GROUNDING THEORY FROM DELPHI STUDIES

Completed Research Paper

Tero Päivärinta
University of Agder, Norway &
Luleå University of Technology,
971 87 Luleå, Sweden
tero.paivarinta@ltu.se

Samuli Pekkola
Tampere University of Technology
PO Box 541
33101 Tampere, Finland
samuli.pekkola@tut.fi

Carl Erik Moe
University of Agder
Serviceboks 422
4604 Kristiansand, Norway
carl.e.moe@uia.no

Abstract

The Delphi method is recommended for exploratory research in emerging research areas. Despite earlier suggestions for using the Delphi method for theory creation, few analytical tools are provided for this purpose. However, Grounded Theory is especially devoted to creating theories from qualitative data. This paper describes an enhanced Delphi method which integrates data analysis techniques from Grounded Theory. The resulting Grounded Delphi Method (GDM) improves Delphi studies by bringing in a data collection technique that focuses explicitly on the identification of the reasons and consequences for issues, ranked by experts. Moreover, the techniques of open and axial coding support the discovery of theoretical concepts from the initial Delphi issues. In turn, the ranking process of the Delphi method provides a rigorous means for selecting core categories for theory development, which decreases researcher interference on this issue.

Keywords: Research methods, Delphi method, Grounded Theory, theory building

Introduction

This paper discusses two relatively popular research methods in the field of information systems (IS): the Delphi method and Grounded Theory[1]. Both of them are intended to enhance exploratory research. We motivate, suggest and describe an improvement on the Delphi research method by adding and integrating data collection and analysis techniques from the Grounded Theory research tradition to it in order to enhance theory building.

The Delphi method has been relatively popular in IS research since the 1980s (cf. Okoli and Pawlowski 2004; Skulmoski et al. 2007; Schmidt et al. 2001). It has been used especially for the purposes of forecasting, issue identification and prioritization, and concept or framework developments. Okoli and Pawlowski (2004) argued that the method can also be used for theory building beyond the plain identification of prioritized issues. For doing this, Okoli and Pawlowski (2004) recommend, in line with Dalkey and Helmer's (1963) seminal work, that the participating experts should justify their responses in order to facilitate the observation of causal relationships between the factors identified in the study. On the other hand, Okoli and Pawlowski recognized that few contemporary Delphi studies in the IS field had utilized such justifications. In fact, Dalkey and Helmer (1963) interviewed their seven Delphi participants individually twice during the research process in order to gain in-depth reasoning, while also gaining "*a large volume of informal comments*" (p. 462) through questionnaires. Beyond these recommendations, however, few methodological guidelines for gathering and analyzing expert justifications for theory building have been described, demonstrated, or proposed. Furthermore, interviewing all participants individually in large-scale Delphi studies might represent an overwhelming workload for the researcher (cf. Huckfeldt and Judd 1974; Landeta 2006). Hence, there is room for methodological enhancements of Delphi studies with regard to the theory-building aspect.

On the other hand, Grounded Theory is essentially developed for theory-building, even though the theory is not *built* but is assumed to continuously *emerge* from the data (Urquhart et al. 2010; Dey 1999). The researcher carries out several coding tasks to discover core conceptual categories and their relationships. However, the Grounded Theory traditions have provided little methodological support for identifying the core categories, beyond the researcher judgment on the frequency or centrality of category manifestations or incidences (cf. Charmaz 2006; Goulding 1998). A researcher is supposed to have theoretical sensitivity (Strauss and Corbin 1998). However, not all researchers seem to possess enough theoretical sensitivity as Grounded Theory studies have been recently criticized for having a low level of theoretical development (Urquhart et al. 2010; Goulding 2002; Olesen 2007).

These two observed shortcomings motivate this paper. Most importantly, we discuss and illustrate how the Delphi method can be enhanced for theory-building by adhering explicitly to the principles of Grounded Theory in the data collection and analysis phases. In particular, we contribute to the research method literature by proposing a step-wise model of data collection and analysis for Delphi studies. The model adopts principles from Grounded Theory for theory creation from the very beginning in the research process, at the research design stage. We will also illustrate how the Delphi method, in turn, may bring analytical rigor for grounded-theory data analysis, especially in the phase of selective coding[2], in cases where the data is collected from a reasonably representative selection of experts within the target domain of the study. Our Delphi method elaboration is coined the *Grounded Delphi Method* (GDM).

The paper is structured as follows. Section two briefly describes the two research approaches, the Delphi method and Grounded Theory, listing their guidelines, uses in IS research, and main problems. We then

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[1] Below, the term Grounded Theory refers to the methodology of grounded theory, whereas a grounded theory refers to a particular theory built in a particular research context.

