Available online at www.sciencedirect.com
SCIENCE DIRECT®
Information & Management 42 (2004) 15–29
INFORMATION & MANAGEMENT
www.elsevier.com/locate/dsw

The Delphi method as a research tool: an example, design considerations and applications

Chitu Okoli*, Suzanne D. Pawlowski

[a]John Molson School of Business, Concordia University, GM 209-23, 1455 Boulevard de Maisonneuve Ouest, Montréal, Qué., Canada H3G 1M8
[b]Department of Information Systems and Decision Sciences, Louisiana State University, Baton Rouge, LA, USA

Accepted 8 November 2003

Available online 27 March 2004

Abstract

The Delphi method has proven a popular tool in information systems research for identifying and prioritizing issues for managerial decision-making. However, many past studies have not adopted a systematic approach to conduct a Delphi study. This article provides rigorous guidelines for the process of selecting appropriate experts for the study and gives detailed principles for making design choices during the process that ensure a valid study. A detailed example of a study to identify key factors affecting the diffusion of e-commerce in Sub-Saharan Africa illustrates the design choices that may be involved. We conclude with suggestions for theoretical applications.

Keywords: Delphi method; Group decision making; Research design; Strategic planning; Electronic commerce

1. Introduction

The Delphi method has proven a popular tool in information systems (IS) research [4,6,13,14,16,24,25,35]. Citing "a lack of a definitive method for conducting the research and a lack of statistical support for the conclusions drawn," Schmidt [34] presented a step-wise methodology for conducting such studies. Building on the framework that Schmidt developed, we offer two contributions towards increasing the value of Delphi studies in investigating research questions. First, we fill in many details in the context of Schmidt's framework by providing guidelines on how to conduct a rigorous Delphi study that identifies the most important issues of interest by soliciting qualified experts. Second, we demonstrate how to use a Delphi survey as a research tool to serve a variety of different purposes in the theorizing process. Increasing the rigor will increase the confidence with which researchers can use the results in subsequent studies and managers can make decisions based on information gathered using these methods.

Bricolage is a French term that means "to use whatever resources and repertoire one has to perform whatever task one faces" [40]. Characterizations of the research process as *bricolage* and the researcher as *bricoleur* [10] serve to remind us of the improvisation and opportunism inherent in the research process and the need to put our research tools to multiple use. A third goal, then, is to encourage researchers to

* Corresponding author. Tel.: +1-514-848-2424x2967; fax: +1-514-848-2824.
E-mail address: cokoli@jmsb.concordia.ca (C. Okoli).

0378-7206/$ – see front matter
doi:10.1016/j.im.2003.11.002

incorporate the Delphi method into their research repertoire and to suggest some of the various ways they could apply the method in the theorizing process.

2. Overview of the Delphi method

The Delphi method originated in a series of studies that the RAND Corporation conducted in the 1950s. The objective was to develop a technique to obtain the most reliable consensus of a group of experts [8]. While researchers have developed variations of the method since its introduction, Linstone and Turoff [17] captured common characteristics in this description:

> Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem. To accomplish this ''structured communication'' there is provided: some feedback of individual contributions of information and knowledge; some assessment of the group judgment or view; some opportunity for individuals to revise views; and some degree of anonymity for the individual responses.

Delphi researchers employ this method primarily in cases where judgmental information is indispensable, and typically use a series of questionnaires interspersed with controlled opinion feedback [33]. A key advantage of the approach is that it avoids direct confrontation of the experts. Dalkey and Helmer observed:

> [The controlled interaction] appears to be more conducive to independent thought on the part of the experts and to aid them in the gradual formation of a considered opinion. Direct confrontation, on the other hand, all too often induces the hasty formulation of preconceived notions, an inclination to close one's mind to novel ideas, a tendency to defend a stand once taken, or, alternatively and sometimes alternately, a predisposition to be swayed by persuasively stated opinions of others.

Researchers have applied the Delphi method to a wide variety of situations as a tool for expert problem solving. They have also developed variations of the method tailored to specific problem types and outcome goals (see Linstone and Turoff for a description of the evolution of the method). One variant that has received widespread use is the ''ranking-type'' Delphi, used to develop group consensus about the relative importance of issues. Schmidt provides a detailed description of how to conduct this type of Delphi survey, including guidelines for data collection, data analysis (based on non-parametric statistical techniques), and reporting of results.

Table 1 lists examples of studies that have used the Delphi method in information systems research. Forecasting and issue identification/prioritization represent one type of application of the method. The majority of the Delphi efforts during the first decade were for pure forecasting, including both short- and long-range forecasts. Follow-up studies (e.g. [1,28]) have demonstrated the validity and long-range accuracy of the Delphi technique. While most forecasting studies use Delphi to surface a consensus opinion, others such as the study by Kendall et al. [15] emphasize differences of opinion in order to develop a set of alternative future scenarios. Concept/framework development represents a second type of application of the Delphi method. These study designs typically involve a two-step process beginning with identification/elaboration of a set of concepts followed by classification/taxonomy development.

3. Example research study design using the Delphi method

Schmidt presented a guideline focusing on the major phases of the process and on analysis issues. However, the example we present in this paper focuses on perhaps the most important yet most neglected aspect of the Delphi method—choosing appropriate experts. This neglect is problematic, considering that most Delphi researchers characterize the technique as a method for soliciting information from experts. We based our guidelines primarily on those initially developed by Delbecq et al. [9]. Setting these principles in Schmidt's framework, we provided a more complete guideline for a rigorous approach towards conducting Delphi methods.

Because of the detail of our instructions, it would be difficult to discuss them abstractly. Thus, rather than