The **Delphi Survey** is a particular collaborative process that is designed to improve group communications about a complex problem or topic. The objectives of a Delphi process are three-fold: (1) to gather the information which is needed to deal with the problem or topic and fill in the resulting knowledge structure; (2) to make sure this information can be understood by the many different backgrounds of the contributors; (3) to expose agreements and disagreements and trying to come up with various recommendations for actions of various types.

The Delphi method involves gathering of what might be a very large group of participants to consider a complex problem, usually about five people in each area of special knowledge or expertise needed to present and share information about the problem and various solutions to it. A knowledge structure allows the participants to place their comments, insights, and concerns in the appropriate location so a large involved discussion is easy to follow. Individual participants, usually anonymous when authoring items and when voting, have the ability to vote on contributions so the group can determine what specific things they agree or disagree on. In the past, the Delphi Survey was largely done by paper and pencil communications and is now often done on the Web. Since the computer process or paper process keeps track of the contributions, what each individual has contributes, what they have read or seen, every participant can participate asynchronously at a time and place convenient for them.

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Definitional aspects

Main article: Definitional aspects of the Delphi method

The basic Delphi concept is the design of a collaborative communication structure and process that is tailored to the nature of the problem and the nature of the group. Anonymity of the responses is one fundamental property so that people will feel free to express themselves and to be able to expose ideas that could turn out to be stupid as well as brilliant. The typical view of Delphi is that it has a round structure and goes through at least three phases:

1. Exploring the problem and exposing new insights and additional relevant material.
2. Gaining a collective understanding of the material generated.
3. Evaluating the material and hopefully reaching a consensus.

Over the past forty years, a number of specific Delphi Structures have been designed and are very popular in

terms of successful usage. This includes the conditional forecasting of trends where the emphasis is generating the conditions that affect the trend forecast. A second is a problem solving Delphi structure to come up with an evaluated list of alternatives or options. The third is the Policy Delphi which is devoted to determining the alternative and complementary policy options to a policy issue and the arguments supporting each one. The fourth is the example of Cross Impact Analysis for building individual and group models of interaction among future events and scenarios. The specific area of cross impact analysis is a foundation for the creation of a Delphi based Planning process.

Delphi like processes

Main article: Delphi like processes

The name of Delphi was not chosen by the inventors of the method at RAND (Olaf Helmer and Norman Dalkey) but by their fellow professionals, since it was commonly used for future predictions. The strange name affixed to the Delphi process has not been favorable for the spread of this method. What has happened as a result is that many of the premises of Delphi have been rediscovered or renamed under other methods to use group processes to try to obtain some level of collective intelligence. This is the concept that the group can reach a higher quality result than any individual in the group would have acting alone[1]. The most common Delphi derivatives today are: collaborative tagging or folksonomies and recommender systems, prediction markets, wikis and collaborative systems for humans.

Examples of Delphi structures

Main article: Examples of Delphi structures

There are a number of "classic" structures that have been used very successfully many times in the past forty years and have been the basis of a number of proprietary organizational studies. They can each be used on a wide range of similar problems. Some of them have been utilized in online exercises using bulletin boards and auxiliary software such as survey packages. A few have been fully implemented in software.

The following are the general types of Delphi processes that apply to a large number of applications:

- Trend Delphi: produces a forecast of a trend along with the mental model of the group making the extrapolation of the trend curve into the future.
- Problem Solving Delphi: Collects solutions to the problem which are rescaled to a group interval scale based upon individuals ranking or paired comparisons. Use voting to focus discussion on items that need it.
- Policy Delphi: seeks policy resolutions and the strongest pro and con evidence or arguments to support each policy resolution.
- Cross Impact Modeling: Collaborative building of a model of the future possible outcomes of a set of unique events.

EUFORIA Delphi Survey

More about the EUFORIA Project.

The Euforia project was commissioned by the *European Foundation for the Improvement of Living and Working Conditions* in the context of its programme aimed at *Analyzing and anticipating change to support socio-economic progress 2001-2004*. The project?s goal was to create a structured process by which questions related to living conditions, working conditions and industrial relations in a Knowledge Society might be illuminated. Euforia was launched as a pilot project taking three EU countries - Finland, Greece and Germany - as its test cases, designed to see how far foresight methods could be used to throw light on the relevance of KS concepts.

A ?Knowledge Society Delphi? Survey was run during the EUFORIA project. The survey covered a large range of topics concerning the Knowledge Society, emerging from national workshops or presenting a particular interest for the project?s sponsor. These topics covered the social, technological, economic, environmental, political and values-related aspects (STEEPV), and were clustered into six categories: governance and mobility, health and privacy, industrial relations, living conditions; sustainable development, and working conditions. The outputs of the Delphi Survey were used as inputs for national scenario workshops, as well as for preparing a full Delphi-based scenario.

Statement-building methodology

The process of building Delphi statements followed a complex methodology.

Step 1: initial lists of topics produced during national workshops were consolidated into a single database with 172 entries;

Step 2: 30 groups of topics with similar characteristics were identified;

Step 3: individual topics within these groups were then annotated with the country of origin and whether or not they were among the recommended set from its country of origin, and thus the list was reduced a total of 136 topics;

Step 4: sets of topics were then created, and those that were repetitions or were seen to be sufficiently similar were written as one topic, which further reduced the number of topics to 77;

Step 5: the topics were then edited using conventional rules for writing Delphi statements, and the total number of statements was reduced again;

Step 6: remaining topics were examined for their relevance, reasonableness and robustness, and a number of them were eliminated because they were considered to be well advanced already or lacking clarity;

Step 7: the PREST team added five more to make the set up to the target of 30 topics;

Step 8: each national centre was asked to name five topics from its original list, which they consider vital to their national location, thus raising the number of topics that appeared in the web-based ?questionnaire? to 35;

Step 9: two more statements proposed by the project sponsor;

Step 10: the statements were clustered into six categories, allowing participants to access only the questions related to one specific category and send their partial questionnaire.