[2] We have adapted the terms open coding, selective coding and axial coding, that explicitly refer to the Straussian approach to Grounded Theory, just to illustrate the different phases and activities of the Grounded Theory research process. The use of these terms does not thus connote or limit the applicability of GDM, although we acknowledge the significant differences between the approaches (cf. Covan 2007; Lamp and Milton 2007). In fact, the Glaserian approach and the use of the terms substantive coding and theoretical coding would have been as arguable a reason as our choice of the Straussian approach.

integrate the methodological steps and propose a unified step-wise model for GDM. The method process is illustrated by an example from an on-going research project. Finally, we discuss the contributions and limitations of GDM.

Background

Grounded Theory

Grounded Theory is a "*specific methodology developed by Glaser and Strauss (1967) for the purpose of building theory from data*", or, more generally, a research approach which denotes the discovery of theoretical constructs from qualitative analysis of data (Strauss and Corbin, 1998). A grounded theory is supposed to emerge without the researcher's interference with the situation, or bringing in his/her theoretical ideas and forcing a certain theory to emerge (Dey 1999). The researcher thus ideally interprets the data without bringing in his/her assumptions, expectations, or ideas, and lets the data "speak out a theory". The ability to engender theory from the data makes grounded theory especially useful for areas where little or no previous theory exists (Orlikowski 1993).

To add rigor to Grounded Theory, several guidelines, principles and procedures have been presented (e.g. Strauss and Corbin 1990; Glaser 1978; Urquhart 2007; Urquhart et al. 2010; Baskerville and Pries-Heje 1999; Goldkuhn and Cronholm 2010). They all include a set of coding procedures that complement each other, and let the theory emerge. Baskerville and Pries-Heje (1999) condense them as follows: "*Analysis in a grounded theory approach is composed of three groups of coding procedures called open, axial and selective coding. Open coding is the process of identifying, naming and categorizing the essential ideas found in the data. Axial coding develops a deeper understanding of the relationships in the phenomena underlying data through the process of connecting various data categories that were determined during coding. Selective coding develops the theory that best fits the phenomena by identifying a story that reveals the central phenomenon (the core issue or "core" category) under study. These procedures do not entirely occur as a sequence, but each overlaps the others and iterates throughout the research project. The approach mitigates problems inherent in "ex post facto hypothesizing" by an analysis process that continuously validates theoretical concepts against newly collected empirical data."* (p. 6).

Several examples of Grounded Theory can be found in IS research. For instance, Lehmann and Gallupe (2005) studied information systems design and implementation for multinational enterprises; Strong and Volkoff (2010) studied misfits between enterprise information systems and organizations; Orlikowski (1993) studied CASE tools and their initiated organizational change, and Sarker and Sahay (2004) studied distributed work and work practices. However, in addition to being used as a research method, Grounded Theory has also been applied to enhance other research methods, e.g. design science research (Müller and Olbrich 2011), and action research (Baskerville and Pries-Heje 1999).

Despite the variety of uses of Grounded Theory in IS literature, it has often been criticized for contributing a relatively low level of theory development, remaining 'just' a coding method (Urquhart et al. 2010; Goldkuhn and Cronholm 2010). This narrow scope consequently often produces a low-level theory that is hard to generalize and relate to a literature base. Expanding the scope and scaling up necessitates the grouping of categories into broader themes.

Another critical issue emerges with the constant comparison and iterative conceptualization of the data and how it has been coded. Even if the researcher had no previous knowledge, i.e., if s/he started from a blank slate (Urquhart and Fernandez 2006), the challenge would remain as to how the coding actually takes place. In the words of Urquhart (2007, p. 352) *"in my experience, it is in defining the relationships between categories that researcher really achieve depth of theory. These relationships can come from [...] coding families, [...] or indeed anywhere, as long as relationships are considered"*. In order to define the categories and their relationships, the researcher needs to have enough 'theoretical sensitivity' (see also Olesen 2007). Yet acquiring this and coding and forming the relationships between the categories are challenges, particularly for an inexperienced researcher, as the categories are supposed to *emerge* from the data. This challenge is concretized when the researcher has to decide, by using his/her experiences, and other theories or research literature, which categories are more important than others, and which form a basis for theory building. Under the circumstances the researcher might very easily lose a lot of "blankness" from his/her slate.

The Delphi Method

While Grounded Theory aims at discovery of an emerging theory, the Delphi method focuses on chosen experts, their expertise and anonymity to each other, and their achieved consensus on a list of important topics identified within the field of interest. This consensus provides a basis for the identification of the research topics or a theoretical perspective, specification of further research questions, selection of variables or propositions of interests, preliminary identification of causal-relationships, definition of constructs and common language, and ultimately, theory development (Okoli and Pawlowski 2004). Although theory-building has not been the main purpose of many Delphi studies, a carefully designed and executed Delphi study has been suggested to help researchers to build theory through the rigor of the method (ibid.).

