

Using the Case Survey Method for Synthesizing Case Study Evidence in Information Systems Research

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ABSTRACT

A common characteristic of the IS discipline is that the bulk of the empirical evidence is embodied in case studies. However, the ever-growing body of case based evidence also constitutes a major challenge to the IS discipline. Although each case study may provide rich insights into specific phenomena, it is difficult to generalize on the basis of single-N or small-N case studies. What IS research would benefit from is a method that allows for the quantitative inquiry of the vast amount of primarily qualitative case studies. The purpose of this paper is to introduce the case survey method as new mode of inquiry to supplement the rich repertoire of IS review methods. Therefore, we show how the case survey method is embedded in the landscape of review methods used in IS research and what its principal stages, techniques, limitations and potentials are.

Keywords

Case survey, meta-analysis, case study research, methodologies

INTRODUCTION

A common characteristic of the information systems (IS) discipline is that the bulk of the empirical evidence is embodied in case studies (Alavi & Carlson, 1992). However, the ever-growing body of case based evidence constitutes a major challenge to the IS discipline. Although each case study may provide rich insights into specific phenomena, it is difficult to generalize on the basis of single-N or small-N case studies (Darke & Shanks, 1998; Newig & Fritsch, 2009). Large-N case studies would be a better choice, but due to high complexity case studies are rarely framed as large-N studies (Larsson, 1993; Piekkari & Welch, 2011). The main crux is not that IS research is lacking knowledge but rather that this knowledge lies distributed over countless single-N and small-N case studies. IS research has progressed to the point that there is a need for identifying the ‘cement that glues’ these unique case studies (Stall-Meadows & Hyle, 2010).

The case survey method presents a powerful approach for identifying and statistically testing patterns across case studies (Larsson, 1993; Lucas, 1974). Case surveys draw on the richness of numerous case studies and therefore allow for wider generalizations than single-N and small-N case studies (Larsson, 1993). The bulk of IS case studies presents a rich pool of relevant empirical findings (Eisenhardt & Graebner, 2007; Myers & Avison, 1997) whose “individually limited scientific contributions can be enhanced through systematic analysis of patterns across cases” (Larsson, 1993). The case survey method holds the following four potentials for IS research: (1) allows IS researchers to tap the vast experiences enclosed in IS case studies, (2) provides an approach for synthesizing qualitative data into quantitative results, (3) helps in answering some basic questions in IS research and (4) supports to establish summative validity for some of the theories developed or extended in IS case studies.

The paper is organized as follows. Section 2 provides a brief summary of the various review methods used in IS research for synthesizing data across research studies and shows how the case survey method fits into this landscape. Section 3 specifies the stages and techniques of the case survey method. In section 5, we discuss the limitations and in section 5 its potentials for IS research.

METHODS USED IN INFORMATION SYSTEMS FOR SYNTHESIZING DATA ACROSS RESEARCH STUDIES

Researchers have a number of methods at their disposal for synthesizing data across research studies (King, 2005). These review methods allow for the aggregation of existing research findings with respect to their historical content and the analysis of contradictions that might exist between the primary studies (Rumrill & Fitzgerald, 2001). To provide an overview, we compiled a profile of the various qualitative, quantitative and mixed methods used in IS research to synthesize data across studies (see figure 1).

