioritisation	4 methods
National panels	Environmental scanning Performance indicators Brainstorming (STEEP)	SWOT analysis Prioritisation Scenarios	6 methods
SWOT analysis	Environmental scanning National panels Performance indicators	Delphi Scenarios	5 methods
Prioritisation	Environmental scanning	Brainstorming (STEEP)	7 methods

	Cross-national workshop National panels	SWOT analysis Delphi Scenarios	
Delphi survey	Environmental scanning Brainstorming (STEEP) CIA Prioritisation	National panels Scenarios	6 methods
Scenarios	Environmental scanning Performance indicators Brainstorming (STEEP) Prioritisation Delphi	National panels	6 methods

Combining Foresight Methods in EUFORIA Project

Before describing each of the methods used in EUFORIA, it may be worth dedicating a few lines to the following two questions:

- What are the benefits of combining foresight methods?
- How is it possible to combine (effectively) such methods?

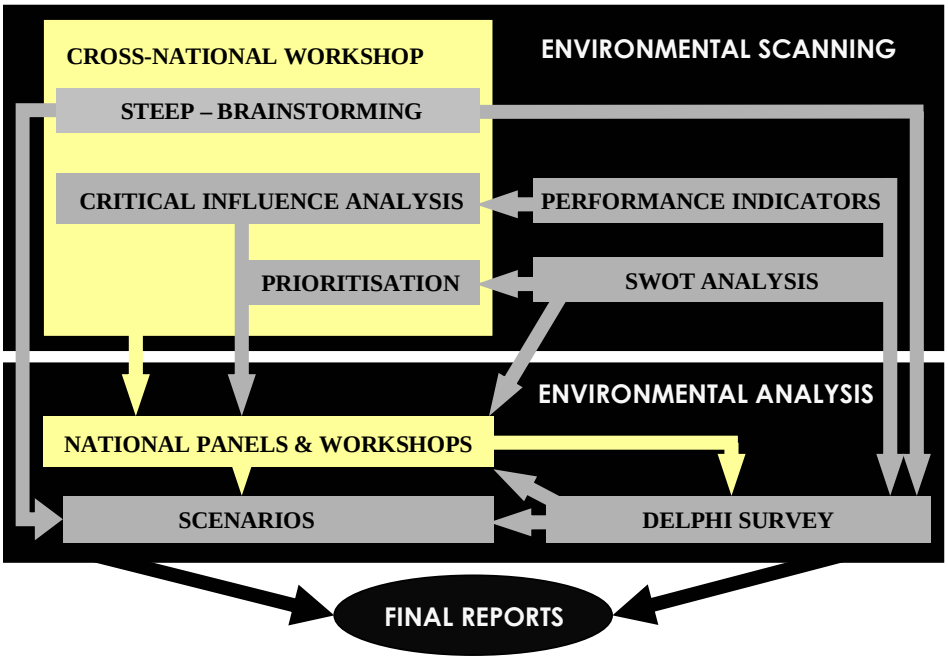
Obviously there is no single answer to these questions. Foresight practitioners may find the first question easier than the second one. Indeed, one straightforward answer could be to reach deeper and clearer understanding of the subject of study and the main issues that surround it. But still, this answer does not capture all the reasons for combining methods. Others include:

- **Socio-cultural reasons** – In order *to reach wider acceptance of the outcomes*, selected foresight methods should be congruent with the thinking structure and mind set of final users. This is why we see more combination of quantitative and qualitative methods in large-scale exercises.
- **Socio-political reasons** – In order *to provide legitimacy to the foresight process*, practitioners combine bottom-up (open participatory) and top-down (panel and expert-based) approaches.
- **Socio-economic reasons** – In order *to better understand and utilize the results*, foresight sponsors and organizers find it important to use methods which are widely understood by industrialists, social scientists and policy-makers (e.g. scenarios, SWOT & trend analysis).

The question related to the effective combination of foresight methods is more complex. It is like asking love-makers how to combine actions, words, kisses, caresses, looks and movements before, during and after making love. This analogy does not seem very scientific but is perfectly consistent with the name of the project.

Knowledge Society Foresight – Methodological framework

In this chart we present the essence of our methodological framework. The arrows indicate the direction of the flow of information across the methods. All methods and their combinations are further explained in the next section.



There are three main processes in EUFORIA project. The first one was related to the scanning activities (see 1st black box).

The second was more focussed on the analysis of data and results (see 2nd black box).

Final reports were drawn from the results of the various activities undertaken during the project. Meetings and discussions among the partners and especially with the project sponsor do not appear in the chart; however they played a fundamental role in shaping the structure and content of the reports.

Environmental scanning: Soft 1

Environmental scanning is a method which involves observation, examination, monitoring and systematic research on a physical (i.e. region, country, organisation, etc.) or conceptual (i.e. employment, transport, biotechnology, etc.) environment. The term environmental scanning has recently come into the foresight jargon as an attractive way to refer to the mix of techniques used for searching information on a subject (i.e. literature review, Web and database searching, bibliometric and patent databases examination, checking reports and workshops material, targeted interviews, expert panels questionnaires or discussions, etc.).

In the 1960s the futures research community started to examine scanning techniques more systematically. It was suggested[4] that scanning can be carried out by:

- **undirected viewing** which consists of reading a variety of publications for no specific purpose other than to be informed;
- **conditioned viewing** which consists of responding to this information in terms of assessing its relevance to organizations;
- **informal searching** which consists of actively seeking specific information but doing it in a relatively unstructured way; and
- **formal searching** which consists of scanning proactively by means of formal methodologies for obtaining information for specific purposes.

The ultimate goal of environmental scanning is to alert decision-makers to potentially significant external changes before they crystallize, in order that social actors

sufficient lead time to react to potential transformations. Consequently, the scope of environmental scanning is broad[5]. In EUFORIA the most tangible outcome of the use of the environmental scanning method is reflected in the **Knowledge Society Handbook**[6].



The handbook is a guide to Foresight and to making decisions to undertake activity in the field. It is illustrated with some examples drawn from relevant activities around the world, while a series of annexes provide more discussion, essays and resource materials for those wishing to pursue matters more deeply. The handbook also provides deep thinking on major issues around the Knowledge Society concept: What is the Knowledge Society? How does the Knowledge Society relate to the Information Society? How does technological innovation feature in the Knowledge Society, etc?

Combining environmental scanning with foresight methods

Findings from environmental scanning (e.g. the relationship between non-technological innovations and the KS, relationship between the service economy and the KS, understanding Knowledge itself and other aspects of social change in KS, etc) were used effectively in many other methods undertaken in the project. So, environmental scanning proved to be useful for:

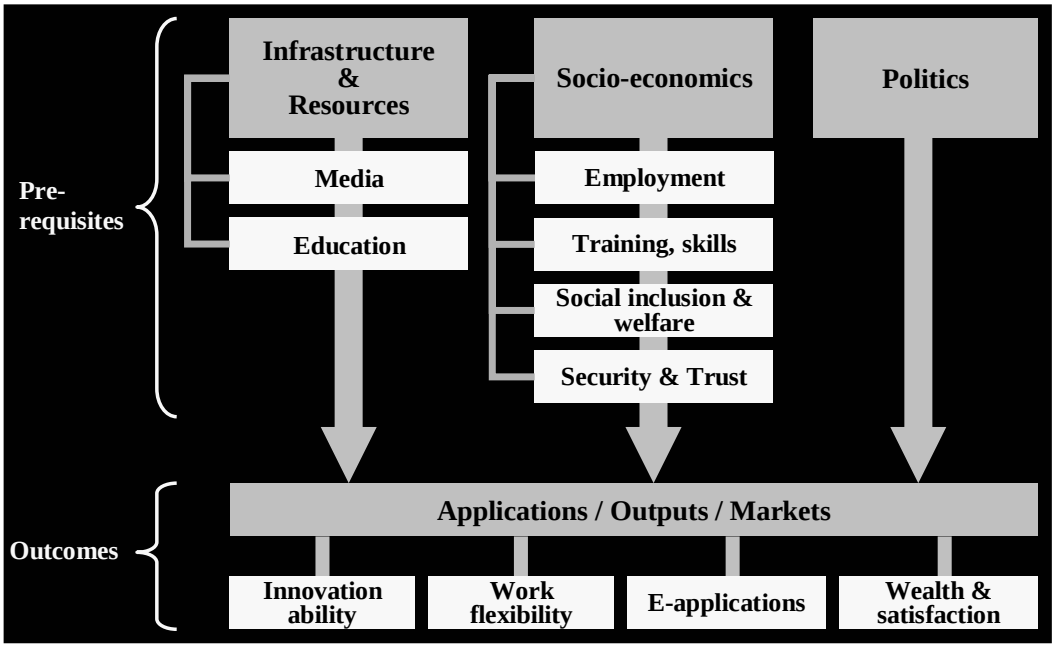
- identifying new potential performance indicators;
- preparing questions for the brainstorming exercises;
- preparing a draft list of STEEP issues (see brainstorming section);
- informing national panels about major Knowledge Society concerns;
- providing draft categories for structuring the Delphi process (i.e. industrial relations, living conditions and working conditions); and,
- identifying key aspects to be considered in scenario activities (i.e. concerns about social change and other non-technological innovation issues).

Given the breadth and value of such uses, we can then conclude that environmental scanning was successfully combined with other foresight methods.

Performance Indicators: Hard 1

Performance indicators are statistical indicators which have been identified and selected to describe, monitor and benchmark relevant phenomena of the knowledge society covering the EU Member States, and also, where possible, countries like the US and Japan, eastern European countries or OECD countries.

A vast number of statistic resources and data for the measurement of the information society or knowledge society exist. Some of this information also lends itself to forecasting developments since it exists as time series data covering different periods of time with appropriate detail. The problem exists as to the appropriateness and quality of such data for the purpose of measurement in the knowledge society. Attempt at measurement therefore require (a) a careful selection of indicators and (b) sorting of the relevant data. This task is ideally guided by the use of an appropriate knowledge society indicator framework. The following indicator framework was developed and deployed in the project.



In a first step, all indicators deemed appropriate (and which were selected for the project) were sorted by whether (a) they measure a prerequisite for the advancement of the knowledge society, or (b) they measure the outcomes of a knowledge society already in existence.

Accordingly, the prerequisites were divided into: (1) Infrastructure and resources, containing data on media penetration and education; (2) Socio-economics, containing data on individual requirements such as employment, training and skills (and relevant socio-economic issues like social inclusion & welfare and security & trust); and (3) Politics, containing data on governmental involvement in the development of the knowledge society.

The outcomes were divided into: (1) Innovation ability, measuring patent applications and R&D expenditures; (2) Work flexibility, containing data on flexible working arrangements (e.g. telework); (3) E-applications, such as e-commerce and e-health, containing data on usage and usage barriers and digital literacy; and (4) Wealth & satisfaction, containing data on economic wealth and individual attitudes towards work.

In a second step, a further structure was used within all indicators on media and its usage dividing them up into ICT-related indicators and 'traditional' indicators. This was done because of the fact that ICT, although widespread, covers only a part of the media landscape and is still not available to all citizens and companies. There are also still considerable differences in the forms of content provided for example by internet and television.

Many of the performance indicators are based on available statistical information, some of which is already rather dated, and may not have been originally focused on the knowledge society. Other, and more up-to-date, indicators providing data more directly related to the ICT use, intensity, impact and outcomes in a Knowledge Society come from completed and ongoing EC-wide projects dealing with new metrics for the Information Society funded as part of the EC IST-Programme. An example of such a project is the SIBIS project (Statistical Indicators Benchmarking the Information Society) (www.sibis-eu.org). These indicators and their associated statistical data provided an important empirical base for the subsequent steps in the KS foresight project. Where possible, the intention was to generate and present time

series data on indicators, which would assist in the identification and elaboration of trends.

Combining performance indicators with foresight methods

The performance indicators and analysis report provided an important input and have proven to be useful especially to the *cross-national workshop*; the *different national panels and workshops*; the *SWOT analysis*; and the *scenario development exercises*. The indicators and the analysis report provided a key empirical basis on which the subsequent discussions in the workshops and the empirical part of the scenario development were based.

Cross-national workshop: Soft 2

A cross-national workshop is an extremely effective process for (1) bringing together a wide range of knowledge and expertise on a particular subject, and (2) thinking about specific topics in a global or broader (i.e. macro-regional) context. Cross-national workshops are generally organised by large or influential organisations (i.e. international organisations, governmental agencies, multinational companies, etc.) and therefore successful levels of participation, commitments and dissemination of results are usually achieved.

The EUFORIA cross-national workshop took place in Brussels (November 2002) within the context of a broader conference on the topic "European Knowledge Society Foresight". The Conference brought together representatives from the Commission, EU-level social partners, national level social partners, government representatives, and the research community. It was co-organised by the European Foundation, and the EC's DGs Research, Enterprise and Information Society of the European Commission. The workshop's main objectives were: (1) to provide cross-national perspectives on the topics that EUFORIA was to investigate from a national basis in three countries (Finland, Germany and Greece); (2) to encourage participants to contribute to various foresight activities (which were described in the Handbook) specially designed for gathering information to kick-off research on the European KS Foresight; and (3) to examine limitations and constraints with respect to the implementation of Foresight methods in relation to the KS interest of the European Foundation.

Combining cross-national workshops with foresight methods

A major lesson derived from the workshop was that the combination of these objectives, together with the more general awareness-raising and other goals of the wider conference, was a source of some confusion for participants. One recommendation for future work is that if it proves necessary for logistical or other reasons to combine activities in this sort of way, it will be helpful to clearly demarcate the distinct elements in the programme and at the event itself, and to provide clearly visible reminders of what types of activities are being undertaken (and what goals are sought) at any point in the process[7]. The cross-national workshop proved to be extremely useful for: validating, disseminating and creating awareness about the environmental scanning and performance indicators findings; gathering ideas by means of structured brainstorming exercises; identifying shared important and uncertain concerns (through prioritisation exercises); and, recognising the challenge of undertaking large-scale, intensive, judgement-eliciting processes similar to the cross-impact analysis.

Brainstorming (using STEEP framework): Soft 3

Brainstorming is a method used in face-to-face and online group working sessions to generate new ideas around a specific area of interest. The main intention is to remove

inhibitions and allow people to think more freely, and move into new areas of thought, and so create new ideas (or *wild*[1] ideas) and solutions. By means of discussions or carefully prepared questionnaires participants share their ideas. All the ideas are gathered without being criticized, and only after the brainstorming is completed all the ideas are evaluated, discussed and clustered into categories (in line with, for example, the STEEP framework of social, technological, economic, environmental and political factors).

In EUFORIA the brainstorming involved a period of freethinking, which was used to articulate and capture ideas, with no critical comments (i.e. using 'post-its' proved to be effective, see picture below). This early stage of idea-generation was followed by more rigorous discussion (grouping ideas or voting based on specific criteria, e.g. importance) [8].

Combining brainstorming with foresight methods

In the workshop a brainstorming session with more than 150 participants opened the discussion about future drivers and trend impacts of the knowledge society. The method used the social, technological, economic, environmental, political (STEEP) framework, which provides a convenient way of orienting attention across the range of possible factors.



Brainstorming played an essential role in the design and preparation of almost all the other foresight methods used in EUFORIA. Our main challenge in combining brainstorming results was to extract the most pertinent and relevant information. Brainstorming proved to be an extremely versatile method used in the context of the project.

