The use of Grounded Theory Technique as a Practical Tool for Qualitative Data Collection and Analysis

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Abstract: When encountering qualitative research for the first time, one is confronted with both the number of methods and the difficulty of collecting, analysing and presenting large amounts of data. In quantitative research, it is possible to make a clear distinction between gathering and analysing data. However, this distinction is not clear-cut in qualitative research. The objective of this paper is to provide insight for the novice researcher and the experienced researcher coming to grounded theory for the first time. For those who already have experience in the use of the method the paper provides further much needed discussion arising out of the method's adoption in the IS field. In this paper the authors present a practical application and illustrate how grounded theory method was applied to an interpretive case study research. The paper discusses grounded theory method and provides guidance for the use of the method in interpretive studies.

Keywords: grounded theory; interpretive; case study; data collection; data analysis; qualitative; quantitative

1. Introduction

One of the main problems of conducting interpretive qualitative research is to decide an appropriate starting point for the research, and the basic framework within which the data will be collected and analysed. Qualitative studies tend to produce large amounts of data that are not readily amenable to mechanical manipulation, analysis and data reduction (Yin, 1984). It not only generates large amount of data, but it generates data in a non standard format which makes analysis problematic (Turner, 1983). Qualitative analysis provides an opportunity for the researcher to gain information and gather insights that may be overlooked with traditional data analysis techniques. The analysis of the case study is done in pursuant to guidance provided by many scholars in this field, (such as Glaser, 1978; Glaser and Strauss, 1967; Lofland and Lofland, 1984; and Taylor and Bogdan, 1984).

The process of data analysis in qualitative research involves working with data, organising it, breaking it down, synthesising it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others (Bogdan and Biklen, 1982). Spradley (1979) refers to analysis as a systematic examination of something to determine its parts, the relationship among parts, and their relationship to the whole. While Miles and Huberman (1984) describe data analysis as consisting of three concurrent activities - data reduction refers to the process of selecting, simplifying, abstracting and transforming the new case data. They argue that data collection and data analysis should overlap to allow for flexibility in data collection procedures so that the researcher remains open to new ideas or patterns which may emerge.

There are many ways of analysing qualitative data and a number of approaches were considered such as hermeneutics, content analysis and semiotics (Myers, 1997). These approaches come from diverse fields and all offer the possibility of different insights on the data. These approaches were evaluated from the perspective of whether the approach draws on all features of case study and whether the philosophy of the approach imposes any pre-existing theories. Eisenhardt (1989) suggests that theory building research must begin as close as possible to the ideal of no theory under consideration and no hypotheses to test since preordained theoretical perspectives may bias and limit the findings.

The objective of the case study research was the development of a conceptual model that explains the adoption of Internet in small to medium-sized enterprises (SMEs) and the objective of the study fits well with the philosophical nature of grounded theory. Accordingly, proponents of the grounded theory advocate that an approach which concerns itself with the meanings, definitions, and interpretations which are made by the subjects of the study has greater potential for depicting their world and priorities more accurately than methods which begin by preconceiving the world and its meaning (De Burca and McLoughlin, 1996). The researcher did not come to the field with a well-defined set of constructs and instruments with which to measure the social reality; rather the researcher derives the categories from the field by in-depth examination and exposure to the phenomenon.

The selection of grounded theory (Glaser and Strauss, 1967; Glaser, 1978; Strauss, 1987; Strauss and Corbin, 1990, 1998) amongst a myriad of other qualitative methods is not arbitrary but rather because it has been a dominant paradigm for social research (Hughes and Jones, 2003) and its use is increasing in the IS field. This is evidenced by the growing literature that is either discursive on philosophy and application or detailed about method (Toraskar, 1991; Orlikowski, 1993; Baskerville and Pries-Heje, 1999; Trauth, 2000; Hughes and Howcroft, 2000; Urquhart, 2001). Hughes and Jones (2003) note that more researchers are taking up qualitative studies, it is therefore worth reflecting on lessons learned from the practical application of the method. The purpose of this paper is to provide insight for the novice researcher and the experienced researcher coming to grounded theory for the first time. For those who already have experience in the use of the method the paper provides further much needed discussion arising out of the method's adoption in the IS field.

The remainder of the paper is structured as follows. It begins with an overview of the grounded theory method and a discourse on the use of grounded theory in Information Systems. This will be followed by a description of the procedures involved in collecting and analyzing data in grounded theory method. Following on from that is the justification for using grounded theory to collect and analyse the case study data. An illustrative piece of research is then presented in which grounded theory was used in interpretive, qualitative case studies and finally, the paper presents some conclusions.

2. The grounded theory method

This section discusses grounded theory (Glaser and Strauss, 1967; Martin and Turner, 1986; Turner, 1983; Glaser, 1978; Strauss, 1987; Strauss and Corbin, 1990, 1998; Dey, 1999; Charmaz, 2003, 2006, 2008). Grounded theory originates in the work of Glaser and Strauss (19967) and is a method that has been used extensively across a variety of social science disciplines. A grounded theory is one that is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to a particular phenomenon (Strauss and Corbin, 1990). It is invaluable when conducting empirical research; it has some attraction for a researcher using qualitative techniques for the first time and it offers well sign-posted procedures. In the method conceptual properties and categories may be 'discovered' or generated from the qualitative data by following a number of guidelines and procedures. The grounded theory is iterative, requiring a steady movement between concept and data, as well as comparative, requiring a constant comparison across types of evidence to control the conceptual level and scope of the emerging theory.