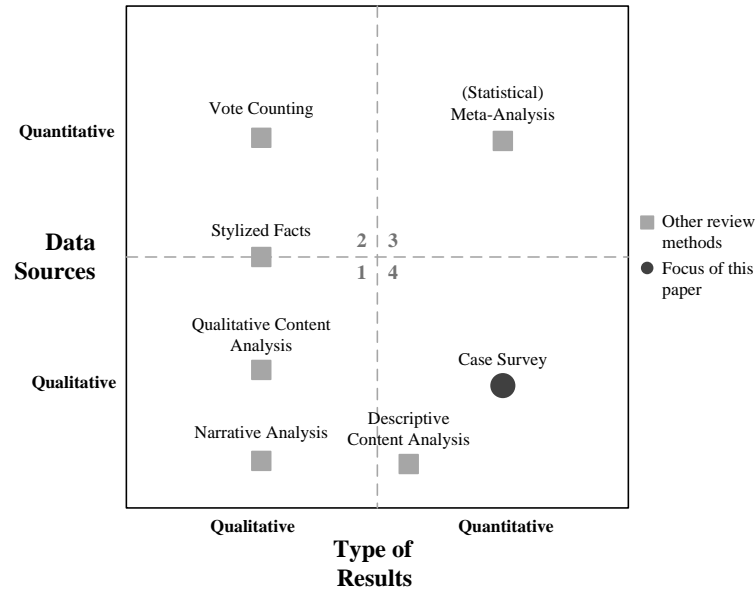


Figure 1. Profile of Review Methods

The first quadrant comprises purely qualitative methods such as the qualitative content analysis and the narrative review method. Even if both methods deal with qualitative data analysis and complement each other to a certain degree, they still differ substantially (Smith, 2000). **Narrative analysis** refers to a family of approaches that focus on the study of diverse kinds of oral, written, filmed or photographed accounts of events, stories and actions (Kohler Riessman, 2005; Smith, 2000). **Qualitative content analysis** is a “research technique used to extract desired information from a body of material by systematically identifying characteristics of the material” (Smith, 2000). The researcher seeks to identify structures and patterned regularities in the material in order to draw replicable and valid inferences on the basis of these regularities (Krippendorff, 1980; Myers & Avison, 1997). Next to the (statistical) meta-analysis, the content analysis presents one of the most commonly used review methods in IS research, which is often used in conjunction with case studies or other mixed-method designs (i.e., Levina & Ross, 2003). The second quadrant contains the **vote counting** method which draws qualitative inferences on the basis of quantitative data. Although conceptually simple, conventional vote counting has some serious drawbacks (Stanley, 2001). In IS research vote counting has been primarily employed to develop quantitatively synthesized conclusions from experiments (Laitenberger, El Emam, & Habrich, 2001). We placed the **stylized facts** method between the first and the second quadrant, because it allows for qualitative inferences on the basis of qualitative and quantitative material (Loos et al., 2011). This method enables the researcher to summarize and cumulate the published knowledge on a specific phenomenon and to synthesize them into cause-effect-relationships (Houy, Fettke, & Loos, 2011). So far, only a few examples of their application exist in IS research (i.e., Fichman, 2004; Houy et al., 2011)). The third quadrant shows the classical **(statistical) meta-analysis**, which statistically analyzes quantitative findings across studies. Compared to other review methods, (statistical) meta-analysis produces more accurate and reliable results (Rosenthal & DiMatteo, 2001). Even though over hundreds of meta-analysis in the medical and social sciences exist (Stanley, 2001), it is far less popular in IS research (King, 2005). The fourth quadrant depicts methods for transforming qualitative data into quantitative results. The method frequently used in IS research to achieve simple quantification (e.g., frequency count) of qualitative data is the **descriptive content analysis** (e.g., Lacity et al., 2011). To assure the generalizability of the results, a descriptive content analysis often involves a systematic search of as many relevant papers in an investigated area as possible. However, this form of content analysis relies only on simple descriptive statistics, which mainly allow for the presentation of frequency distributions. The descriptive content analysis does not allow us to rigorously examine the knowledge that lies underutilized in the numerous IS case studies.

What IS research currently misses is a method with which one could transform qualitative case based evidence into quantifiable results (e.g., test hypothesis or extent existing theories). The **case survey method** could fill this gap. The case survey method allows to convert qualitative case study data into statistically analyzable quantitative data, using a coding scheme and expert judgments by multiple coders (Larsson, 1993; Lucas, 1974; Yin & Heald, 1975). In the past five decades, the case survey method was successfully employed and developed further in political science (Lucas, 1974; Yin & Heald, 1975), management science (Larsson, 1993) and public administration (Jensen & Rodgers, 2001). Applications of the method in these disciplines have proven that case surveys are powerful and rigorous.

