

Chapter 4

An Analytical Algorithm for Delphi Method for Consensus Building and Organizational Productivity

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ABSTRACT

The Delphi technique is being increasingly used in many complex areas where a consensus is to be reached. In such an environment, the Delphi technique allows researchers to acquire high quality, unbiased information from a panel of certified experts. Despite its vast uses, the Delphi method has seen a lack of consistent procedural guidance for its application. A review of literature revealed a significant variation in methodological approach of the method. The purpose of this paper is to develop a practical algorithm for the Delphi study application based on the literature review and the authors' practiced experiences. A few modifications are suggested to make the Delphi study more practical in research and decision making. Using the guidelines provided by this paper, it is expected that the reader may better understand the appropriate application and procedure of the modified Delphi process.

INTRODUCTION

The Delphi technique is being increasingly used in many complex areas where a consensus is to be reached (Chan, 2002). Norman Dalkey of the RAND Corporation developed the original Delphi concept in the 1950's for a United States Air Force sponsored project. The goal of the project was to solicit expert opinions, from the view point of a Soviet strategic planner, of an optimal USA industrial target system and to the estimation of the number of A-bombs required to reduce the munitions output by a prescribed amount (Dalkey & Helmer, 1963). In academic research, the Delphi concept is particularly useful for highly controversial or multi-dimensional subjects such as technological, economic, sociological or medical (Derian & Morize, 1973). In other words, the Delphi study is well suited as a research instrument when there is incomplete knowledge about a problem or phenomenon where there are no 'correct' answers (Skulmosti et al., 2007; Paliwoda, 1983). Hanafin et al. (2007) and Linstone (1978) viewed that the method is particularly well suited to highly complex problems in which:

1. Ethical, political, legal, or social dilemmas dominate economic or technical ones;
2. Face-to-face contact is not possible or desirable, due to prohibitive financial, geographical or temporal constraints and/or concerns regarding democratic participation;
3. Precise analytical techniques and exact knowledge are absent and the gathering of subjective opinion, moderated through group consensus, is the only approach available; and
4. Relevant experts are in different fields and/or occupations and not in direct communication.

The Delphi method uses an iterative feedback technique with a group of experts and is based on qualitative research methods. It relies on the opinions of individuals who are believed to be experts on the subject under consideration (Schmidt, 1997). The Delphi method is a highly formalized method of communication that is designed to extract the maximum amount of unbiased information from a panel of experts (Chan, 2002). Moreover, as compared to the traditional surveys and interviews, the Delphi method requires participants to have expert certification before the survey process begins. It allows the expert to interact anonymously to achieve consensus (Tran et al., 2014). The research data, i.e. expert opinions, are typically collected using several rounds of intensive questionnaires, which generate a series of qualitative and quantitative data for analysis. The analysis findings then determine the form and content of subsequent questionnaires, and so on, until group opinion is formed and declared stable (Gupta & Clarke, 1996). Rowe and Wright (1999) characterized the classical Delphi method into four key attributes:

1. **Anonymity:** Allows the panellists the opportunity to express their opinions and judgments freely without undue social pressures from dominant or dogmatic others members in the group, and is achieved through the use of questionnaires.
2. **Iteration:** Allows the panellists the opportunity to refine their opinions and judgments without fear of losing face in the eyes of the (anonymous) others in the group, and are achieved through a number of rounds of questionnaires distribution.
3. **Controlled Feedback:** Informs the panellists of the opinions of their anonymous colleagues, and is presented as a simple statistical summary in terms of a mean or median value.
4. **Group Judgment:** Allows for statistical analysis and interpretation of data.

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