STEEP framework[9]

Social:	Trends concerning people and their everyday social relationships: demographics, lifestyles, families, health, crime, and education.
Technological:	Trends concerning the development and application of new knowledge about the world: scientific and technological developments.
Economic:	Trends concerning market relations: conditions in international, national, regional, and local economies, including developments in the labour force, income, and the infrastructure.
Environmental:	Trends concerning natural and physical environments and human impacts on: energy, resources, pollution, reuse and recycling, biodiversity, protecting ecological bases, food protection, and air and water quality.
Political:	Trends concerning political relations between social groups, states and governments at all levels: political conflict and modes of governance, political participation, government policies, regulation, and court decisions.

[1] An idea is considered *wild* when it has low probability of occurrence and potential high level of impact over the study physical or conceptual environment.

Critical Influence Analysis (CIA): Hard 2

This CIA method includes various elements that are often used in Foresight workshops and more specifically in cross-impact analysis, including a process whereby participants identify and analyse drivers of change and important factors that these influence (and attempt to give some priority to their considerations, etc.). While this yields formal outputs in the form of lists of factors and topics, hints as to issues that should be examined and so on, it needs to be stressed that a major role of such methods is to provide a structured context for discussion in small groups. The idea is that the specific methods push participants to sharing knowledge, and to breaking out of their standard ways of presenting and absorbing inputs. A learning process is involved, some of which is captured in formal outputs and in notes made on the discussions that were underway, but much of which is likely to be apparent only in the longer term.

Cross-Impact Analysis is a technique used to identify and understand the correlation between variables. It has been commonly implemented in French and Latin American foresight exercises as a tool to identify how socio-economic and technological developments in a particular area could affect other areas. The major benefit of using a cross-impact analysis resides in the method's ability to reveal relationships between the variables of a system. In other words, the method brings systemic thinking into play. This is especially important since many other foresight methods produce information in isolation without considering a wide range of interdependencies among variables (i.e. trends, drivers or technologies).

In recent European foresight projects, the cross-impact method has not been used as widely as other foresight methods probably because it demands considerable time and effort from participants. Another reason could be lack of understanding of its full potential. By combining formal analytical techniques such as matrix-based operations with collective judgements of experts the method facilitates the identification of important explicit and hidden relationships between variables (or drivers) of a system.[10]

Because the cross-impact analysis generally demands significant input from participants, EUFORIA used a lighter version of the method which did not require the study of interactions of drivers and their influence on each other. The team focused only on how selected drivers influenced a circumscribed set of trend impacts. This approach was labelled Critical Influences Analysis (CIA), however in the futures research literature, similar approaches have generally been called Trend Impact Analysis (TIA).

KS DRIVERS	Trend Impacts on LC, IR and WC												
	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	+ Influence	- Influence	No Influence
D1	0	0	0	1	0	2	-2	0	2	0	**5**	**-2**	**6**
D2	1	2	2	1	2	1	0	1	2	-1	**12**	**-1**	**1**
D3	1	1	1	1	0	2	2	-1	2	0	**10**	**-1**	**2**
D4	0	0	0	0	0	0	0	0	0	1	**1**	**0**	**9**
D5	2	1	0	-1	0	1	1	0	1	0	**6**	**-1**	**4**
D6	1	0	0	1	0	0	-1	0	0	0	**2**	**-1**	**7**
D7	1	1	1	1	0	1	1	0	2	1	**9**	**0**	**2**
D8	0	2	0	0	0	-1	0	0	2	1	**5**	**-1**	**6**
D9	-1	0	0	0	0	1	2	0	1	0	**4**	**-1**	**6**
D10	2	2	2	2	1	1	3	1	2	2	**18**	**0**	**0**
D11	2	3	1	1	2	0	0	0	1	1	**11**	**0**	**3**
D12	2	0	3	2	2	1	0	0	2	1	**13**	**0**	**3**
D13	0	2	1	0	-1	2	2	0	1	0	**8**	**-1**	**4**
D14	1	1	-1	0	-1	2	3	3	2	0	**12**	**-2**	**2**
D15	1	1	0	0	-1	3	3	2	1	0	**11**	**-1**	**3**

+ Dependency	**14**	**16**	**11**	**10**	**7**	**17**	**17**	**7**	**21**	**7**	**Matrix of the KS Drivers influences over the LC, WC and IR Trend Impacts**
- Dependency	**-1**	**0**	**-1**	**-1**	**-3**	**-1**	**-3**	**-1**	**0**	**-1**	
No Dependency	**4**	**5**	**7**	**6**	**8**	**3**	**5**	**10**	**2**	**8**	

Combining CIA with foresight methods

The CIA method used a 15x10 matrix (see above) to collect judgements from participants. Both the *set of 15 KS drivers* (see box 1 in the Annex) and the *set of 10 provisional trends* related to living conditions, industrial relations and working conditions (see box 2 in the Annex) were obtained by means of synthesis and prioritisation processes carried out after the brainstorming session organised at the cross-national workshop. The workshop also gave the project team an opportunity to work together, see tools and techniques in action, and share the experience of involving various social actors in group decision processes. Full analysis of participants' judgments could not be conducted at the workshop itself, but some processing, and analysis was possible using online foresight software Strategylet[2]. The CIA results provided valuable information about (1) KS drivers influences; (2) consistent KS drivers; and (3) robust and fragile trend impacts.

The CIA method proved to be:

- Useful for the identification of key issues to be addressed by the national panels;
- Valuable in the detection of shared KS-topics to be considered in the preparation of Delphi statements. These results provided considerable food for thought in the next activities and meetings of the project team;
- Difficult to fully exploit because both the set of drivers and trend impacts were worked-through separately by different groups and it was sometimes hard to understand their meaning and judge their influences, i.e. Driver 9 (Evolution of democracy in an E-Government Environment) was misunderstood by some participants therefore fewer judgements were assigned to it;
- Difficult to carry out within the cross-national workshop/conference hybrid setting. Some participants became tired and others confused with respect to the rationale for, and usefulness, of undertaking the CIA exercise.

National panels: Soft 4

National panels are particularly helpful processes which have become widely implemented in most recent national or cross-national foresight activities. They are generally designed to work around selected themes or sectors. The three major rationales for organising national panels are: (1) to bring together pertinent local expertise (providing information and knowledge); (2) to think 'out of the box' (being creative, imaginative and visionary); and (3) to impact on the environment (disseminating results, building networks and/or reaching commitments).

Combining national panels with foresight methods

The national panels were interdisciplinary groups of experts meeting regularly. There were panels in each pilot country (Finland, Germany and Greece). The main tasks of the panels were: (1) to synthesise inputs and prepare reports about different areas of concern that are fed into the Foresight process; (2) to produce and gather relevant information and knowledge in the national context; (3) to disseminate results (i.e. in

[2] Strategylet is a software designed for carrying out cross-impact analysis online © Calibrum Corporation

the form of a handbook) and (4) to promote ongoing activities (i.e. invite people to fill in the Delphi survey). The national panels proved to be:

- An ideal setting for undertaking Brainstorming exercises;
- An outstanding environment to carry out SWOT analysis;
- A relevant setting to generate and discuss Delphi topic statements; and
- An appropriate environment to develop strategic intelligence for national workshops.

SWOT (strengths, weaknesses, opportunities & threats): Soft 5

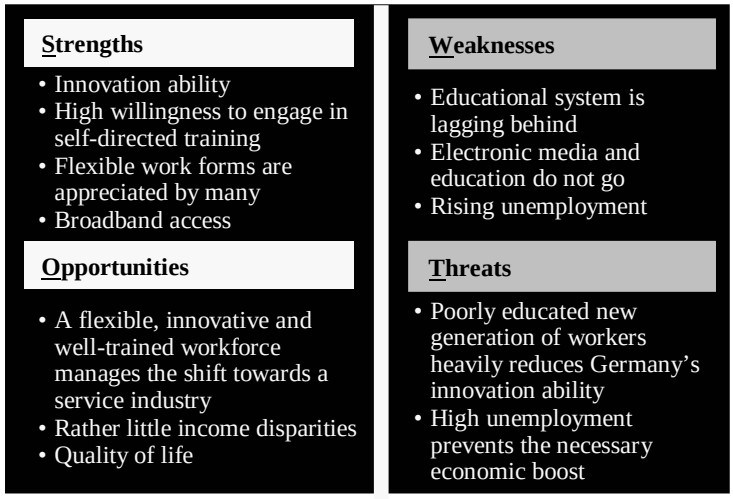
An examination of the internal and external environment is an essential part of a foresight or strategic planning process. Environmental factors internal to the system (i.e. industry, company, firm or sector) can generally be classified as strengths or weaknesses, and external factors can be classified as opportunities or threats. Such an analysis of the strategic environment is referred to as a SWOT analysis. The SWOT analysis provides useful information about resources and capabilities required to deal with a competitive environment. In other words, it is a vital tool for the strategy formulation and selection process.