STAGES AND TECHNIQUES OF THE CASE SURVEY METHOD

The case survey method was originally developed for public policy analysis (Lucas, 1974; Yin & Heald, 1975). It is sometimes referred to as structured content analysis of cases (Jauch, Osborn, & Martin, 1980) or case-meta analysis (Bullock & Tubbs, 1990). The method was further refined by management science (Larsson, 1993) and public administration scholars (Jensen & Rodgers, 2001). One important aspect of applying methods, which are originally home to other disciplines, is their rigorous application. However, rigor necessitates that a “dominant set of standards and designs” exists to which the IS community can commit to (Benbasat & Zmud, 2003). In the following sections, we will discuss the stages and techniques of the case survey method, which should be adhered to, if rigorous outcomes are to be achieved. Figure 2 provides an overview of the method’s five major stages, each of which generates a certain output.

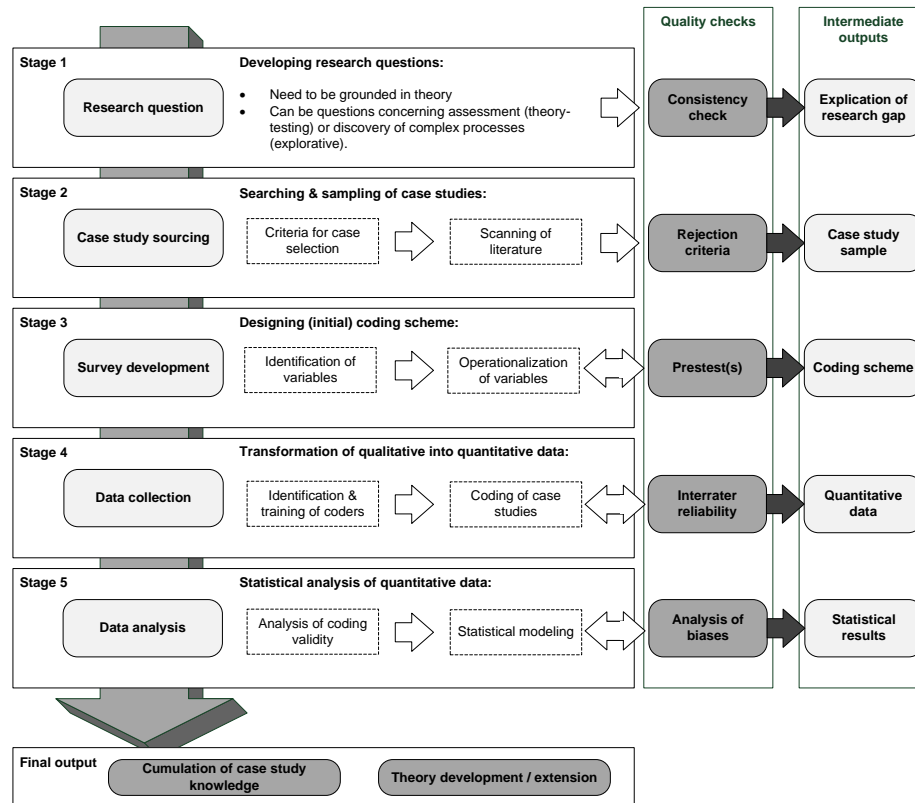


Figure 2. A Blueprint for the Case Survey Method

Stage 1: Developing a Research Question

Developing carefully structured and clear research questions are the natural starting point for a case survey. These questions can either be concrete and transferred into testable hypothesis or they can be more of explanatory nature (Larsson, 1993). However, previous case studies in public policy analysis and management science showed that the case survey method may be more appropriate for questions of assessment than the discovery of complex processes (Larsson & Finkelstein, 1999; Robert K Yin & Heald, 1975). An example of such a question of assessment can be found in Stahl and Kremershof’s (2004) case survey on mergers and acquisitions. They structured their research with the question “whether trust mediates the relationships between characteristics of the integration process and post-combination integration outcomes” (Stahl & Kremershof, 2004). Jurisch et al.’s (2013) case survey provides an example of a more explorative research question: “Which

capabilities matter for successful business process change?”. Notwithstanding the type of research question posed, it appears essential to thoroughly reflect on the type of knowledge one seeks to gain from the analysis of patterns across case studies (Newig & Fritsch, 2009).

