PARTICIPATORY METHODS TOOLKIT

A practitioner's manual

Delphi

viWTA SAMENLEVING & TECHNOLOGIE

King Baudouin Foundation

Colophon

Participatory Methods Toolkit. A practitioner's manual
Method: Delphi

This is an extract of the publication 'Participatory Methods Toolkit. A practitioner's manual', a joint publication of the King Baudouin Foundation and the Flemish Institute for Science and Technology Assessment (viWTA).

The full version of the manual includes:

- Introduction about participatory methods
- General guidelines and tips for participatory methods
- Complete description of 13 participatory methods: 21st Century Town Meeting® ; Charrette ; Citizens Jury ; Consensus Conference ; Deliberative Polling® ; Delphi ; Expert Panel ; Focus Group ; Participatory Assessment, Monitoring and Evaluation ; Planning Cell ; Scenario Building Exercise ; Technology Festival ; The World Café
- Brief descriptions of 50 methods and techniques

All publications are available free of charge, online via www.kbs-frb.be or www.viWTA.be.

Editors
Stef Steyaert (viWTA) and Hervé Lisoir (King Baudouin Foundation)

Author
Nikki Slocum (United Nations University – Comparative Regional Integration Studies)

Layout and printing
Belgian Advertising (B.AD)

Legal depot
D/2005/2893/19

ISBN
90-5130-506-0

With the support of the Belgian National Lottery

September 2005

Delphi

(and Policy Delphi, Public Delphi, Delphi Conference, Delphi face-to-face)

I. DEFINITION

Delphi involves an iterative survey of experts. Each participant completes a questionnaire and is then given feedback on the whole set of responses. With this information in hand, (s)he then fills in the questionnaire again, this time providing explanations for any views they hold that were significantly divergent from the viewpoints of the others participants. The explanations serve as useful intelligence for others. In addition, (s)he may change his/her opinion, based upon his/her evaluation of new information provided by other participants. This process is repeated as many times as is useful. The idea is that the entire group can weigh dissenting views that are based on privileged or rare information. Thus, in most Delphi processes the mount of consensus increases from round to round.

While traditionally conducted via mail, other variations of Delphi can be conducted online or face-to-face. In the original Delphi process, the key characteristics of this method were (1) structuring of information flow, (2) feedback to the participants and (3) anonymity for the participants. In a face-to-face Delphi, the anonymity is eliminated. Another variation of the Delphi is the 'Policy Delphi', the main goal of which is to expose all the different options and opinions regarding an issue and the principal pro and con arguments for these positions.

II. WHEN TO USE

A dialectical process, Delphi was designed to provide the benefits of a pooling and exchange of opinions, so that respondents can learn from each others' views, without the sort of undue influence likely in conventional face-to-face settings (which are typically dominated by the people who talk the loudest or have most prestige). The technique allows experts to deal systematically with a complex problem. From round to round the relevant information is shared, further educating the panel members. Recommendations can thus be made on the basis of more complete information.

Usually one or more of the following properties of the application leads to the need or usefulness of employing Delphi:

- The problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis.
- The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication and may represent diverse backgrounds with respect to experience or expertise.
- More individuals are needed than can effectively interact in a face-to-face exchange (except through the face-to-face Delphi's shuttle process between plenary and sub-groups).
- Time and cost make frequent group meetings infeasible.
- The efficiency of face-to-face meetings can be increased by a supplemental group communication process.

[1] The Delphi method was originally developed at the RAND Corporation by Olaf Helmer and Norman Dalkey.

- Disagreements among individuals are so severe or politically unpalatable that the communication process must be refereed and/or anonymity assured.
- heterogeneity of the participants must be preserved to assure validity of the results, i.e. avoidance of domination by quantity or by strength of personality.

The *Policy Delphi* serves any one or a combination of the following objectives:

- to ensure that all possible options have been put on the table for consideration
- to estimate the impact and consequences of any particular option
- to examine and estimate the acceptability of any particular option.