Combining SWOT with other foresight methods

The SWOT exercises were carried out at the national level by each pilot country. SWOT proved to be one of the most effective ways of making participants to think in the national context. It was enriched by the outcomes of the environmental scanning, national panels, and performance indicators. SWOT results powerfully influenced the Delphi and scenario building activities. Different combinations with other foresight methodologies and presentation formats were used as part of the SWOT analysis. These included:

Generation of country profiles using 29 indicators grouped in relevant topic areas in a standardised way: the average for the EU15 is set at 100 and values for each indicator are calculated as a deviation from this; and,

The use of a SWOT matrix which summarises the results from the empirical analysis based on the performance indicators and the expert workshops (see an example from Germany to the right).



Prioritisation: Soft 6

Prioritisation is a method that involves: (1) the construction of a list of issues to be prioritised; (2) setting the criteria (i.e. importance, uncertainty, desirability, etc.) and weighting scale with clear meanings for each value (i.e. using Likert scale); (3) setting up a group to make assessments and score issues based on data or judgments; (4) processing scores and presenting ranked results; and (5) identifying top issues (i.e. drivers, trends, strategies, policies, etc.). The prioritisation methods is generally carried out by experts in a given area, however it is also common to see cross-panel prioritisation processes with the intention of better understanding cross-cutting issues.

Combining prioritisation with foresight methods

Several prioritisation activities were carried out by the project team with the aim of digesting the large amount of information obtained in each stage of the project. The national workshops also examined national priorities and therefore most prioritisation discussions considered two criteria for weighting the KS trends: importance for the country and level of uncertainty. The experts in the German workshops were, for instance, asked to freely distribute 25 points to the different topics and statements concerning drivers and trends identified as key issues. This means, the more points a topic received the more important experts deemed it to be. Prioritisation proved to be the most effective method for filtering the large amount of information produced at the brainstorming and SWOT activities.

Delphi survey: Soft 7

The Delphi process consists of collecting and distilling knowledge from a group of experts by means of a series of questionnaires interspersed with controlled opinion feedback. In this sense, it is conceived as a communication structure methodology with the purpose of producing detailed critical examination and discussion upon several topics. There are certainly other goals different from the exploratory activities of future-oriented thinking which require a more normative approach. Among these goals are: (1) preparing policy options or recommendations; (2) designing strategy implementations; and (3) identifying major trends or issues characterising the future of a particular society.

In his article on "suitability of technology forecasting/foresight methods for decision systems and strategy" Eto[11] argues that experienced technologists often make S&T decisions in their areas intuitively by retrieving information from cumulated experience. Therefore it may be expected that Delphi respondents and users will accept some of the intuitiveness of Delphi results. Regarding the sources of retrieved information, Eto argues that quite often, highly technical decisions (e.g., about medical policies), are made by non-randomly selected experts prior to the taking of decisions in policy fora. Such policy fora are also not randomly elected, so it may be also acceptable that S&T decisions are frequently made by non-randomly selected experts. Other proponents of Delphi suggest that, for large-scale national or industry forecasts, the method constitutes the single most feasible approach[12].

Delphi played a key role in EUFORIA; however it was never seen as the only possible way of foresighting the Knowledge Society. Indeed, without the outcomes of other foresight methods it would have been extremely difficult to prepare the Delphi. In addition, because the Delphi was not meant to be a mechanism for making decisions, it was designed to be a policy Delphi. In other words, it was a tool for the analysis of policy issues where generating a consensus was not the prime objective, and the structure of the communication process as well as the choice of the respondent group was such that reaching consensus on particular topics was very unlikely[13]. The EUFORIA Delphi[3] was also innovative. It is believed to be the first cross-national multilingual online[4] Delphi. But the efforts involved in running a four-language Delphi (English, Finnish, German and Greek) were underestimated[14]. Concerning the Delphi results[15], it was possible to identify key areas of concern summarised in seven prospective policy areas: (1) Emphasis on ethics, justice and equity; (2) Widespread organisational learning; (3) Bottom-up decision-making style in organisations; (4) E-commerce as a tool for regional development; (5) Improved

[3] See EUFORIA Delphi website at http://les.man.ac.uk/PREST/euforia/delphi.htm
[4] Using the online software Surveylet © Calibrum Corporation – http://www.calibrum.com

trade unions; (6) Labour organisations hand-by-hand with government & business; and (7) Shifts of EU resources towards accession countries.

Combining Delphi with other foresight methods

For the elaboration of the first draft of the Delphi structure the project team used some of the results of the brainstorming, performance indicators and SWOT analysis. However, the final design was powerfully shaped by the activities of the national panels and workshops. In fact, we actually assigned Delphi-related tasks to the national panels and the project sponsor (see box 3 in the Annex). Regarding its usefulness, the Delphi produced rich information about respondents' perception on how developments towards a European Knowledge Society would impact over the future of *working conditions*, *industrial relations* and *living conditions* at both the national (Finland, Germany and Greece) and the European contexts. Big controversial issues and polemic results of the Delphi were used as input for the discussions at the national scenario workshops as well as to prepare a full Delphi-based scenario.

Scenarios: Soft 8

The scenario methods have been created based upon the belief that a consistent and critical analysis of some of the existing and emerging drivers/trends in society (i.e. Social, Technological, Economic, Environmental, Political and Value-based - STEEPV[5]) can help us to better understand the evolution and interaction of today's driving forces and envision possible futures. Scenarios show optional ways of how the future may look like. They are not forecasts, but they help us think about plausible, pertinent and challenging futures and therefore encourage today's proactive behaviour to either reach or avoid particular situations. Therefore, the main goal of the scenario method is to try to provide a picture of the possible futures of a country, micro/macro region, organisation or study subject.

Regarding the construction of scenarios Martino speaks about it as a subjective art[16]. Coates also considers that the ambiguity of the meaning of the word "art" fits well with the creation of scenarios as a futurist's activity[17]. In EUFORIA the national workshops were free to include different visions of the future Knowledge Society in their countries. The following table summarises the major themes emerging from the scenario workshops in each country.

Finland	Germany	Greece
1. Unemployment 2. Social exclusion leading to poverty 3. Potential labour shortages accompanying demographic change 4. Lack of entrepreneurship 5. Lack of labour flexibility and mobility 6. Polarisation in working life 7. Regaining an	1. Economic Structure and Performance 2. Social and Political Circum-stances 3. Living Conditions in: a) Family structures, household composition b) Child- and elder-care c) Domestic division of labour d) Living standards e) Time use f) Work-life balance g) Social and political participation h) Access to public services 4. Working Conditions: a) Levels of employment and Unemployment	1. Exploitation of the natural comparative advantages in: a) services, education and training, health and tourism b) The "development engine" is the services sector (tourism-health-culture c) Agricultural sector (integrated management of cultivations, biological-organic) d) Health and the environment related ones (energy, water management). e) Upgrading and modernisation of the educational system and the services provided f) "Organisation" change in

[5] In the future research literature it was introduced as STEPV by Schwartz, in 1972. In 1974 the dimension Ecological (Environmental) was added by Holroyd & Loveridge, however the work remains unpublished.

appropriate work-life balance	b) Skills & training required at work c) Quality of working environment d) Part-time working 5. "New" forms of work/ Industrial Relations a) Strength & strategy of trade unions b) participation in decision making concerning organisational and technological change	favour of knowledge creation, management, diffusion and exploitation g) Training and life-long learning 2. Modernisation of the public sector through the use of new technologies and the promotion of their integration in every-day living involving public services, work, communication and education

Combining scenarios with other foresight methods

The scenarios are the outcome and result of the previous application of various other methods such as national expert workshops and panels, performance indicator development etc. The Delphi results were also used for the preparation of a more integrated European Knowledge Society scenario which included consensual visions about the EU15 by 2015. The scenarios have proven to be useful for consensus development on vision of the future. They also helped to specify necessary policy implications, social innovations and roles of key players to achieve it.

