

DELPHI METHOD

Description of the technique

The Delphi Method is based on a structured process for collecting and synthesising knowledge from a group of experts by means of a series of questionnaires accompanied by controlled opinion feedback (Adler and Ziglio, 1996). The questionnaires are presented in the form of an anonymous and iterative consultation procedure by means of surveys (postal and/or e-mail).

The Delphi Method originated as part of a post-war movement towards forecasting the possible effects of technology development in relation to economic and social re-generation. The technology forecasting studies were initiated by the Douglas Aircraft Company, which established the RAND project in 1946 to study the "broad subject of inter-continental warfare" (Fowles, 1978). The theoretical and methodological basis for forecasting was elaborated in a subsequent series of papers produced by the project. These argued that, in the absence of an established evidence base, emergent fields of enquiry could begin to develop such an evidence base through capturing and synthesising the opinions of domain experts. The Delphi method was therefore an attempt to 'align' the sometimes conflicting positions of experts into a coherent and unified perspective.

The technique is relatively simple. It consists of a series of questionnaires sent to a pre-selected group of experts. These questionnaires are designed to elicit and develop individual responses to the task specified and to enable the experts to refine their views as the group's work progresses in accordance with the assigned task. The rationale behind the Delphi method is to address and overcome the disadvantages of traditional forms of 'consultation by committee', particularly those related to group dynamics.

Purposes of the technique

Delphi is primarily used to facilitate the formation of a group judgement (Helmer, 1977). It developed in response to problems associated with conventional group opinion assessment techniques, such as Focus Groups, which can create problems of response bias due to the dominance of powerful opinion-leaders (Wissema, 1982). It may be used in forward planning to establish hypotheses about how scenarios are likely to develop, and on their socio-economic implications. For example, it has been widely used to generate forecasts in technology, education, and other fields (Cornish, 1977). Fundamentally, the method serves to shed light on the evolution of a situation, to identify priorities or to draw up prospective scenarios.

Circumstances in which it is applied

Although the approach was originally developed to capture expertise in uncertain and emergent domains, it tends to be used in evaluation when significant expertise exists on the subject, for example in the case of programmes that are not innovative. The method is recommended when the questions posed are simple (a programme with few objectives, of a technical nature) and for the purpose of establishing a quantitative estimation of the potential impacts of an isolated intervention (e.g. increase in taxes or in the price of energy). It is also recommended in an ex ante evaluation context if the evaluation concerns public intervention of a technical nature. Thus, it was very often used in the framework of energy policies, for example, for prospective studies on the impact of changes in taxation. In the case of the evaluation of Structural Funds, for example, the Delphi inquiry has been recommended for obtaining macro-economic estimations when the phenomena involved are complex; for example, to quantify the impact of a major

infrastructure project. It may also be used to specify relations of causes and potential effects in the case of innovative interventions. It is particularly useful when a very large territory is being dealt with since there are no experts' travel expenses, only communication costs.

It has found to be particularly useful in programmes related to public health issues (such as, policies for drug use reduction and prevention of AIDS/HIV) and education (Adler and Ziglio, 1996; Cornish, 1977). According to a number of commentators, context is everything in deciding whether and when to use the Delphi method. According to Adler and Ziglio (1996), the key questions that need to be asked are:

- What kind of group communication process is desirable in order to explore the issue?
- Who are the people with expertise on the issue and where are they located?
- What are the alternative techniques available and what results can reasonably be expected from their application?

An example of policy scenario analysis using the Delphi method is given in **Box 1**.

Box 1: AIDS vaccination policy: a scenario analysis using the Delphi method

The Delphi method was used to explore and identify the potential implications associated with the introduction of a first AIDS vaccination in Switzerland. Thirty participants with an interest in the field contributed anonymously to the study. The study focused on an existing scenario which modelled the characteristics of a first preventive, partially effective, vaccination against AIDS.