In general, the Delphi method was invented in an attempt to overcome various social-psychological challenges associated with committee processes, including:

- the domineering personality or outspoken individual that takes over the committee process
- the unwillingness of individuals to take a position on an issue before all the facts are in or before it is known which way the majority is headed
- the difficulty of publicly contradicting individuals in higher positions
- the unwillingness to abandon a position once it is publicly taken
- the fear of bringing up an uncertain idea that might turn out to be undesirable and result in a loss of face.

III. PROCEDURE

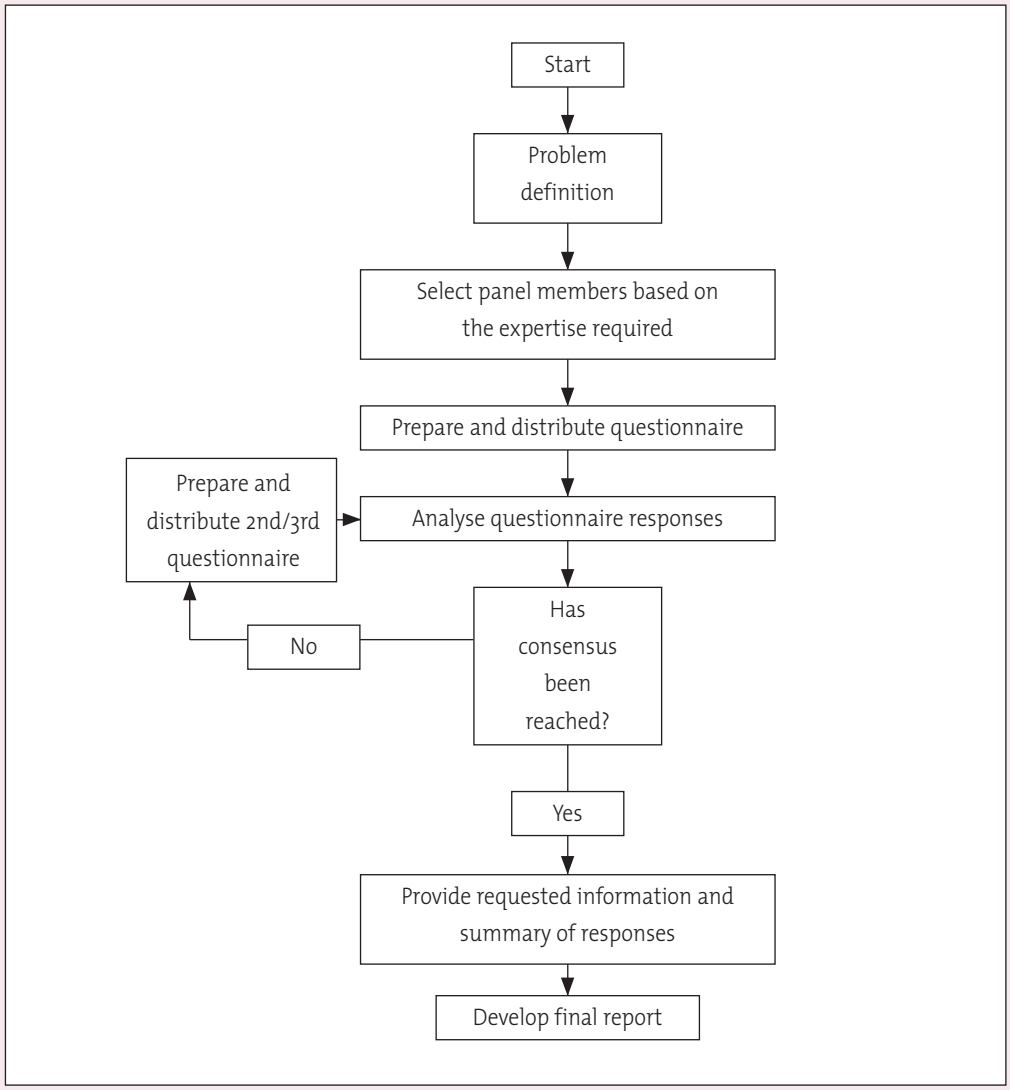
A. Overview

Refer to the Delphi Method Flowchart below for a graphic overview of this method.