Building on Schmidt's (1997) work, Okoli and Pawlowski (2004) elaborated a set of detailed guidelines that have been adopted widely (e.g. Singh et al. 2009; De Haes and Van Grembergen 2008; Duan et al. 2010; Iden et al. 2011). Those guidelines form a systematic procedure that may eventually result in both theoretical and practical contributions. The first step is to carefully select and invite qualified experts onto the expert panels. This phase is emphasized, as the participants need to have a deep understanding of the issues to be able to reliably contribute to the latter phases. The second phase consists of data collection. It takes place through an asynchronous brainstorming process. Each panelist anonymously lists issues that are relevant, from his or her viewpoint, for the topic. The next phase is categorizing, i.e. forming consolidated lists of all answers. That list is again validated by the panels. The fourth phase involves narrowing down the lists by asking the panelists to choose the most important factors. The fifth phase aims for a consensus. The panelists rank the factors and potentially argue for their categorizing. These rankings and arguments are put together by the researchers, and sent out to the panelists for another iteration if consensus has not been achieved yet. This may take up to three rounds. As the panelists remain anonymous throughout the procedure, the resulting list of ranked, prioritized factors provides the experts' commonly agreed opinion, without distractions from their status, reputation, or organization.

The Delphi method has been widely used in information systems research (c.f. Skulmoski et al. 2007). In addition to the aforementioned studies, the Delphi method has been used to select IS projects (Peffers and Tuunanen 2005), rank software development project risks (Schmidt et al. 2001), specify IS project requirements (Perez and Schueler 1982), identify key issues in IS management (Brancheau and Wetherbe 1987), develop a framework of knowledge manipulation activities (Holsapple and Joshi 2002), understand the roles and scope of knowledge management systems in organizations (Nevo and Chan 2007), and to study IS research on offshoring (King and Torkzadeh 2008). According to Okoli and Pawlowski (2004) this versatility makes the Delphi method, as with Grounded Theory, "*particularly well suited to new research areas and exploratory studies*" (ibid. p. 27).

Use of expert panels for data collection has been occasionally problematized (cf. Okoli and Pawlowski 2004; Keeney et al. 2001). Even though the experts are knowledgeable, inappropriate selection of them will cause bias. Similarly, retaining the experts might become challenging when the number of data collection and ranking rounds increases. Generalizing findings and consensus to a broader context is often impossible if the panel selection or the response rate fails. Yet, at the same time, the use of expert panels is an asset if the panelists form a representative assemblage. Another issue emerges with theory-building. If the Delphi method has been carried out with the panelists' minimalistic arguments on their rankings, the rankings might become unusable from the viewpoint of theory development. The arguments might not necessarily reveal reasons for or consequences of why a certain factor is ranked. "*Although not many recent Delphi studies have taken advantages of [asking the arguments], asking respondents to justify their responses can be valuable aid to* understand the causal relationships between factors*, an understanding that is necessary to build theory*." (Okoli and Pawlowski 2004, p. 27).

Our motivation for this article stems from our own experiences from conducting studies by using both the Delphi method (Päivärinta and Dertz 2008; Westin and Päivärinta 2011; Iden et al. 2011; Moe and Päivärinta 2011) and Grounded Theory (Antikainen and Pekkola 2009; Kankaanpää and Pekkola 2010). During our early Delphi studies, we collected data without paying attention to the relationships between the identified issues. This led us to rethink the data collection and theory creation phases. As we also had experiences from Grounded Theory, the idea of combining these two approaches emerged. For our next Delphi project, we defined the "Grounded Delphi Method", which is introduced in the next section. The method has so far been used in one project where we studied the challenges of IT procurement in the public sector. The illustrative descriptions below are thus derived mainly from this experience.

Grounded Delphi Method

Figure 1 illustrates the research process of GDM. The process can be roughly divided into four phases:

1. Data Collection,
2. Concept Discovery,
3. Concept Prioritization, and
4. Theory Development.

The figure also shows which parts GDM adopts from the Delphi method and Grounded Theory, respectively, in each phase. In the following, the phases are described in more detail, and illustrated with some snapshots from our ongoing study on IT procurement challenges in the public sector.