The Delphi consultation was carried out in three stages, and the participants were asked to:

- *list the objectives to be achieved in the first five years*
- *evaluate the acceptability and feasibility of proposals concerning the development of a public health strategy and the AIDS vaccination*
- *estimate the potential use of the vaccination by different groups of users.*

The consultation process produced two main outcomes: firstly, a set of strategies and recommendations for the development of a framework of AIDS prevention campaigns and, secondly, an institutional framework for the setting up of a future AIDS vaccination strategy.

Source: Zuber, P. (1994) Introducing a first AIDS vaccination in Switzerland: A Delphi Policy Analysis. Lausanne: Institut de médecine sociale et préventive.

The main steps involved

The approach consists of questioning the experts by means of successive questionnaires, in order to reveal convergence and any consensus there may be. The main stages of this process are (Fowles, 1978):

Step 1. Determination and formulation of questions

Particular care must be given to the choice and formulation of questions, so as to obtain useful information.

Step 2. Selection of experts

They must have specific knowledge on the subject and be prepared to become involved in this type of procedure. The panel is generally composed of about fifty persons.

Step 3. Formulation of a first questionnaire that is sent to the experts

The first questionnaire must contain a reminder of the nature of the study and include two or three semi-open and open questions.

Step 4. Analysis of the answers to the first questionnaire

The answers are analysed in order to determine the general tendency and the most extreme answers.

Step 5. Formulation of a second questionnaire that is sent to experts

Each expert informed of the results of the first round is asked to provide a new answer and to justify it if it differs from the general tendency.

Step 6. Sending of a third questionnaire

This questionnaire is intended only for those experts whose answers were "extreme". They are asked to criticise the arguments of those who supported the opposite point of view. The comparison of opinions has a moderating influence and facilitates the appearance of convergence between the points of view.

Sufficient convergence of opinions generally appears with the fourth questionnaire. If that is not the case, the cycle continues.

Step 7: Summary of the process and drawing up of the final report.

It is important to note that the analysis of data elicited through Delphi surveys should be carried out using statistical analysis (for example cluster analysis or canonical correlation analysis) in order to identify convergences and divergences in responses.

Strengths and limitations of the approach

As has often been remarked, the results of a Delphi survey are only as valid as the opinions of the experts involved (Martino, 1978). Martino is only one of a number of critics of the Delphi approach. His suggestion that the technique represents a 'last resort' when there are no other techniques suitable or available echoes the results of a number of systematic reviews and meta-analyses of the application of the technique. The key problems reported include: poor internal consistency and reliability of judgements among experts, and therefore low reproduceability of

forecasts based on the results elicited; sensitivity of results to ambiguity and respondent reactivity in the questionnaires used for data collection; difficulty in assessing the degree of expertise held by participating experts (Makridakis and Wheelright, 1978).

A major problem identified by research into the implementation and application of Delphi surveys has been the tendency for experts to over-simplify particular issues, and treat them as isolated events. This is particularly the case in forecasting, where experts tend to think in terms of linear, sequential events, rather than applying a holistic view that involves complex chains and associations. This has led to the development of techniques such as 'cross impact matrix forecasting', which are intended to compare a range of 'possible futures' against each other, and to consider the displacement, substitution and multiplier effects associated with the scenarios identified by the experts involved (Gordon and Hayward, 1968; Gatewood and Gatewood, 1983; Adler and Ziglio, 1996).

On the other hand, there have been several studies (Ament, 1970; Wissema, 1982; Helmer, 1983) supporting the Delphi method. These studies seem to suggest that In general, the Delphi method is useful to explore and unpack specific, single-dimension issues. There is less support for its use in complex, multi-dimensional modelling. In these cases, the evidence does suggest that data gathered by Delphi surveys is a useful input, when supported by data gathered from other sources, to complex scenario-building.

Key terms

Delphi survey – the actual process through which expert opinion is elicited – in the form of iterative questionnaire surveys

Cross-impact matrix forecasting – comparing the results of Delphi surveys against other possible scenarios, and predicting the possible 'unforeseen effects' that might apply