Stage 2: Searching and Sampling of Case Studies

The identification of the case study sample is one of the most crucial stages in the case survey method. In order to achieve reliability and generalizability, the sampling of the case studies has to be planned and executed systematically (Miles & Huberman, 1994). This stage can be separated into the following two steps: (1) definition of case selection and rejection criteria and (2) the scanning of the literature.

Very clear selection and rejection criteria are needed in order to decide which cases studies should be included in the case survey sample (Lucas, 1974). These criteria should be explicit and based on the theoretical domain the research questions define (Bullock, 1986). Thus, the researcher has to first identify which theoretical domain(s) the phenomena studied apply to (Lucas, 1974). For IS researchers this can vary considerably. For instance, if a researcher is interested in examining the impact of trust on e-government adoption, he or she should not only include IS relevant literature, but also case studies from public administration, political science and management science. The identification of the right population is essential for the generalizability of the case survey results (Lucas, 1974). However, compared to more traditional reviews, the case survey sample should not be restricted by the type of time period, publication status or research design (Larsson, 1993). As part of the statistical analysis, the case survey method can control for the impact of these aspects (Newig & Fritsch, 2009). Another important selection criterion is the amount of data reported on the phenomenon of interest within the case study. If too little information is reported, the case study should be discarded. In case that two case studies exist that report the same empirical evidence (cf., Bence, 1995; Hughes & Golden, 2001), one of them should be dismissed or both should be combined in one coding set (Bullock, 1986). Otherwise, the occurrences would be counted twice.

Given that the research questions, the boundaries of the theoretical domain and the criteria for selection and rejection are defined, the next step is to scan the literature for relevant case studies. In order to obtain a representative sample of case studies from the defined universe of cases, the researcher needs to identify as many case studies as possible from as many sources as possible (Larsson, 1993). Of course the question of sample size needs to be addressed. Larsson (1993) asserts that collecting all relevant case studies may not only be impossible, but also difficult to handle by the available resources. Thus, the sample size is not only limited by the number of existing case studies and statistical sufficiency, but by the available resources. At the end, the researcher has to decide whether the total sample or a random subset of cases is used for the coding (Newig & Fritsch, 2009).

Unfortunately, the current literature on the case survey method provides no insights on how to deal with the different epistemological foundations of the case survey population. No references exist on how the different epistemological assumptions of case studies (e.g., positivistic vs. explorative) would impact the overall results of the case survey. Larsson (1993) only states that the case survey method holds the potential to bridge over traditional research gaps, such as those between positivistic and humanistic approaches. In addition, not much clarity exists on how to evaluate the validity of the case studies' results or if this even a necessary step. However, this is a crucial topic that needs to be addressed, since invalid results could taint the case survey's conclusion.

Stage 3: Design of Coding Scheme

After the sampling of the case studies, their qualitative information needs to be converted into quantified variables through a coding scheme (Bullock, 1986). One advantage of the case survey method compared to conventional questionnaires is that lengthier and more comprehensive coding schemes can be used to allow for maximal information extraction (Lucas, 1974). Since the reading and coding of the case studies presents a substantial effort, it is recommendable to collect as much information as possible. To minimize potential biases, the researcher should even code all factors presenting possible unwanted influence (e.g., author, publication, selection, coding and other biases) as variables. Newig and Fritsch (2009) assert that “coding twice as many variables, implies considerably less than twice the effort”.

Even if the researcher is following a theory-testing research design, he or she should be open for surprises. Thus, the coding scheme should account for the possibility that unpredicted correlations between variables might occur (Newig & Fritsch, 2009). Throughout the statistical analysis, the researcher can always exclude or aggregate data, but not the other way around. The same is true for the design of the coding scales. A complex and potentially unreliable coding scheme can always be collapsed into a more reliable one. For instance, a five-point Likert scale can be collapsed into a three-point Likert scale, but not vice versa (Larsson & Finkelstein, 1999).

One has to be aware, however, that more complex and detailed coding schemes may lead to lower interrater-reliability. Larsson (1993) posits that the limit on how much complexity a case survey can capture is reached whenever interrater-reliability becomes unacceptable. But the only way to identify this point is to start with a more comprehensive coding scheme and to simplify it throughout several pretests until the level of reliability is acceptable (Larsson, 1993).