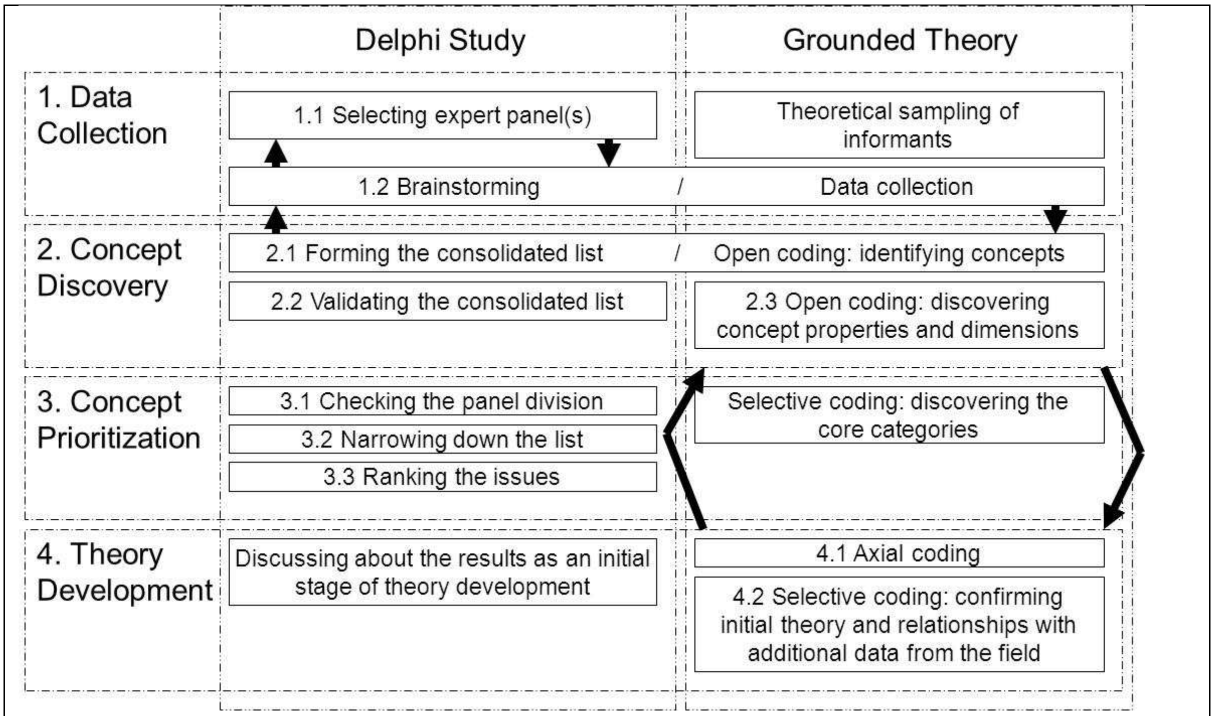

Figure 1. Grounded Delphi Method

Data Collection

Gaining access to a representative ensemble of qualified experts to form expert panel(s) (step 1.1 in Figure 1) is crucial for the reliability of the results in Delphi studies. Okoli and Pawlowski (2004) address this by giving a set of detailed guidelines for recruiting the experts systematically. The researcher must also ponder the number and line-up of the panels. For example, Schmidt et al. (2001) recruited three panels, based on the nationality of the respondents, to study cultural differences in managing software project risks, and Iden et al. (2011) recruited three panels representing different stakeholders of systems development and operations.

Next, the brainstorming step (Schmidt 1997, step 1.2) follows. In our model, it forms the basis for data collection. In the Delphi method (Schmidt 1997; Okoli and Pawlowski 2004), the brainstorming phase is used to gather issues, identified by the panel members, for a consolidated list. The panel members act as individuals and are not divided into separate panels; they all participate jointly in defining the issues of interest for the study. However, according to Okoli and Pawlowski (2004) and experiences from our earlier Delphi studies, a plain list of issues-to-be-ranked provides little food for thought related to potential relationships between the individual issues, while many panelists in our earlier Delphi studies have later commented that some issues are clearly related to each other.

We thus designed our latest Delphi study (Moe and Päivärinta 2011) so that we can collect the issues with additional information about their reasons and consequences, from the very beginning of the study. In this case, the panelists listed the most challenging issues and problems of public sector IS procurement in Norway (a partially filled form used in our data collection is illustrated in Table 1). This small adjustment forces the panelists to consider their own local theories related to the issues. Importantly, the data collection also equipped us with more explicitly expressed data, needed in the grounded theory and theory development phases later on.

Table 1. An example of a data collection sheet for the brainstorming phase. This shows two identified challenges of public sector IS procurement, the reasons for them, and the consequences.

(Informant name, role & contact information: e-mail: xxx@yyy)			
Nr.	Reason(s)	Challenge / Issue	Consequence(s)
1	IT procurers are not professional	Writing a good and detailed requirements specification.	Thin and low-quality bids [from the vendors]
2	System users may have problems in defining their needs. It is difficult to find an appropriate level of detail. Many years can go by between subsequent projects in one professional domain, before new systems are bought. We are a little like amateurs, but we meet vendors who make this business professionally.	Buying software. It is difficult to define the needs.	Municipal governance is much intertwined and a many-sided organization, which delivers a wide spectrum of services. This is, in turn, reflected in IT applications. A typical municipality can have 70-90 different business applications. This forms a challenge to acquire and to ensure necessary integration between the applications. The same data is often registered and stored in many places, because the systems do not communicate with each other.
3	...	...	...