Delphis – whether conventional, real-time on computer or face-to-face – usually undergo four phases. In the first phase the subject under discussion is explored and each individual contributes the information (s)he feels is pertinent to the issue. In the second phase an overview is reached on how the group views the issue, for example, where there is dis/agreement over what is meant by relative terms such as 'feasible', 'important', 'desirable', etc. If there is significant disagreement, then this is explored in the third phase in order to illuminate the reasons for the differences and evaluate them. The fourth phase entails a final evaluation that occurs when all previously gathered information has been initially analysed and the evaluations have been fed back for reconsideration.

In the following sections a step-by-step description of conventional Delphi is presented, followed by a description of the variations that constitute the Policy Delphi. Finally, the steps of the Delphi Conference are presented.

Delphi Method Flowchart [1]



[1] From http://www.ryerson.ca/~mjoppe/ResearchProcess/841TheDelphiMethod.htm

B. Realisation

1. PERSONNEL AND TASKS

(a) Organisational Team

The tasks of the organisational team are as follows:

- Develop the questionnaires.
- Identify and recruit experts.
- Distribute questionnaires.
- Analyse the comments and give feedback to the experts after each round.
- Write the final report.

(b) Experts

- Complete the questionnaires.
- If the Delphi is face-to-face, attend the scheduled events.

(c) Moderator(s)

If the Delphi is conducted face-to-face, one or two moderators will be required to facilitate the process.

2. CONVENTIONAL (PEN-AND-PAPER) DELPHI

The procedure of the original Delphi can be described in the following steps. (For a graphic overview, please refer to the Delphi Method Flowchart.)

(1) Form a team to undertake and monitor a Delphi on a given subject.

(2) Select and recruit panel(s) to participate in the exercise.

Customarily the panellists are experts in the area to be investigated. Some literature suggests that while the panellists should be well informed about the topic, a high degree of expertise is not necessary. Of course, the required level of expertise will depend upon the specific topic and questions being addressed. The number of panellists varies greatly between Delphis, but should include a very minimum of four persons per panel.

TIP: The panellists should be assured that they are participating in an exercise that involves a peer group. Therefore, in the letter of invitation indicate the types of backgrounds reflected in the participant group.

(3) Develop the first-round Delphi questionnaire.

A month or more is needed to develop the first-round questionnaire. Ideally, the questions posed should be specific enough to eliminate most irrelevant information, but otherwise place as few constraints on the information as possible. In addition to the questionnaire, a factual summary of background material is usually supplied. In some cases single or multiple sets of scenarios are provided that specify certain items that the respondents are to assume as given for the purpose of evaluating the issues. (Typically these scenarios deal with aspects like future economic conditions, such as the rate of inflation.)

Often, various alternatives are presented along with rating scales, which give the respondents an opportunity to quantify their preferences. An example of a commonly used scale follows.

1	*	2	*	3	*	4	*	5	*	6
strongly disagree		disagree		somewhat disagree		somewhat agree		agree		strongly agree

If the rating procedure is used, take care not to use compound statements (such as 'Do you think y, if x....'; rather break down such statements into two simple statements (e.g. 'Do you think x?' and 'Do you think y?').

TIP: If new to Delphi, the respondents will often respond with compound and lengthy comments. It is useful to provide some examples of the form you would like their answers to take, in terms of being short, specific and s ingular in nature. Allow the panellists to suggest changes in the wording of items and introduce them as new items. Policy issues are often very sensitive to precise wording.

TIP: Sometimes it is appropriate to introduce a set of alternative assumptions making up scenarios and let the respondents form a group scenario by voting on the validity of each.

(4) Test the questionnaire for proper wording (e.g. ambiguities, vagueness).

Each questionnaire should be pre-tested with people who have not been involved in the design. Identify any items that are phrased in a confusing manner and revise them.

(5) Transmit the first questionnaires to the panellists.

(6) Analyse the first-round replies.

(7) Prepare the second-round questionnaires (and possible testing).

