



# Advancing the State of Policy Delphi Practice: A Systematic Review Evaluating Methodological Evolution, Innovation, and Opportunities



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## ABSTRACT

The policy Delphi is a method that uses iterative stages of data collection to reveal positions on an issue within a panel of people with relevant knowledge. Policy Delphi surveys have become popular in a variety of disciplines since the method was first proposed in this journal in 1970. In this paper, we benchmark the state-of-the-art in policy Delphi methods, focusing on strengths and limitations, and on innovative ways of addressing key shortcomings. We report findings from a systematic review of 63 empirical studies conducted between 1971 and the end of 2014 that used the policy Delphi method. We found little consistency in how studies have been designed and executed. The inherent flexibility of the method is a strength, but a lack of consistency in how it is used undermines the ability of analysts to generate accessible insights. Specifically, our analysis reveals limited use of validity and reliability tests, a blurring of conventional and policy Delphi rationales, diverse data collection and analysis techniques, and mixed quality when reporting the approach, format, and results for individual studies. Indeed, potential new users of the method will struggle to understand what a policy Delphi survey actually is. We conclude with advice for addressing key shortcomings in current policy Delphi practice.

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## 1. Introduction

The Delphi method was developed in the 1950s as a way to structure group communication and interaction among panels of experts, with the goal of forecasting the occurrence of events or trends through iterative processes (Linstone and Turoff, 1975). It was based on the assumption that the collective responses of a group of experts can provide meaningful insights into future trends and events (Linstone and Turoff, 2011). The goal in Delphi studies that adhere to the original rationale typically is to produce consensus, based on the assumption that agreement among members of an expert group can provide the basis for accurate forecasts and better decisions. In contrast, the *policy Delphi* – as originally conceived by Turoff in this journal (Turoff, 1970) – had almost diametrically opposed objectives. Turoff (Turoff, 1975) described the policy Delphi as a tool for generating the strongest possible opposing viewpoints on issues within a group of experts. The policy Delphi aimed to generate ideas, and to uncover and evaluate policy alternatives, through structured, critical collective debate among anonymous panelists (Needham and de Loë, 1990). It has been used across

numerous fields to explore complex and contentious issues relating to new technologies, social policies, and environmental concerns.

Although Turoff (Turoff, 1970, 1975) offered concrete guidance and suggestions, in practice there is no standardized approach to designing and implementing a policy Delphi (von der Gracht, 2008). Nonetheless, the following are generally accepted characteristics of studies using the method:

- A panel of people knowledgeable about an issue is assembled and engaged in an anonymous, multi-round, structured dialogue on a question or problem.
- The process takes place over two or more rounds, beginning with an initial questionnaire that can be open-ended or more narrowly scoped.
- Responses from the initial round are synthesized and returned to panelists for their evaluation. Rating systems are commonly used to evaluate ideas, and more detailed written evaluations often are sought.
- Third and subsequent rounds refine the group's evaluation, and can open new lines of inquiry.

When used successfully, analysts have found that the policy Delphi method can effectively reveal options and alternatives, identify points of agreement and disagreement, clarify arguments, and uncover the

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strength of evidence associated with diverse viewpoints (Klenk and Hickey, 2010; Franklin and Hart, 2007). Furthermore, it allows for a hybrid of qualitative and quantitative methods (Franklin and Hart, 2007), and is well suited to investigating problems that require inputs from multiple, different, and often conflicting points of view (Klenk and Hickey, 2010). The iterative nature of the method permits panelists to engage with, evaluate and respond to the ideas of other panelists. Finally, users of the policy Delphi note that it is well suited to proactive identification of emergent and future issues (Franklin and Hart, 2007). These qualities make it very well suited to studying complex policy problems in a host of fields. Researchers working in diverse health, social policy, environmental and technology fields have used the method to explore policy questions by drawing on insights from diverse panels of experts and stakeholders (e.g., Franklin and Hart, 2007; Bailey et al., 2012; Hahn et al., 1999; Andrews, 2004; O'Loughlin and Kelly, 2004; Collins et al., 2009; Baumann et al., 1982).

As originally conceived the policy Delphi was distinct from the conventional Delphi, even though both methods share common procedures. This distinction has been translated into practice. Important differences exist in how each method is structured, and in how panels are created (Turoff, 2002). These reflect the differing overall goals of the methods. To illustrate, because the policy Delphi seeks to identify opposing positions and opinions on policy questions, its panels often are explicitly recruited for their heterogeneity, a characteristic that is not necessarily associated with panels in conventional Delphi studies. Nonetheless, despite their different aims, the distinction between conventional and policy Delphi methods has become blurred over the years, and confusion exists in the literature (Yousuf, 2007). Furthermore, numerous adjustments and amendments have been made to the original concept of the policy Delphi method since it was originally proposed. These reflect not only the inherent flexibility of the method and the creativity of its users, but also a general lack of agreement on how it should be used.