The data from the brainstorming phase forms the basis for a grounded theory. However, our data collection phase slightly differs from Grounded Theory á la Strauss and Corbin (1998) with regard to the idea of continuous discovery of issues through theoretical sampling. In Grounded Theory, the researcher can gather data flexibly and iteratively from new sources until theoretical saturation has been achieved, i.e. the emergence of core categories has halted. However, in Delphi studies the researcher needs to define both data sources and the initial research objectives clearly at the beginning of the study, as the experts need to be assigned to the panels. However, as the data collection process is asynchronous, there are no reasons for not involving new experts even after the first brainstorming results have been carried out and preliminarily analyzed. Also, the use of so-called snowball sampling, where the experts may suggest new panel members according to their level of expertise, expands the size of the panels throughout the data collection. This means that the concept discovery and even scrutiny of how to sample the panelists may go on concurrently with the data collection. However, the consolidated list cannot be expanded with new issues after it has been validated by the panelists.

Concept Discovery

Both Delphi studies and Grounded Theory aim to form abstracted classes of concepts. Delphi studies do this by analyzing the results from the brainstorming and identifying a consolidated list of issues (to be prioritized later on). We argue that this step would greatly benefit from the principles of open coding (Strauss and Corbin 1998), which is "*[t]he analytic process through which concepts are identified and their properties and dimensions are discovered in data.*" (ibid., p. 101). In fact, many Delphi studies do not analyze the issues deeply enough to identify the actual concepts and dimensions embedded in them. Open coding principles would consequently contribute to the concept discovery phase (step 2.1).

The consolidated list of issues is sent back to the panelists for their validation (step 2.2). This follows the principles of the Delphi method (Okoli and Pawlowski 2004). However, at the same time as validating the consolidated list, a researcher can continue open coding by defining dimensions for the concepts (step 2.3). The open coding analysis would result in a list of concepts, to be related to each other through subsequent (and iterative) axial coding, while the subsequent ranking of the Delphi issues would later reveal which concepts are, according to the panelists, worth being considered as the "core category" candidates. For example, from Table 1 above, the challenge of writing a good requirements specification could be coded to involve a concept of "quality of requirements specification", which may further involve a dimension of "detailed – too generic". The dimensions can be refined further through the subsequent data analysis in the theory creation phase, while axial coding starts to suggest relationships between the concepts and their dimensions (Strauss and Corbin 1998).

In our example, the consolidated list included altogether 98 challenges and dilemmas of information systems procurement in the public sector. Those were identified by three stakeholder panels – chief information officers, procurement managers, and vendors. Each challenge was listed with a brief clarifying explanation and categorized into more general-level categories to give an overview of the larger-scale topics. Table 2 illustrates a small snapshot of such a list.

Table 2. Excerpt of a consolidated list of Delphi issues

Category		**Challenge**	**Explanation**
1. Requirement specification			
Quality of the requirement specification	1.1	Clear requirements	Difficult to define clear and objective requirements.
	1.2	Complete requirements	Incomplete requirement specifications
	1.3	Sober requirements	Customers ask for more than they plan to utilize
Content of the requirement specification	1.4	User support as part of the requirements	Get optimal user support from the vendor
2. Change management	2.1	Change of work processes and benefit realization	Difficult to achieve change of work processes and of the organization and to realize the possible benefits
	2.2	Resistance to change	
	2.3	User training for new systems and work processes	The need for training is not estimated properly
…		…	…

Concept Prioritization

After the consolidated list is created and validated, the panel(s) begin to narrow the list of issues down to a manageable size in order to rank them (step 3.1). Different heuristics can be used. For example, different lists can be provided for different panels (e.g. Schmidt et al. 2001) or an identical list involving the most important issues from every panel can be used (e.g. Iden et al. 2011). In the latter case, Kendall's tau between each pair of panels (Siegel and Castellan 1998) is useful for evaluating whether the panels have ranked similar issues as of the most importance, and whether it makes sense to keep the panels divided for the ranking phase. Merging the panels becomes sensible when Kendall's tau is above 0.5, indicating that the narrowed-down lists correlate to a great extent between the panels.

After the final consolidated list is sent for the panelists to be narrowed-down, no new issues can be added. This is slightly different from Grounded Theory, as the principle of continuous theoretical sampling becomes compromised. This step consequently represents an end to the identification of new Delphi issues, within which the core categories for further theorizing can be found. In our example, the narrowed-down list consisted of 19 issues, representing 12 out of 13 categories identified in the previous phase (Table 3).