In this round the discrepancies between the participants' views are brought to the fore (but still kept anonymous). Participants are asked to try to explain the differences between their views and others', providing their reasoning and any influential information to which the others may not be privy. In each round such information and reasoning are shared with the other participants (still maintaining anonymity).

(8) Transmit the second-round questionnaires to the panellists.

TIP: When asking for re-votes on an item, show the individuals their original votes and provide them with two copies of the questionnaire so that they may retain one for later reference or do draft work.

(9) Analyse the second-round replies.

Steps 7 – 9 are reiterated as long as desired or necessary to achieve stability in the results.

(10) Prepare a report by the analysis team to present the conclusions of the exercise.

TIP: It is very important that all of the participants understand the aim of the Delphi exercise; otherwise they may answer inappropriately or become frustrated and lose interest.

3. POLICY DELPHI [2]

Delphi, as it originally was introduced and practised, tended to deal with technical topics and seek a consensus among a homogeneous group of experts. In contrast, the Policy Delphi is employed to generate the strongest possible opposing views on the potential resolutions of a major policy issue. A policy issue can be seen as an issue for which there are no 'experts', only informed advocates and referees. An expert or analyst may contribute a quantifiable or analytical estimation of some effect resulting from a particular resolution of a policy issue, but it is unlikely that a clear-cut (to all concerned) resolution of a policy issue will result from such an analysis. The expert becomes an advocate for effectiveness or efficiency and must compete with the advocates for concerned interest groups within the society.

The Policy Delphi rests on the premise that the decision maker is not interested in having a group generate his/her decision, but rather in having an informed group present all the options and supporting evidence for his/her consideration. Therefore, the Policy Delphi is a tool for the analysis of policy issues and not a mechanism for making a decision. Generating a consensus is not the prime objective. The structure of the communication process, as well as the choice of the respondent group, may make achieving consensus on a particular resolution very unlikely. In fact, in some cases the sponsor may even request a design that inhibits consensus formulation.

The procedure for the Policy Delphi is the same as for the traditional Delphi, but the survey questions posed to the panellists will aim more at exploring all possibilities, opinions and reasons rather than at achieving consensus.

[2] From Turoff, M. (Internet). The Policy Delphi. In The Delphi Method: Techniques and Applications, pp. 80 – 96.
http://www.is.njit.edu/pubs/delphibook/ch3b1.html

The following questions should guide the planning and implementation phases of a Policy Delphi:

- Formulation of the issues. What is the issue that really should be under consideration? How should it be stated?
- Exposing the options. Given the issue, what are the policy options available?
- Determining initial positions on the issues. Which are the ones everyone already agrees upon and which are the unimportant ones to be discarded? Which are the ones exhibiting disagreement among the respondents?
- Exploring and obtaining the reasons for disagreements. What underlying assumptions, views or facts are being used by the individuals to support their respective positions?
- Evaluating the underlying reasons. How does the group view the separate arguments used to defend various positions, and how do they compare to one another on a relative basis?
- Re-evaluating the options. Re-evaluation is based upon the views of the underlying 'evidence' and the assessment of its relevance to each position taken.

In principle, this process would require five rounds in a paper-and-pencil Delphi procedure. However, in practice most Delphis on policy try to maintain a three-round or four-round limit by doing the following:

- The monitor team devotes considerable time to carefully pre-formulating the issues.
- The questionnaires provide a list(s) of an initial range of options but allow for the panellists to add to the list(s).
- The panellists are asked for their positions on an item and their underlying assumptions in the first round.

TIP: It has been suggested that the best vehicle for a policy Delphi is a computerised version of the process, in which the round structure disappears and each of these phases is carried through in a continuous process.

In a Policy Delphi it is necessary that informed people, representative of the many sides of the issues under examination, are chosen as participants. The initial design must ensure that all of the 'obvious' questions and sub-issues have been included and that the participants are being asked to supply the more subtle aspects of the problem. Thus, the monitors must understand the subject well enough to recognise the implications of the participants' abbreviated remarks.