4. Combining expert judgements with formal analytical methods

A very common question of foresight sponsors and organisers is how foresight practitioners make use of available expertise to extract knowledge and visions. In the last decades, several methods (soft and hard) have been developed in order to enhance forward-looking activities. Some of the so called 'hard' foresight methods have borrowed or adapted features from formal analytical methods in order to improve the quality of decision-making processes. They generally require deep understanding of the study subject, and more especially, a clear identification of most factors (or indicators) playing a role in a decision. Such factors are carefully evaluated and their relationships are further analyzed so as to set priorities and simulate situations resulting from the combination of different assumptions. Examples of such methods are econometric and statistical simulations, modelling techniques, cross-impact analysis, etc.

In 1990 a forecasting study on the American transport sector[18] recommended the combination of the Delphi method and formal analytical methods as the best approach to forecast sub-regional socioeconomic variables. Today it is possible to observe a re-emergence of interest and recognition of the attractiveness and potential of formal analytical methods as tools for (1) *providing richer information about uncertain fields*, such as financial markets, technological developments, political environments, etc., and (2) *simulating impacts and consequences of specific actions*, such as strategic economic and political decisions, etc.

In EUFORIA we combined some features of formal analytical methods (cross-impact analysis) with experts' judgements (input information from selected key European individuals) in a method labelled Critical Influences Analysis (CIA). The CIA method tried then to represent the main relationships between key KS driving forces (see box 1 in the Annex) and their main impacts over factors associated with European living conditions, industrial relations and working conditions (see box 2 in the Annex).

To do this we used experts' judgements for both the **design of the structure** (the matrix of drivers and impacts) and the **identification of relationships**. The *structure* was built by means of brainstorming sessions together with a prioritisation process aimed to select 15 key drivers and 10 impacts. The *relationships* were represented in a matrix interrelating drivers and their impacts where experts' judgements were used

to fill in the 150 cells of the matrix. Experts were asked to assign values using the following rating scale:

- -3 if a particular driver would have a very strong inhibiting effect on the trend impact;
- -2 to a moderately strong negative influence;
- -1 to a slightly negative influence;
- 0 to neutral or evenly balanced influence;
- +1 if the driver would have a slight positive or reinforcing effect on the trend impact;
- +2 to a moderate positive or reinforcing effect on the area trend impact;
- +3 to a very strong positive or reinforcing influence.

Experts were asked to mark their ratings on wall posters using 'post-its'. This allowed rapid visual appraisal of the pattern of results – where there are strong influences, where there are no or weak ones, where there is lack of consensus or a bimodal distribution. Results were then discussed in groups, and facilitators allowed changes in ratings if experts decided that their own judgements were misplaced and needed to be reallocated. Either final consensus or average values were assumed to be the final judgements to be processed in the online system[6].

Lessons from combining experts' judgements with formal analytical methods

Valuable lessons on difficulties and possible problems of such approaches can be drawn from the EUFORIA's CIA exercise:

- *The combination of detached experts' judgements can sometimes produce inappropriate information for designing the structure of an exercise*

There was strong critique of the formulation of many of the drivers and it was reported to be challenging to work with drivers that were formulated by other groups (i.e. the driver "*Evolution of democracy in an E-Government Environment*" was widely felt to be unclear, and groups diverged in their interpretation of it).

- *The lack of consensus among experts sometimes lead to take an average value to weight a specific relationship between variables*

Sometimes neutral influences represent a real lack of connection between variables. However, they could also indicate diverse results – across regions, over time, between different aspects of one or other complex variable – that are being averaged out.

- *The combination of positive and negative issues may lead to confusions when the weighting criteria tries to measure positive and negative influences*

When a driver was believed to be negative, sometimes it was difficult to allocate a positive weight to indicate that the driver was reinforcing a trend that was believed to be negative (i.e. *Decreasing confidence of (e-)transactions and data protection* showed to have reinforcing influence over the *increased levels of (cyber)security by firms creates increased surveillance of employees*).

- *The identification of interrelationships between drivers and their impacts sometimes challenge the capacity to obtain forward-looking thinking*

Some groups found it hard to think about specific interconnections between variables using the 2015 time horizon. There was also the feeling that more background

[6] Using the online software Strategylet © Calibrum Corporation – http://www.calibrum.com

information on the drivers and trend impacts would have helped participants to think more in the long-term.

- *The use of rigid structures (i.e. matrix-based methods or models) sometimes hinder the capacity to capture important issues emerging at the group discussions*

For example, during the CIA workshop one of the groups was considering developments such as genomics self-diagnosis, as an alternative to existing health service models. This was not captured or reflected in the main CIA results. Similarly, new impacts were also identified (e.g. environmental pollution); but it was too late to build them into the process. Likewise new drivers (e.g. nationalism) rose to the fore. Also, in some cases it was felt that there may be underlying drivers that need to be specified (a set of three ICT-related drivers were seen to be very closely linked, for instance).

5. Combining real and virtual work

The combination of real and virtual work was driven by two main limitations:

- Limited resources: Online processes are highly recommended when there are limited resources. The use of online consultation (especially in the Delphi) helped to avoid traditional expenses of off-line practices (i.e. printing hundreds of questionnaires for each Delphi round, posting the questionnaires, mailing cost of filled questionnaires for each round, cost of trained personnel to input received data into a system for processing, etc.). Most of the management and communication of activities (i.e. reporting of partners to the project leader and sponsor, sharing documentation, discussing results) were carried out, to a large extent, by means of emails or telephone conferences. However, face-to-face meetings proved to be highly productive in terms of generating knowledge and integrating participants to the virtual activities.
- Limited time: One of the drawbacks of carrying out so many methods in the EUFORIA project was the little amount of time that could be allocated in the Workplan for each activity. For example, the maximum amount of time that could be assigned to the Delphi preparation and implementation was 17 weeks. The preparation of hardcopy questionnaires would not only have represented additional costs but also extra time for graphical design and printing of handouts and surveys, in addition to the posting time.

Virtual work not only helped overcome time and resources limitations, it also allowed us to challenge the level of commitment to e-processes. Because it is believed that online communication for knowledge sharing and exchange in a KS will continue to increase by 2015, we decided to undertake a fully online Delphi. One of the main lessons from EUFORIA Delphi is that promotion strategies should combine face-to-face and online work by means of conventional off- and online marketing (i.e. leaflets, brochures, posters, links to web-sites, promotion on newsletters, etc.) and use of well-networked and committed people. Online participation brought into play some other restrictions regarding the way participants transfer their knowledge. When carrying out fully online methods one must take into account that the structure and length of the activity is user-friendly enough to be filled in relatively quickly in front of the computer while connected to the web at many different speeds. It is believed that by 2015 most Internet connections in Europe will be broadband (high speed connections), however at the present moment we can still find a large number of users with dial-up connections as well as slow processors/modems (old PCs). For this reason it is recommended the use of dynamic and flexible software together with

artistic creativity and experience in web design in order to (1) provide multiple ways for accessing the exercise and (2) motivate participants to contribute to the activity.

6. Early impacts of EUFORIA project

This section on impacts was not originally planned when we thought about writing this paper. This was because the project has been completed just a couple of months ago. However, we believe that even at this early post-EUFORIA stage we can identify substantial amount of work directly inspired by KS findings and methodological framework.