Table 3. A narrowed-down list of 19 challenges and dilemmas related to IS procurement in the public sector

#	Category	Top 19 Challenges and Dilemmas
1.	Requirements specification	1.1 Clear requirements 1.2 Complete requirements 1.3 Sober requirements
2.	Change management	2.1 Change of work processes and benefits realization
3.	Different stakeholders, cooperation	3.3 Co-operation between different stakeholders
4.	Competence	4.1 Procurement competence
5.	Competition	5.2 (& 1.10) Finding good criteria for vendor evaluation. 5.3 Weighting / Prioritization between vendor evaluation criteria 5.5 Monopoly-resembling vendor conditions 5.6Vendors are not given an opportunity to show their qualities
6.	Contracting issues	6.6 Framework contracts
7.	Cooperation between municipalities	7.1 Municipal cooperation is challenging
8.	Governmental management	
9.	Procurement process	9.1 Lack of coordination and standardization (of the work processes / services)
10.	Rules and regulations	10.1 Complex regulations 10.3 Partnership and innovation is hindered 10.5 Tendering obligation may conflict with long-term planning (switching cost to change vendor)
11.	Technology and infrastructure	11.2 Integration, compatibility
12.	Vendors	12.2. Vendors "oversell"
13.	IT Governance	13.9 Too much focus on costs

After the consolidated list has been narrowed down, the panels start taking rounds of ranking the issues into a relative order of importance (step 3.2). The level of consensus on the rankings in each panel can be measured with Kendall's W (Schmidt 1997). The ranking stops when the panels have reached a strong consensus or when additional ranking rounds would not be practical; for example, when the experts stop changing their rankings. This phase gives a strong indication as to which issues *the experts* regard as the most important. If they are knowledgeable experts in the field in question, it is very likely that the issues they picked will include the core categories. From this perspective, the "core category or categories" selected by the researcher might be totally different. Also, with regard to reporting the results, the Delphi results are often accepted as a contribution of their own and initial results can be published already from this step. From the Grounded Theory viewpoint, these Delphi steps consider the discovering of the core categories step (Fig. 1). That is, the researcher can now discover which open-coded concepts would be related to the top-ranked issues, and then pick a set for further theory development.

In our recent study, for example, the first prioritizations between the panels varied (Kendall tau:s <0,5). The analyses were correspondingly conducted separately for each panel. The panel of CIOs, for example, chose the most important challenge to be the creation of clear requirements specification (challenge 1.1 in Table 3). The panels reached a moderate consensus about the relative importance of the issues, as Kendall W's for the panels ranged from 0.391 to 0.562. In each panel, the rankings were considered significant (sig. = 0.000). This means that the choosing of the top-ranked issues as core categories is more sensible than, for instance, choosing the issues that were ranked bottom of the narrowed-down list. The differences between the panels also provide several alternatives for theory development as new theories can be derived by examining the differences between the panels, or by forming three 'stakeholder theories' from the viewpoint of each panel.

Theory Development

The concept prioritization by the expert panelists gives a strong indication of the most important issues related to the concept categories. Those concept categories should be chosen for further theory development. This means that the analysis steps of axial (4.1) and selective coding (4.2) can focus on the categories involved in the prioritized issues to form more detailed explanations and theories. In these phases, the researcher can go back to the brainstorming data, and seek the relationships between different concepts, found from the actual issues, and their identified reasons and suggested consequences. In this phase, the researcher can, again, form new concepts iteratively from the data if the identified core concepts and categories included in the top-ranked issues seem to be related. As such, the use of the analytical processes of Grounded Theory brings more rigor and methodological guidance to the general-level recommendations of Okoli and Pawlowski (2004).

In our example, the initial brainstorming data (Table 1) emphasizes the concept of "competence of procurers", which relates to the previously observed core concept of "quality of requirements specification". In turn, the concept of "quality of requirements specification" seems to have some influence on "quality of vendor bids". In a similar manner, the researcher can now read through the brainstorming data in order to create and relate the concepts describing observed reasons and consequences in relation to those core concepts. Altogether, the brainstorming data and the experts' responses and comments gathered during the concept prioritization phase provide a basis for initial "grounded theory" related to the core category of "quality of requirements specification".

In our study, for example, the grounded theory researcher followed the principle of creating core categories with many dimensions, which would explain the different sides of the phenomenon (Strauss and Corbin, 1998). Therefore, for instance the previously identified issue of "clarity of requirements specification" is merged with more generic core category of "quality of requirements specification". Figure 2 illustrates the initial results of axial coding, related to the grounded dimensions of "quality of requirements specification". The figure also shows how the experts often suggest various explanations for various dimensions, as well as varying consequences. While the selective coding proceeds, competing explanations can also be validated with additional data from the field, concerning the core categories (in our case, core challenges to overcome in the public sector IS procurement).