TIP: In some cases the participants may over-concentrate their efforts on some issues to the detriment of others. This may occur because the group is not as diversified as the total scope of the exercise should be. With proper knowledge of the subject material, the design team can stimulate consideration of the neglected issues by interjecting comments in the summaries for consideration by the group. It is a matter of integrity to use this privilege sparingly to stimulate dialogue on all sides of an issue and not to sway the participants toward one particular perspective.

4. DELPHI CONFERENCE (ALSO FACE-TO-FACE OR GROUP DELPHI)

This face-to-face group version of Delphi allows for more discussion and debate and takes less time than the traditional version, but the participants forego anonymity.

- Recruit a design-monitor team, group facilitator and an assistant to undertake and monitor the group Delphi. The design-monitor team should consist of at least two professionals, so that one can check the other. Ideally, one should be knowledgeable in the issue at hand and the other should have editorial talents.
- A management team must decide on (and usually narrow down) the topic(s), as well as the number of Delphi panels that will be conducted on the topic(s).
  Decide on the date that the panel will be held. One full day will allow for several rounds of the process, in addressing one question. More time will be required to address very complex issues or more than one major question.
  Reserve a location for the workshop. One large room to accommodate all panellists is required. It would be ideal to have access to a few smaller rooms, in which the sub-groups can do their work.
- Select and recruit participants for each panel.
  Customarily the panellists are experts in the area to be investigated.
- Reserve accommodation for those who require them. Make catering arrangements.
- Development of the Delphi questionnaire.
- Individual question replies.
  Working individually and without discussion, each participant responds to the question.
- Small groups.
  Participants divide into sub-groups of 'similar' people and prepare a list of information, arranged in order of importance. Here 'similar' refers to their views on the topic being addressed. The purpose of having homogenous sub-groups is to help ensure that all information that is important to a particular perspective or interest group will reach the plenary list.
- Plenary group.
  Gather the important items from each group and list them where everyone can see them (newsprint, flipcharts, etc.). To do this, ask each group in turn to contribute the most important item on their list that has not already been added to the plenary group's list.
- Plenary vote.
  A multiple-vote procedure is used to rank the items from most to least important. A natural cut-off point is chosen between items with high scores and those with low scores. Somewhere between six and nine items are appropriate for most topics.
- Individual changes.
  Each individual considers what changes (s)he wishes to make to his/her small-group list after having seen the plenary list.
- Small groups.
  Members compare the list of top items on their small-group list to those on the plenary list. Where the small group list differs from the plenary list, the small group has two options. It can either change its list to conform more closely to the plenary list or it can develop evidence for changing the plenary list more in the direction of its list. This is done as follows: add to the small-group list the items from the plenary list that the small group previously omitted but is ready to accept. Prepare a brief report supporting any of the top items from the small-group list that the group believes should be added to the plenary list. NOTE: A time limit for the report, of one minute for example, should be enforced. The purpose of this report is not to persuade others to adapt

their point of view, but to present evidence that the group thinks others may have overlooked. Each small group then documents its revised list on one sheet of newsprint and its evidence (in note form) on another.

- Small-group reports to the plenary:
  The revised lists of the small groups are displayed without comment. Each group in turn displays its sheet of evidence and explains it briefly. Each group report is followed by a brief session of questions for clarification only. Strict time limits are reinforced.
- Plenary consensus development: return to step 9 and repeat the cycle until consensus emerges.
  Time constraints may require a fixed number of cycles. Consensus can be increased by having two rounds of voting, instead of one, at step 9.

For additional in-depth information on the philosophy behind the Delphi method, as well as various applications, refer to: http://www.is.njit.edu/pubs/delphibook/

IV. RESOURCE CONSIDERATIONS (TIME, BUDGET)

A. Timing

The following table presents a general weekly schedule for an online version of Delphi. However, this is just to provide a general guideline. It should be noted that schedules will vary greatly and that face-to-face Delphis will require significantly more time than those conducted online.