- EUFORIA managed to raise awareness and interest on KS concerns in EU15 countries
- EUFORIA inspired the European Foundation to produce a general model for national KS foresights
- EUFORIA inspired the Irish Government to organise a Presidency Conference on Foresight for Innovations: thinking, debating and shaping the future
- EUFORIA motivated the Greek Technology Foresight Programme to create a new working group on *Foresight and Society*[7]
- EUFORIA influenced the 2004 discussions on the KS strategy of the Finnish Parliament
- EUFORIA inspired KS research in New Member States, particularly in Malta[8] [19]

Impacts specifically related to the methodological framework

- EUFORIA inspired the European Foundation to adopt foresight methodology as a part of its research strategy
- EUFORIA's online Delphi structure and platform has been used by PhD researchers in the UK and governmental authorities to design other Delphi studies
- EUFORIA raised Latin America's interest in European social concerns[9]
- EUFORIA stimulated KS initiatives at the academic & public sectors in Latin America[10]

7. Conclusions

Probably the main lesson from combining large number of foresight methods would be related to the time for reflection on partial results. On the one hand, the use of several approaches helped us process the information in many different ways and increased the attractiveness of the project. On the other hand, time was a constraint which forced the team to conduct the analysis of outcomes and the preparation of partial and final reports in too short time. Methods such as performance indicators and Delphi surveys do require a lot of time and effort to be prepared but most importantly they need probably the same or even more time to be absorbed, disseminated and exploited to the maximum potential.

We should also say that more critical analysis of the added value and limits of the different methods and their combinations can be found in the various partial reports submitted to the European Foundation (some of which are available online[11]). For this reason, this paper only intent to provide a general picture of the usefulness of the

[7] see http://www.foresight-gsrt.gr/english/
[8] see http://dataserver.mcst.org.mt/misc/20040305.pdf
[9] see http://www.concytec.gob.pe/prospecta/programa.htm
[10] see http://www.cnp.org.co/docs/congreso_internacional.pdf
[11] See http://www.eurofound.eu.int/publications/General.htm

techniques and methods used in EUFORIA. In these concluding remarks we recall some of the learning from each method's combinations:

- **Environmental scanning** proved to be useful for identifying new potential performance indicators; preparing questions for the brainstorming exercises; preparing a draft list of STEEP issues; informing national panels about major Knowledge Society concerns; providing draft categories for structuring the Delphi process (i.e. industrial relations, living conditions and working conditions); and, identifying key aspects to be considered in scenario activities (i.e. concerns about social change and other non-technological innovation issues).
- **Performance indicators** provided an important input and have proven to be useful especially to the *cross-national workshop*; the *different national panels and workshops*; the *SWOT analysis*; and the *scenario development exercises*. The indicators and the analysis report provided a key empirical basis on which the subsequent discussions in the workshops and the empirical part of the scenario development were based.
- **Cross-national workshop** proved to be extremely useful for: validating, disseminating and creating awareness about the environmental scanning and performance indicators findings; gathering ideas by means of structured brainstorming exercises; identifying shared important and uncertain concerns (through prioritisation exercises); and, recognising the challenge of undertaking large-scale, intensive, judgement-eliciting processes similar to the cross-impact analysis.
- **Brainstorming** played an essential role in the design and preparation of almost all the other foresight methods. In this respect it may be rather fair to assume that its combination with other methods is basically compulsory.
- **Critical Influences Analysis** proved on the one hand to be useful for the identification of key issues to be addressed by the national panels and valuable in the detection of shared KS-topics to be considered in the preparation of Delphi statements. On the other hand, it was difficult to fully exploit because both the set of drivers and trend impacts were worked-through separately by different groups and it was sometimes hard to understand their meaning and judge their influences.
- **National panels** proved to be: an ideal setting for undertaking Brainstorming exercises; an outstanding environment to carry out SWOT analysis; a relevant setting to generate and discuss Delphi topic statements; and an appropriate environment to develop strategic intelligence for national workshops.
- **SWOT** proved to be one of the most effective ways of making participants to think in the national context. It was enriched by the outcomes of the environmental scanning, national panels, and performance indicators. SWOT results powerfully influenced the Delphi and scenario building activities.
- **Prioritisation** proved to be the most effective method for filtering the large amount of information produced at the brainstorming and SWOT activities.
- **Delphi** produced rich information about respondents' perception on how developments towards a European Knowledge Society would impact over the future of *working conditions*, *industrial relations* and *living conditions* at both the national (Finland, Germany and Greece) and the European contexts. Big controversial issues and polemic results of the Delphi were used as input for the discussions at the national scenario workshops as well as to prepare a full Delphi-based scenario.

- **Scenarios** proved to be useful for consensus development on vision of the future. They also helped to specify necessary policy implications, social innovations and roles of key players to achieve it.

The overall outcome of the EUFORIA experience left a pleasant foresight aftertaste in the project sponsor, partners and some participants. We hope that the learning curve continues to grow by means of publications and other dissemination activities motivated by this paper.

8. Acknowledgements

We would like to acknowledge the contributions of Timo Kauppinen (European Foundation) Ian Miles, Denis Loveridge, Michael Keenan, Lawrence Green, Kieron Flanagan (PREST), Effie Amanatidou (Atlantis), Jari Kaivo-oja (Finland Futures Research Centre) to this paper. The paper is heavily based on the work of the project team: **PREST** (Ian Miles, Denis Loveridge, Michael Keenan, Rafael Popper and Duncan Thomas), **Finland Futures Research Centre** (Ira Ahokas and Jari Kaivo-oja), **Empirica** (Werner B. Korte, Ingo Meyer and Lutz Ellermann) and **ATLANTIS Consulting S.A** (Effie Amanatidou, Tonia Damvakeraki and Foteini Psarra). However, any opinions, errors or biases are the sole responsibility of the authors. Nothing on this paper should be seen as reflecting official view or decisions of the **European Foundation for the Improvement of Living and Working Conditions**.

We would also like to thank the European Foundation for the opportunity to undertake this project and for allowing the authors to use EUFORIA results for the preparation of this paper.

9. Annexes

Box 1: List of Knowledge Society Drivers

Driver 01. Decreasing confidence of (e-) transactions and data protection
Driver 02. More demand for low skill services but decreasing supply
Driver 03. Enlargement of EU to 25+ and even more
Driver 04. Increasing rate of climate change and global warming
Driver 05. Increasing degree of artificial environment – preference to spend leisure time in e.g. theme parks, virtual reality entertainment, etc. rather than natural environments
Driver 06. Growing Importance of Environmental Education
Driver 07. Glocalisation: Development of Global Governance and emergence of local interests increases complexity of interactions
Driver 08. Changing political priorities, e.g. sustainability
Driver 09. Evolution of democracy in an E-Government Environment
Driver 10. Increasing ageing society intensified especially by EU Enlargement
Driver 11. Growing heterogeneity in family forms
Driver 12. Challenges for social security and public health care
Driver 13. Wide application of new technologies in public services with wide implications – for health, education (but also privacy concerns)
Driver 14. Widespread development and diffusion of new methods for producing, locating, sharing and managing knowledge for individuals and organisations
Driver 15. Continuing increases in all aspects of ICT performance (e.g. wireless connectivity, storage, size)

Box 2: List of KS Impacts on Living Conditions, Industrial Relations & Working Conditions

Impact 01. Work pressure increasingly strains work-life balance
Impact 02. Emergence of new forms of childcare and care for elderly
Impact 03. Emergence of a two-tier society sees the wealthy move to private service provision, whilst public services for the poor become poor services
Impact 04. Uncertainty and constraints in the workplace create more stress and associated health problems
Impact 05. Aging workforce is increasingly unsuited to long hours
Impact 06. Increased levels of (cyber) security by firms creates increased surveillance of employees
Impact 07. More multi-location work
Impact 08. Divergent trends to more individual contracts and neo-Taylorist working conditions
Impact 09. Trade unions become more innovative in recruiting and retaining various segments of the workforce (e.g. temporary/contract workers)
Impact 10. Take up of unskilled jobs by economic migrants leads to friction between native & foreign workers