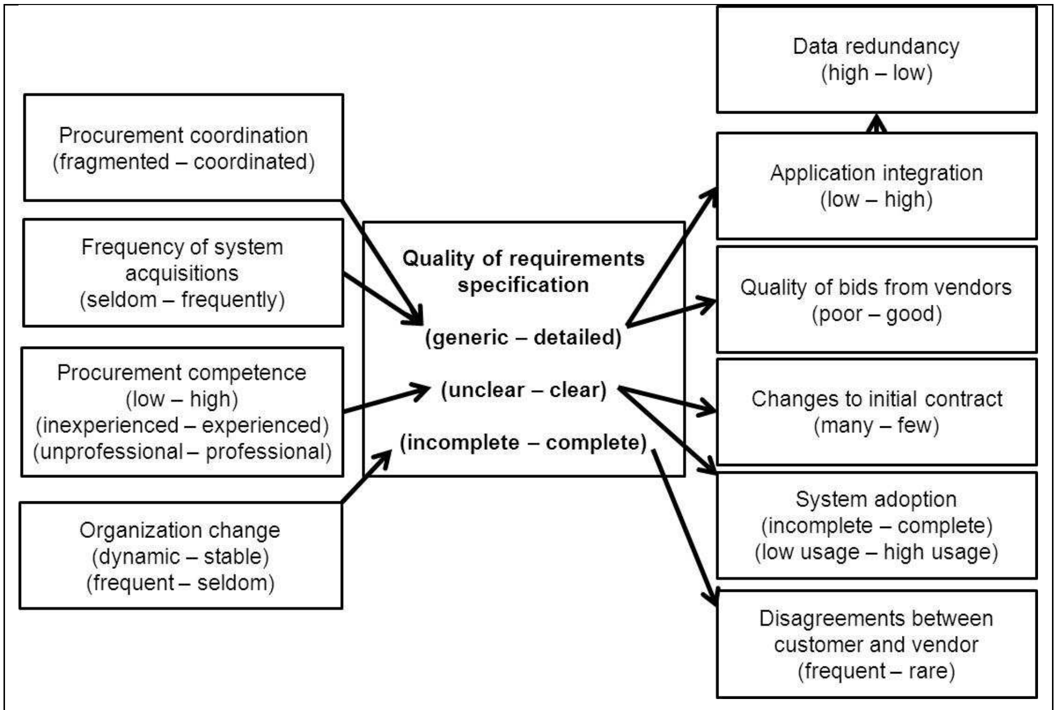

Figure 2. Example of axial and selective coding of a core category, quality of requirements specification, involving the highly ranked issue in the Delphi study: "clarity of requirements"

Discussion

Next, our contributions related to GDM, Grounded Theory and Delphi studies are discussed.

In the Grounded Theory tradition, the researcher has the factual power to interpret the data according to his/her personal preferences and foci when choosing the core categories for theory building. While such criteria as frequency or centrality of discovered concepts have been suggested for grounding the selection of the core categories, even their identification depends greatly on the researcher's theoretical sensitivity, and on his/her interpretations and preferences. Grounded Theory does not necessarily presume validation of the discovered categories from the initial informants (panelists) either. The Delphi method introduces systematic procedures for validating the consolidated list, which can be used as a basis for open coding, and explicit prioritization of emerging issues by the field experts. In this sense, GDM fulfills the requirement of minimizing researcher interference and the researcher´s lack of theoretical sensitivity for observing and prioritizing the core categories to a greater extent than traditional Grounded Theory.

However, we regard the main contribution of GDM to be the analytical strength which Grounded Theory brings to the Delphi method. The brainstorming phase in GDM is in line with Strauss' and Corbin's (1998) recommendations by explicitly asking the experts about conditions for and consequences of the suggested issues. This supplementation for data collection forms an efficient basis for grounding the relationships between the categories in the axial coding phase. By keeping the requirements for axial coding in mind during the data collection step, the method ensures richer brainstorming data than just declarations of problematic issues for ranking. This additional information about the causes and consequences also increases researchers' understanding of the issues. This improves the data collection step in contrast to the more unstructured issue lists of many Delphi studies.

With the aim of obtaining richer data and the adoption of the open, axial, and selective coding principles from Grounded Theory, GDM contributes to the calls for creating theories from ranking-type Delphi studies. This is actualized by integrating well known analytical techniques for theory creation with the Delphi process. Those techniques lift the conceptual abstraction of theorizing from simple "issues" or "challenges" towards explicitly building conceptual categories and relations between them, while still being grounded on the initial data from the field. In Lee's (2004) terms, GDM helps to lift the level of theorizing from Delphi studies from 'level 1' concepts to 'level 2' concepts, which are needed for creating and discussing social theories.