General Schedule for Delphi-online	Week
1. Preparation of the Delphi project	1&2
■ General preparation	
■ Compose expert panel	
■ Email addresses participants	
■ Make the collaboration more concrete	
■ Develop accompanying texts	
2. Start up and configuration of Delphi online system	1&2
■ Questions first round	
■ Develop invitation-email;	
■ Call participants for formal consent	
■ Create first round in Delphi online system (users, passwords, texts, ...)	
3. First question round Delphi	3&4
■ Call the nonrespondents	5

4. Treatment of results of first round and start up second round ■ Data-analysis: reduce the answers to the open questions to a more limited set without losing content ■ Introduce the system ■ Invite participants by email	6&7
5. Second question round Delphi ■ Call the nonrespondents	8&9 10
6. Treatment of results of second round and start up third round ■ Data-analysis: response to closed questions and arguments ■ Invite participants by email	11&12
7. Third question round Delphi ■ Call the nonrespondents	13&14 15
8. Treatment of results of third round ■ Intermediate report	16&17
9. Project management ■ Elaborate project plan ■ Project meetings	continuous
10.Final report Delphi project	18&19

B. Budget

The following items listed are the main budgetary items in a Delphi:

- Personnel
  - organisational team
  - stipends for experts
  - moderator(s)
- Travel
  - only for Face-to-Face Delphi: travel for experts and moderator(s)
- Accommodation
  - only for Face-to-Face Delphi: accommodation for experts and moderator(s)
- Food
  - only for Face-to-Face Delphi: meals for experts and moderator(s)
- Recruitment and promotion
  - recruitment of experts

- Communications
  - printing and postage costs for surveys (if done by traditional mail)
  - printing of draft and final report and dissemination
- Facilities
  - only for Face-to-Face Delphi: location for event
- Materials and Supplies
  (These depend upon the type of Delphi conducted.)

V. ADDITIONAL BEST PRACTICES AND POTENTIAL PITFALLS

Some common reasons for the 'failure' of a Delphi are:

- the imposition of the monitor's views and preconceptions of a problem upon the panellists by over-specifying the structure of the Delphi and thus not allowing for the contribution of other perspectives related to the problem
- the assumption that Delphi can be a surrogate for all other human communications in a given situation
- poor techniques of summarising and presenting the group response and thus failing to ensure common interpretations of the evaluation scales utilised in the exercise
- ignoring, rather than exploring, disagreements so that discouraged dissenters drop out and an artificial consensus is generated
- underestimating the demanding nature of a Delphi; failing to recognise the respondents as consultants and properly compensate them for their time if the Delphi is not an integral part of their job function.

For a successful Delphi, it is important to:

- carefully select the group of respondents/panellists
- adapt the Delphi design to your particular application
- assure the honesty and lack of bias in the monitoring team
- assure a common language and logic, particularly if participants come from diverse cultural backgrounds.

References and Resources

Brown, B. (1968) The Delphi Process: A Methodology Used for the Elicitation of Opinions of Experts. Rand Document No. P-3925. www.rand.org

Dalkey, N. and Helmer-Hirschberg, O. (1962) An Experimental Application of the Delphi Method to the Use of Experts. RM-727-PR. www.rand.org.

Dick, B. (2000) *Delphi face to face* [On line]. Available at http://www.scu.edu.au/schools/gcm/ar/arp/delphi.html

Glenn, J. (Ed.) *Futures Research Methodology.* Version 1.0. AC/UNU The Millennium Project.

Linstone, H. and Turoff, M. (2002) Introduction. In H. Linstone and M. Turoff (Eds.), The Delphi *Method: Techniques and Applications.* pp. 3 – 12. http://www.is.njit.edu/pubs/delphibook/

Practical Guide to Regional Foresight in the United Kingdom.

Turoff, M. (Internet). The Policy Delphi. In The Delphi Method: Techniques and Applications, pp. 80 – 96. http://www.is.njit.edu/pubs/delphibook/ch3b1.html

Numerous publications on the Delphi method and its applications, of which only a few are given below, can be found on the Rand Corporation website, www.rand.org.

Sackman, H. (1974). Delphi Assessment: Expert Opinion, Forecasting, and Group Process. Rand Document No. R-1283-PR. www.rand.org.