Stage 4: Transformation of Qualitative into Quantitative Data

The coding of the case studies refers to the systematic assignment of codes (numbers) to units based on the coding scheme (Srnska & Koeszegi, 2007). This stage is typically the most time and resource consuming one in the entire case survey. Each case study should be read and coded by a minimum of two and ideally three trained coders (Bullock, 1986). In order to avoid undue coding influences, it is recommendable that the coders are unaware of the theoretical hypotheses (Larsson, 1993). We can report from our own experiences with the case survey method that it is quite a lengthy and expensive endeavor. The reading and coding (survey of 37 variables and 125 items) of a case study (15 pages on average) takes a trained coder typically around 3.5 hours. Since our sample consisted of 129 case studies, the overall coding hours amounted up to 450 hours per coder. Hence, it is recommendable to include some of the original case study authors in the coding process. The authors can provide more information than what is reported in the published evidence of their case study. Even though the original authors present an excellent form of secondary validation (Larsson, 1993), the researcher has to be aware that the case survey will take even longer once the authors are involved. Furthermore, author participation does frequently result in lower interrater-reliability (Larsson & Finkelstein, 1999).

Stage 5: Statistical Analysis

As a minimum criterion of validity the construct validity should be assessed (Larsson & Finkelstein, 1999). An item has high construct validity when it correlates with other items of the same construct (convergent) and is uncorrelated with items of dissimilar constructs (discriminant) (Weber, 1990).

Whenever coding validity is established, the researcher can start to statistically analyze the large amounts of generated code. Bullock (Bullock, 1986) posits that research questions in case surveys are either bivariate (e.g., the effect of size on results) or multivariate (e.g., the effects of process and implementation variables on results). Thus, manifold methods exist for their statistical inquiry. Next to bivariate and multivariate correlations, regression and path analysis are also common techniques in case surveys (Bullock & Svyantek, 1985; Jurisch et al., 2013; Larsson, 1993; Newig & Fritsch, 2009). For instance, Bullock and Svyantek (1985) relied on bivariate statistics, whereas Larsson and Finkelstein (1999) and Bullock and Tubbs (1990) used multivariate statistics. LISREL and structured equation modeling are suitable for studying the complex relationships in case studies (Jurisch et al., 2013; Larsson, 1993).

It is crucial that the case study aggregation must have no hidden biases. The researcher must apply the same standards and procedures of rigorous inquiry as to any other statistical analysis (Lucas, 1974). In a case survey, researchers need to estimate potential biases and apply weights to adjust for them. A number of methods exist for adjusting signs and magnitudes of the combined effect sizes to reduce sources of potential bias. One of the goals in many meta-analytic inquiries is to calculate a main effect or overall effect size (Whiston & Li, 2011). The case survey method offers the opportunity to identify even small and non-significant effects, which can also contribute to the overall picture of the results.

LIMITATIONS OF THE CASE SURVEY METHOD

The case survey method has some inherent biases by virtue of the inclusion and exclusion criteria and the methods chosen to review the literature. In fact, those biases are very similar to those of other review methods. First is the garbage in and garbage out rule (Rosenthal & DiMatteo, 2001). If the information presented in the case studies is too vague or too little, no statistical analysis can repair this damage (Bullock & Svyantek, 1985). The researcher must control for this bias in the searching and sampling stage of the case survey. Second, the results are limited to theoretical domain, which the researcher identifies in stage two of the case survey method. Thus, generalizations only apply within the realm of the selected domain (King, 2005). Third, since the case survey method focuses on knowledge accumulation, it may not give sufficient attention to the unique factors of an individual case (Yin & Heald, 1975). This trade-off, however, applies to any review method. The fourth limitation is the publication bias, which refers to the fact that significant results are more likely to be published than non-significant results (King, 2005). However, these results may not always be representative for the entire research population. The fifth limitation addresses the sample size of a case survey. The statistical power of detecting a genuine effect size depends on the number of case studies included in a case survey. However, no information exists on the minimum sample size of a case survey. For instance, Larsson and Finkelstein's (1999) final sample consisted of 61 case studies, whereas Stahl and Kremershof's (2004) sample comprised 50 case studies on mergers and acquisitions. The smallest reported

case survey had a sample size of 33 case studies (Bullock & Tubbs, 1990). Hence, further specification on the minimum sample size is needed.