However, GDM also has some limitations compared to Grounded Theory in general. Firstly, GDM fits only with research settings where high-quality expert panels are available and Delphi studies make sense. Secondly, Grounded Theory, in its initial form, can lean on rich sources of qualitative data while the use of GDM is feasible only in the more limited setting of expert panels.

Thirdly, continuous theoretical sampling, which is the main principle of Grounded Theory, needs to be carefully considered. In Grounded Theory, the researcher can freely analyze and gather new data throughout the research process. In GDM, the theoretical sampling of the panelists in the data collection needs to be ultimately decided on when the validation of the consolidated list begins. After that stage, an ongoing updating of new issues, which also represents an early form of open coding, cannot be done because the concept prioritization phase needs to be carried out with a limited set of issues. However, open coding can still continue even from the initially observed Delphi issues if the coded concepts can explicitly be traced back to particular issues. In this way, the selection of core categories would still be robustly based on the Delphi rankings.

Fourthly, our explicit focus on reasons or causes and consequences of the observed issues in the data collection phase may narrow the researcher's and the panelists' mindsets, as addressed e.g. by Kelle (2005). Further research is thus needed to develop and test more open-minded techniques for the brainstorming phase. For enhanced axial coding, initial data collection techniques should thus facilitate rich contextual descriptions of many-sided relations between the observed concepts.

Philosophically, both methods seem to fit well with each other. They both share a common view of appreciation and interpretation of field data through inductive reasoning and concept development. Mitroff and Turoff (1975) highlight that the models resulting from Delphi studies do not rest upon any theoretical pre-assumptions. That is, the data is valued prior to theory. Instead, Delphi studies result in Lockean experimental, consensual models increasing inductively towards "more general networks of factual propositions". The validity of models and concepts recognized through the Delphi process is measured with regard to the agreement between different human observers about the meaningfulness of the propositions and their fit to the experts' direct observations of the world (ibid.). Grounded Theory, in turn, has been stated to offer a "*compromise between extreme empiricism and complete relativism by articulating a middle ground in which systematic data collection could be used to develop theories that address interpretive realities of the actors in social settings*" (Suddaby 2006).

Accordingly, both Grounded Theory (Urquhart 2007) and Delphi studies (Keeney et al. 2001) have been regarded as usable within both positivist and interpretivist research traditions. In our view, both techniques can at least be regarded as useful from the standpoint of "soft positivism" (Kirsch 2004; Seddon and Scheepers 2006). Soft positivism believes in somewhat objective reality, in between purely relativist or individual viewpoints (Seddon and Scheepers 2006), but where the researchers still need to be aware of the contextual nature of observed patterns and regularities in the empirical data (including the informants' experiences). In fact, the use of Grounded Theory might help to mitigate the tension between the individual expert viewpoints and the pursuit of "consensual truth" in Delphi studies by revealing local explanations for potential variations between the prioritized issues, their reasons and observed consequences. The use of Grounded theory might thus gear Delphi studies towards a slightly more interpretivist, context-aware direction, without fully losing the pursuit of more generalizable results.

Conclusion

This paper has argued for and described a step-wise research process of the Grounded Delphi Method (GDM). It imports data analysis techniques from Grounded Theory to the Delphi method. We argue that GDM enhances the Delphi method by providing well-established, systematic techniques for analyzing qualitative data from the Delphi's brainstorming and ranking phases in order to create relationships between the conceptual categories identified with the prioritized Delphi issues. At the same time, the ranking process of the Delphi method provides a rigorous means for selecting core categories in Grounded

Theory analyses by exploiting the rankings of the expert panels, instead of relying on the researcher's interference and 'theoretical sensitivity' in the core category selection.

So far we have used the Grounded Delphi Method, in its current form, in one Delphi research process, while the motivation for enhancing the Delphi method originates in our previous experience. Our future research efforts are thus focused on enhancing the method, particularly to study whether the experts would feel unnecessarily "forced" (cf. Kelle 2005) to think in a particular manner in terms of theorizing, such as in line with plain cause-effect relationships. The data collection technique for brainstorming might be developed to facilitate the discovery of also other types of relationships between concepts. Whereas this method leans on the availability of qualified expert panels to perform the concept prioritization steps, it does not directly fit with other types of data collection models used in Grounded Theory studies. Hence, we regard GDM mainly as an enhancement of the Delphi method, which brings rigor to theory discovery and building in cases where the theory can be grounded upon data collected from expert panels.

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