Innovations in study designs are reflected in the rich and growing empirical literature that uses the policy Delphi. However, the enormous heterogeneity in policy Delphi practice that is evident also points to a fragmented and disjointed understanding of what actually constitutes a “policy Delphi”, as opposed to something else (e.g., a conventional Delphi, or simply a survey with multiple rounds). The inconsistency evident among users of the method, we argue, has the unintended outcome of undermining the impact that can be achieved through its use. Numerous authors have raised concerns regarding the way both the Delphi and policy Delphi are being used (Yousuf, 2007; Hasson and Keeney, 2011; Landeta, 2006). These critiques highlight methodological issues, such as oversimplified structured inquiries into complex issues (Hill and Fowles, 1975; Tapio, 2003); ambiguous questionnaire designs (Berry et al., 2004; Donahoe and Needham, 2009); and practical concerns such as the amount of time that is required to complete studies (Hasson and Keeney, 2011; Hung et al., 2008). Examples of concerns specific to policy Delphi studies include biased participant selection and the inability to capture the full diversity of views (Franklin and Hart, 2007; Meskell et al., 2014) as well as indifference towards disagreements (Tapio, 2003), which is problematic given that the method was conceived specifically to uncover a lack of consensus.

Taken together, growth in the use of the policy Delphi technique and the conceptual confusion that is evident in the literature warrant a careful synthesis and stock-taking of empirical practices. The purpose of this paper is to present findings from a comprehensive review of empirical studies that used the policy Delphi method. Our goal was to benchmark the state-of-the-art in policy Delphi methods, focusing on strengths, limitations, and innovations since its inception in 1970. Based on a systematic review of empirical studies published between 1971 and 2014 that used the policy Delphi, we propose ways of addressing major shortcomings in how the method has been used. The systematic review covered articles from a host of social, environmental and technological policy fields. Hence, our findings are immediately useful and broadly

transferable to people using the method to explore complex policy problems in virtually any policy field.

## 2. Method

Systematic reviews are a powerful tool for comprehensively identifying and analyzing relevant studies to answer specific research questions (Petticrew and Roberts, 2006). In this study, a systematic review of journal articles that report findings from empirical studies using the policy Delphi method was employed. This allowed us to benchmark how the method has been used, and to identify methodological innovations. The multidisciplinary databases *Web of Science*, *Scopus*, and *Geobase* were searched to identify peer-reviewed journal articles and conference proceedings in any field that made use of the policy Delphi. These databases were chosen for their broad and comprehensive coverage of both social and natural sciences in multiple disciplines.

Search parameters were set to capture all items in the databases that used the policy Delphi. The specific search syntax differed among the three databases, but in all cases the presence of the term “policy Delphi” in the title, abstract, or keywords of articles written in English was the sole determinant of whether or not an article was included in the initial pool. A date range was not specified, which meant that all articles from the earliest ones in the databases through to the end of 2014 were identified. In *Scopus* the search phrase was *TITLE-ABS-KEY*(“policy delphi”); in *Web of Science* it was *TOPIC*: (“policy delphi”) *OR TITLE*: (“policy delphi”); and in *GeoBase* it was (“policy delphi”) *WN KY*.

Results from the three separate searches were combined and duplicates eliminated. The abstract or introduction of each unique item in the pool was then reviewed to eliminate false positives. To be included in the systematic review, articles had to report on an empirical study that used the policy Delphi – either alone or as part of a multi-method research process. A multi-method research process for this review was defined as a study where the policy Delphi was a stand-alone phase in a larger research project where other methods are used previously, simultaneously, or after a policy Delphi.

Our goal was to build a database of empirical studies. Hence, articles that described or evaluated the policy Delphi as a method, rather than using it in an empirical study, were excluded from the analysis; importantly, this kind of literature provided part of the motivation and conceptual foundation for the analysis. In total 93 articles were identified in the initial search. Of these 73 were accessible and available in English. Ten were eliminated because they did not report empirical research that used the policy Delphi – leaving 63 items in the pool analyzed using systematic review techniques. This comprehensive database covered the years 1971 through 2014; topics addressed a diverse range of technological, social, economic and environmental concerns.

Systematic reviews are guided by a consistent set of research questions or concerns (Petticrew and Roberts, 2006). *Box 1* identifies the themes that guided coding in this study. These themes were identified through a review of previous publications that conceptualized or evaluated the policy Delphi or Delphi studies in general. Literature relating to basic research methods and survey design was also used to establish some of the benchmarks in *Box 1* (e.g., Berg, 2009). To illustrate, basic design and operational concerns (e.g., number of rounds, size of the panel) are identified in publications that address the design of the policy Delphi (e.g., Turoff, 1970; Franklin and Hart, 2007; Novakowski and Wellar, 2008). In light of the aim of our study, the themes in *Box 1* also address questions such as the extent to which the method was integrated into a larger methodology that used other tools, novel approaches for analyzing and portraying data, and deviations from (and innovations to) the original policy Delphi concept.

QSR NVivo software was used to capture, organize, code and store text from the articles that related to the themes. Open, axial, and, finally, selective coding techniques were used to analyze the articles relative to the themes in *Box 1* (see Thorne et al., 2004; Corbin and Strauss, 1990). This approach helped to ensure consistency when interpretations were

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