Box 3: Procedure used to develop the Delphi statements

a. The topic lists that emerged from the first national workshops were consolidated into a single database with 172 entries
b. The database was searched, using key word stems, to identify groups of topics with similar characteristics – 30 were identified
c. The individual topics in these 30 groups were then manually annotated with the country of origin and other information indicating whether or not it was among the recommended set from its country of origin; this reduced the total 136 topics
d. The groups of 30 topics were then sorted manually into sets of topics, amalgamating those that were repetitions or were immediately seen to be sufficiently similar to be written as one topic at a later stage: this further reduced the number of topics to 77
e. The topics were then edited using the conventional rules for writing Delphi topic statements; during this process more topics were eliminated when further overlapping or repetition became clear
f. In the final stage the remaining topics were examined for their relevance, reasonableness and robustness. Topics were eliminated when they were considered to be well advanced already or they lacked clarity regarding the content despite editing
g. After this final stage some 25 topics remained to which the PREST team added five to make the set up to the target of 30 topics
h. The project sponsor then added 2 topics making the final set of 32 cross-national statements
i. Subsequently, each national centre was asked to name five (5) topics from its original list that did not appear in the cross-national list, which they consider vital to their national context. With these included, 37 topics appeared in the web-based 'questionnaire.'

11. References

[1] Loveridge, D et al., (2004) European Knowledge Society Foresight - The EUFORIA Project Synthesis Report, Report submitted by PREST to the European Foundation for Living Conditions, Working Conditions and Industrial Relations

[2] Georguiou, L. (1998), Global cooperation in research, Research Policy 27, 611-626

[3] Havas, A., (2003), Evolving Foresight in a Small Transition Economy, Journal of Forecasting 22, 179-201

[4] Aguilar, F. (1967). Scanning the business environment. New York: Macmillan

[5] Morrison, J. L. (1992). Environmental scanning. In M. A. Whitely, J. D. Porter, and R. H. Fenske (Eds.), A primer for new institutional researchers (pp. 86-99). Tallahassee, Florida: The Association for Institutional Research.]

[6] Miles, I. et al. (2002) Handbook of the Knowledge Society Foresight. Report prepared by PREST and FFRC for the European Foundation for the Improvement of Living and Working Conditions, Manchester

[7] Popper, R. and Miles, I. (2002), The EUFORIA cross-national workshop, Report submitted by PREST to the European Foundation for Living Conditions, Working Conditions and Industrial Relations. Available online at: http://les.man.ac.uk/PREST/euforia/documents/PREST_report_22.11.2002.pdf

[8] Adapted from Miles, I. et al. (2002) Handbook of the Knowledge Society Foresight. Report prepared by PREST and FFRC for the European Foundation for the Improvement of Living and Working Conditions

[9] Idem 7

[10] Popper, R. (2002) Cross-impact method for detecting key drivers in Peru. Report on the foresight workshop organized by the Consortium Prospective Peru (CPP) October 17-18, 2002, Lima, Peru. Available online at: http://les.man.ac.uk/PREST/euforia/POPPER/Peru_foresight.pdf

[11] Eto, H. (2003), The suitability of technology forecasting/foresight methods for decision systems and strategy - A Japanese view, Technological Forecasting and Social Change, Volume 70, Issue 3 , March 2003, Pages 231-249

[12] Martino, J. (2003) A review of selected recent advances in technological forecasting, Technological Forecasting and Social Change, Volume 70, Issue 8 , October 2003, Pages 719-733

[13] Adapted from Turoff, M. (1970), The Design of a Policy Delphi, Technological Forecasting and Social Change 2, No. 2. Available online at: http://www.is.njit.edu/pubs/delphibook/

[14] Popper, R. (2003) The Knowledge Society EUFORIA Delphi Report. Report submitted by PREST to the European Foundation for the Improvement of Living and Working Conditions. Available online at: http://les.man.ac.uk/PREST/euforia/documents/RP_Final_Delphi_Report.pdf

[15] Popper, R., (2003), The Knowledge Society Delphi: Executive Summary of Main Results…underpinning trends, impacts and policy areas in EU15's working conditions, industrial relations & living conditions, Reported by PREST to the European Foundation for the Improvement of Living and Working Conditions. Available online at: http://les.man.ac.uk/PREST/euforia/documents/RP_Delphi_executive_summary.pdf

[16] Martino, J. A review of selected recent advances in technological forecasting, Technological Forecasting and Social Change, Volume 70, Issue 8 , October 2003, Pages 719-733

[17] Coates, J. (2000), Scenario Planning, Technological Forecasting and Social Change 65, 115-123

[18] Bajpai, J. N. (1990), Forecasting the Basic Inputs to Transportation Planning at the Zonal Level, Washington, D.C., Transportation Research Board, 55p.

[19] Report on A Forward Look at the Knowledge Society in Malta 2015, Gender Perspectives and Implications, Produced by the Malta Council for Science & Technology and the National Commission for the Promotion of Equality for Men and Women (March 2004) - http://dataserver.mcst.org.mt/misc/20040305.pdf

Other reports related to EUFORIA

The following reports can be downloaded from the website of the European Foundation for the Improvement of Living and Working Conditions (publication date: 2004):

The Knowledge Society in Finland (summary),

The Knowledge Society in Finland: Current situation and future trends

The Knowledge Society in Germany (summary)

The Knowledge Society in Germany: Current situation and future trends

The Knowledge Society in Greece (summary)

The Knowledge Society in Greece: Current situation and future trends

http://www.eurofound.eu.int/publications/General.htm

See also project website at http://les.man.ac.uk/PREST/euforia/

Presentation 1 :





THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

About EUFORIA…

In the context of its four-year work programme, *Analysing and Anticipating Change to Support Socio-Economic Progress 2001-2004*, the European Foundation for the Improvement of Living and Working Conditions undertook a foresight project (EUFORIA) concerning the European Knowledge Society, with the aim of:

- **Phase 1**
  - producing a handbook on the Knowledge Society
- **Phase 2**
  - testing foresight methods in practice
  - setting up three national foresight points
  - producing indicator analysis on advancement of the Knowledge Society (KS)
  - finding KS drivers
  - analysing the drivers' impacts on living conditions, working conditions and industrial relations in EU15 countries by 2015

PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

1. Combining multi-approach activities



- **Integrative** (various countries + international community)
- **Exploratory** (various traditional methods)
- **Experimental** (modifying methods + multi-languages)
- **Developmental** (activities outcomes as inputs for following stages)
- **Forward-looking** (using 15 years as the time horizon in all activities)



Sponsor
European Foundation for the Improvement of Living & Working Conditions
Project coordinator
PREST (UK)
Project partners
Atlantis (Greece)
Empirica (Germany)
Finland Futures Research Centre (Finland)

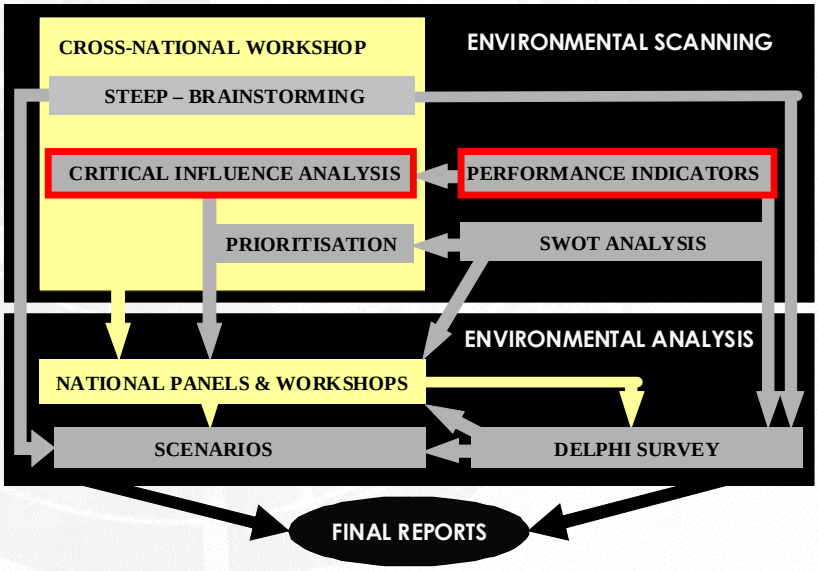
PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