1. *governance and mobility:* interactions between EU governments, citizens, and labor organizations;

working force immigration and emigration; the use of information technologies by governments; etc;
2. *health and privacy:* EU policies on genetic engineering; civil liberties, health monitoring; DNA screening; creation of genetic databanks; etc.;
3. *industrial relations*: the way in which EU industries manage their networks; monitoring and supervision through electronic means; employment contracts; role of trade unions; decision-making practices; etc.;
4. *living conditions*: EU citizens? behavior and live; ethics; justice; education; social isolation and loneliness; lifelong learning; work-life balance and family relations; role of ICT in everyday life; etc.;
5. *sustainability and development*: EU governments? policies on sustainable development; regional employment; business management practices; environmental technologies; wealth creation and quality of life; effects of EU enlargement; etc.;
6. *working conditions*: EU governments? policies on gender-related work inequalities; working time; forms of employment; organizational learning; violence and harassment at work; etc.

Assessment options

The Delphi statements were exploratory option was chosen, asking how far a development will have progressed by the time horizon of 2015, a rough approximation to the time horizon of 2010 set in the recommendations of the Lisbon Council, rather than the more common form of by when a development will transpire. This would allow comparison between countries at different stages of development to be made more readily.

When responding to the Delphi statements, the respondents were offered a choice from the following five options[2]:

1. the statement underestimates the situation by 2015;
2. the statement is about right by 2015;
3. the statement overestimates the situation by 2015;
4. the statement will not follow this path; and,
5. the statement is too uncertain (participant does not know or cannot provide any judgment on the development of the statement).

Respondents were asked to indicate the influence of each statement on each of nine factors related to the conclusions of the Lisbon Council and the Foundation?s mission. The specified factors were[3]:

1. **social cohesion** - those features of society that relate to social integration and the reduction of conflict between or within social groupings;
2. **social exclusion or divides** - any matters that create or exacerbate inequality and inequity between or within social groupings including the ?digital divide,? access to education, gender and other equality related issues;
3. **sustainability/environmental quality** - those matters that influence the development of the natural and built environments in which future generations will live;
4. **employer-employee relations** - includes the role of trade unions, management, and employees including employment standards as set by regulations and directives;
5. **economic growth/wealth creation** - those matters that increase national income and strengthen the industrial base;
6. **entrepreneurship and innovativeness** - those matters that enable and promote new products, processes and services in existing businesses and the formation of new businesses in novel fields;
7. **employee exercise of autonomy and responsibility at work** - including the advancement of the quality of working life through freedom to make decisions, to exercise management of time and to embark on retraining;

8. **work-life balance** - those matters that enable people to manage the stresses caused by for example the pressures arising from longer and unsocial working conditions;
9. **job creation** - refers to the expansion of employment opportunities at all skill levels irrespective of gender.

For each factor, the influence of the statements were rated by selecting one of the following criteria:

1. the statement would strongly increase/improve the factor;
2. the statement would increase/improve the factor;
3. the statement would have no effect on the factor;
4. the statement would decrease/deteriorate the factor;
5. the statement would strongly decrease/deteriorate the factor.

The online survey

The Delphi was run online. Difficulties in achieving a workable online Delphi resulted from its multilingual nature. A reasonable level of involvement in the survey was obtained from Greek and Finnish participants, while Germany had a disappointing level of about 20 participants. Many people took part from other countries (United Kingdom, Netherlands) bringing the total response rate to over 180. Organizers consider this number to be lower than desirable. According to them, a Delphi is not expected to involve a large enough sample to be representative of a population, but rather to tap into expert knowledge. However, the range of topics considered was such that a lot of people may be required to ensure that this condition was achieved.

Lessons learned

The main concern was the lack of a committed body of respondents. It was a mistake to assume that a sufficient number of respondents would emerge from a light marketing approach. In any larger study it will be necessary to ensure that in each country there is an existing body of interested and willing respondents. A low percentage response rate resulted in a lack of appreciation of the viability of survey, particularly by people from a scientific background who expect statistically high response rates for the outcome to be of any value. Organizers believe a reasonable response rate should be in the region of 10% of the likely population.

Experience with the online Delphi did not confirm all initial expectations. One reason for the low overall response rate might have something to do with the fact that users were experiencing an upsurge of spam and viruses. Another factor may have been that the need to log in to a website to fill in a survey was just too much of a break from normal routines. Organizers believe that greater attention needs to be paid to the respondents? level of skill with online working. More effort needs to be put into the preparations for an online Delphi, not just on the technical side, but in the management of the survey.

Translating the Delphi questionnaire proved to be a daunting task, and the particular Delphi format employed was a source of aggravation for some respondents. Translation can affect the quality and credibility of the Delphi process, since the original English nuances can easily be lost. This produces uncertainties in regard to the ways in which respondents interpret and answer the questions.

The results themselves were fairly typical and told an interesting story. However, organizers believe there is still a good deal of persistent misunderstanding about the interpretation of a Delphi survey?s output. Panels usually complain that they do not get unusual ideas and new information from the survey. Fortunately, that was not the case in the Euforia survey, where the workshops did not pose questions to seek confirmation of their established

ideas and opinions.

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