POTENTIALS OF THE CASE SURVEY METHOD FOR INFORMATION SYSTEMS RESEARCH

Despite its limitations, we believe that the case survey methods holds the following potentials for IS research.

Taps the Vast Experiences Enclosed in IS Case Studies

Case studies are a tradition of IS research because they allow to focus specifically on the aggregate unit of analysis, such as the organization, institution, or process. Some researchers argued that IS case studies produced somewhat disappointing results and few theoretical generalizations (Benbasat, Goldstein, & Mead, 1987; Dubé & Paré, 2003); whereas others highlight the rich insights and understandings into IS-related phenomena generated by case studies (Doolin, 1996; Myers & Avison, 1997). The positive aspect of this discussion is that the ever growing body of case-based and other empirical evidence is a sign that the IS discipline is maturing and evolving (King, 2005). Now, to continue this development, the often inconsistent empirical findings need to be aggregated to help advance our theoretical core and direct future research in other IS issues. More so, in order for the IS discipline to establish itself in a pluralist research tradition, there is a necessity to reflect alternative methods (Chen & Hirschheim, 2004). The case survey method would introduce a new method into IS research with which researchers could tap these vast experiences enclosed in IS case studies. The method provides a stringent and subjective approach for analyzing this of pool of knowledge (Yin & Heald, 1975).

Synthesizes Qualitative Data into Quantitative Results

Additionally, the case survey method can fill a gap in the landscape of IS review methods currently used to synthesize qualitative data into quantitative results. So far, only the descriptive content analysis is used in IS research to achieve quantification of qualitative data (see figure 1). However, this method has the disadvantage that it only relies on simple descriptive statistics and the statistical significance of the calculations resulting therefrom are often limited. The case survey method allows researchers to arrive at conclusions that are accurate and credible. Of course, case surveys are not inherently better than any other method. It is just that certain methods are more suitable for certain research questions and data sets (Jensen & Rodgers, 2001). The results of past case surveys range from hypotheses and impact factor (model) testing (Bullock & Tubbs, 1990; Jurisch et al., 2013; Stahl & Kremershof, 2004) to theory extensions (Larsson & Finkelstein, 1999) and theory developments (Provan & Milward, 1995).

Helps in Answering Some Basic Questions in IS Research

We believe that the case survey method can even help provide answers to some basic questions that have been discussed in IS research for a long time. Basic questions in this context refer to questions addressing the development of new theory or the extension of existing theory. For instance, Larsson and Finkelstein (Larsson & Finkelstein, 1999) case survey synthesized several theoretical perspectives on the topic of mergers and acquisitions into an integrative model. According to Eisenhardt (Larsson & Finkelstein, 1999) their research provides some fundamental answers and therefore presents a defining paper on this issue in management science. In IS research the case survey method can be helpful for investigating questions around IS development, implementation, usage and impact (Benbasat & Zmud, 2003) in domains which are typically dominated by case study research (e.g., electronic government, business process management, electronic health, open innovation, etc.).

Establishes Summative Validity for Theories Developed or Extended in IS Case Studies

The case survey method also offers a promising approach to the development, extension, synthesis and testing of theories in IS research. As discussed previously the method is most suitable for questions of assessment. Therefore, it can help establish summative validity of some of the theories developed or extended in previous case studies. Theories developed or extended in IS case studies often have formative validity, but lack summative validity (Lee & Hubona, 2009). A theory that was created following rigorous procedures may have formative validity and if this theory survives empirical inquiries it gains summative validity (Carugati & Rossignoli, 2011). In other words, “there is no less of a need to develop rigorous techniques for empirically testing an overall theory so as to establish its summative validity” (Lee & Hubona, 2009). We believe that the case survey method can help IS researchers in (1) establishing summative validity for the theories developed in case studies, (2) making these theories accessible to a wider IS audience and thus increase their relevance, and (3) enriching and strengthening the theoretical core of the IS research community.

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