2. Combining 'hard' and 'soft' techniques

EUFORIA's methodological approach



PREST

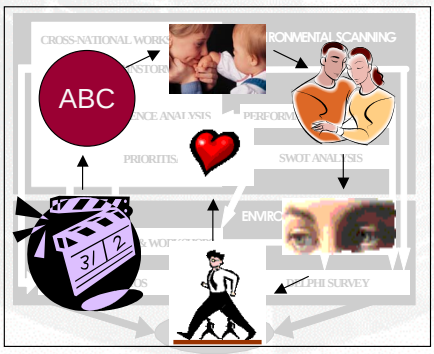
THE UNIVERSITY of MANCHESTER

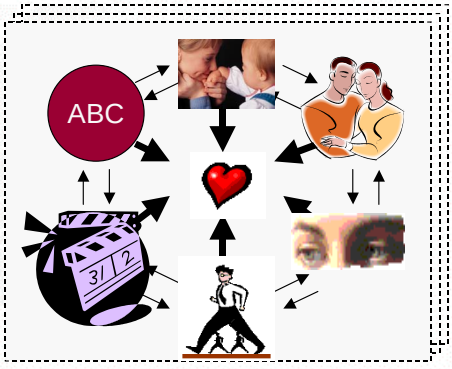
http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

…combining 'hard' and 'soft' techniques

How to **successfully** implement & combine 'hard' and 'soft' techniques?

NO single approach!





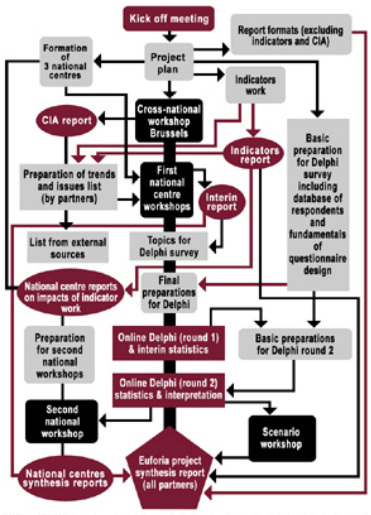
PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

…combining methods: Resources & Reflection time

Activities	Duration
Scanning & indicators work	November 2002 (1 week + 1 or 2 weeks analysis)
Brainstorming	
Critical Influence Analysis	
Panels	December 2002 (1 week)
Identification of trends & issues	January & February 2003
Prioritisation	March 2003
Online Delphi	April-July 2003
Scenarios	June 2003 (1 week + 1 or 2 weeks writing)
Synthesis report	September 2003 (3 weeks + 1 week editing)



- Desk work + Meetings: **management, design & analysis**
- Workshops: **knowledge capturing + socialisation**
- Reports: **synthesis & reflection**

PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

3. Combining experts' judgements with FAM

- The combination of detached experts' judgements can sometimes produce inappropriate information for designing the structure of an exercise
- The lack of consensus among experts sometimes lead to take an average value to weight a specific relationship between variables
- The combination of positive and negative issues may lead to confusions when the weighting criteria tries to measure positive and negative influences
- The identification of interrelationships between drivers and their impacts sometimes challenge the capacity to obtain forward-looking thinking
- The use of rigid structures (i.e. matrix-based methods or indicators) sometimes hinder the capacity to capture important issues emerging at the group discussions

PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

4. Combining face-to-face & virtual work

Sometimes improves 3 major limitations

Time Management Resources



PREST

THE UNIVERSITY of MANCHESTER

http://les.man.ac.uk/PREST/euforia/ EUFORIA Knowledge Society Foresight

5. Early impacts

1. EUFORIA managed to raise awareness and interest on KS concerns in various EU15 countries
2. EUFORIA inspired the European Foundation to produce a general model for national KS foresights
3. EUFORIA inspired the Irish Government to organise a Presidency Conference on Foresight for Innovations: thinking, debating and shaping the future
4. EUFORIA motivated the Greek Technology Foresight Programme to create a new working group on *Foresight and Society*
5. EUFORIA influenced the 2004 discussions on the KS strategy of the Finnish Parliament
6. EUFORIA inspired KS research in New Member States, particularly in Malta
7. EUFORIA inspired further research at PhD level (so far… in Greece & Germany)

Impacts of the methodological framework

8. EUFORIA inspired the European Foundation to adopt foresight methodology as a part of its research strategy
9. EUFORIA's online Delphi structure and platform has been used by PhD researchers in the UK and governmental authorities in Latin America to design other studies
10. EUFORIA raised Latin America's interest in European social concerns
11. EUFORIA stimulated KS initiatives at the academic & public sectors in Latin America

PREST



6. Lessons on combining methods

Goals - Resources - Environment - Analysis - Time

- **Environmental scanning** proved to be useful for identifying new potential performance indicators; preparing questions for the brainstorming exercises; preparing a draft list of STEEP issues; informing national panels about major Knowledge Society concerns; providing draft categories for structuring the Delphi process (i.e. industrial relations, living conditions and working conditions); and, identifying key aspects to be considered in scenario activities (i.e. concerns about social change and other non-technological innovation issues).
- **Performance indicators** provided an important input and have proven to be useful especially to the *cross-national workshop*; the *different national panels and workshops*; the *SWOT analysis*; and the *scenario development exercises*. The indicators and the analysis report provided a key empirical basis on which the subsequent discussions in the workshops and the empirical part of the scenario development were based.
- **Cross-national workshop** proved to be extremely useful for: validating, disseminating and creating awareness about the environmental scanning and performance indicators findings; gathering ideas by means of structured brainstorming exercises; identifying shared important and uncertain concerns (through prioritisation exercises); and, recognising the challenge of undertaking large-scale, intensive, judgement-eliciting processes similar to the cross-impact analysis.
- **Brainstorming** played an essential role in the design and preparation of almost all the other foresight methods. In this respect it may be rather fair to assume that its combination with other methods is basically compulsory.
- **Critical Influences Analysis** proved on the one hand to be useful for the identification of key issues to be addressed by the national panels and valuable in the detection of shared KS-topics to be considered in the preparation of Delphi statements. On the other hand, it was difficult to fully exploit because both the set of drivers and trend impacts were worked-through separately by different groups and it was sometimes hard to understand their meaning and judge their influences.
- **National panels** proved to be: an ideal setting for undertaking Brainstorming exercises; an outstanding environment to carry out SWOT analysis; a relevant setting to generate and discuss Delphi topic statements; and an appropriate environment to develop strategic intelligence for national workshops.
- **SWOT** proved to be one of the most effective ways of making participants to think in the national context. It was enriched by the outcomes of the environmental scanning, national panels, and performance indicators. SWOT results powerfully influenced the Delphi and scenario building activities.
- **Prioritisation** proved to be the most effective method for filtering the large amount of information produced at the brainstorming and SWOT activities.
- **Delphi** produced rich information about respondents' perception on how developments towards a European Knowledge Society would impact over the future of *working conditions*, *industrial relations* and *living conditions* at both the national (Finland, Germany and Greece) and the European contexts. Big controversial issues and polemic results of the Delphi were used as input for the discussions at the national scenario workshops as well as to prepare a full Delphi-based scenario.
- **Scenarios** proved to be useful for consensus development on vision of the future. They also helped to specify necessary policy implications, social innovations and roles of key players to achieve them.