The goal of grounded theory is seeking a theory that is intimately tied with the evidence, so that the resultant theory is likely to be consistent with empirical data (Orlikowski 1993; Eisenhardt 1989). Data collection, coding rationale, integration of categories, abstracting from the data and construction of theory are thus guided by theory as it emerges. Hughes and Wood-Harper (1999) report that the main application areas of grounded theory are most notably in Glaser and Strauss' own research into status passage, but also in a number of other, usually medical or nursing related areas such as - experiences with chronic illness (Charmaz, 1980); the management of a hazardous pregnancy (Corbin, 1992) and homecoming (Hall, 1992). Additionally much work has been done with respect to guidance on the use of grounded theory method. Most notable amongst them include Turner (1983); Martin and Turner (1986); Strauss (1987); Strauss and Corbin (1990); Dey (1999); Charmaz (2003, 2006, 2008); Jones and Alony (2011).

The use of grounded theory has also spread to other disciplines including research in information systems (Torasker, 1991; Pidgeon *et al*, 1991; Oliphant and Blockley, 1991; Pries-Heje, 1992; Orlikowski, 1993; Pettigrew, 1990; Calloway and Ariav, 199l; Baskerville and Pries-Heje, 1995, 1998). The most notable use of grounded theory in

IS research is that by Orlikowski (1993) in which she presents findings of a study into the adoption and use of CASE tools. In this study the use of grounded theory was justified on the basis that it provided 'a focus on contextual and processual elements as well as the action of key players associated with organizational change elements that are often omitted in IS studies. The grounded theory fitted well with the interpretivist rather than positivst nature of this research. Grounded theory studies in this interpretivist tradition have become increasingly common in the IS research literature precisely because the method is useful in developing context-based, process-oriented descriptions and explanations of phenomenon (Myers, 1997; Urquhart, 2001).

Hughes and Howcroft (2000) consider that the individual researcher plays a critical role in an interpretive study. They maintain that using the grounded theory procedures may be a way for a researcher to deal with some of the uncertainty that some researchers feel when faced with data collection and analysis in interpretive studies. Notably they point to the fact that for novice researchers (or experienced researchers new to interpretive studies) grounded theory 'provides a useful template…and as such serves as a comfort factor in the stressful and uncertain nature of conducting qualitative research (Hughes and Jones, 2003).

Grounded theory is a general style of doing analysis that does not depend on any particular disciplinary perspectives (Strauss 1987) and, therefore, would seem to lend itself to information systems research, which can be described as a hybrid discipline. The main aspect of grounded theory, which differentiates it from other qualitative research methods, is its emphasis upon theory development (Strauss and Corbin, 1998). Theory is grounded when it emerges from and generates explanations of relationships and events that reflect the life experiences of those people and processes that the researcher is attempting to understand. It also differs from other qualitative approaches, because traditional qualitative approaches collect data first before commencing the analysis and long after they have left the research site. In contrast, grounded theory uses the emerging theoretical categories to shape the data collection while doing the fieldwork (data collection and analysis proceed simultaneously). By analysing data from the lived experience of the research participants, the researcher can, from the beginning attends to how they construct their world.

The use of grounded theory is founded on the premise that the generation of theory at various levels is indispensable for a deep understanding of social phenomena (Glaser and Strauss 1967; Glaser 1978). It requires that the researcher demonstrates theoretical sensitivity (Glaser and Strauss 1967; Glaser 1978) by being well grounded in technical literature as well as from personal and professional experience in collection and analysis of data (Strauss and Corbin 1990). It encourages researchers to steer their thinking out of the confines of technical literature and avoid standard ways of thinking about the data. The interplay between emergent theory and technical literature comes to the fore when extending generalisations from the study, which is achieved by either integrating supplementary or conflicting analysis into the theory by including them as categories or conditions, or criticising them in terms of what has emerged (Strauss 1987). Grounded theory is particularly suitable for a case study aimed at exploring the factors that influence the adoption of Internet in Small to Medium-sized Enterprises. It is useful for understanding contextual elements (Orlikowski 1993) that constituted the main focus of this case study.

One very practical problem with grounded theory is that the method is extremely labour intensive, requiring the investment of considerable cognitive effort by the researcher. However, the author believes that grounded theory technique is a suitable approach to use, especially when a researcher needs to analyse large quantities of unstructured or semi-structured qualitative data. This section has presented and discussed grounded theory as a practical tool for collecting and analysing qualitative data. The description of the procedures involved in collecting and analysing data in grounded theory is the topic of the next section.

3. Grounded theory procedures

The previous section explicated grounded theory method. The defining characteristic of grounded theory is that of a general methodology for discovering theory that is grounded in data systematically gathered and analysed. The theory evolves during actual research, and it does this through a continuous interplay between analysis and data collection; data analysis guides future data collection. In this section consideration will be given to the details of the procedures associated with data collection and analysis in grounded theory method.

Strauss and Corbin (1990) identify three levels of analysis - (a) to present the data without interpretation and abstraction, the participants tell their own story; (b) to create a rich and believable descriptive narrative using field

notes, interview transcripts and researcher interpretations; and (c) building a theory using high levels of interpretation and abstraction. This research combines the second and third approaches, to present rich and detailed descriptions, which allows the reader to make sufficient contextual judgements to transfer the case study findings to alternative settings. The concern here is with the multiple constructions of reality as experienced by Small to Medium-sized Enterprises.

Data analysis in grounded theory involves specific procedures which, when applied appropriately and with vigilance will result in theory that is rigorous and well grounded in the data. Strauss (1987) points out that the procedures should be thought of as rules of thumb, rather than hard or fixed rules, and advises researchers to study these rules of thumb, use them, and modify them in accordance with the requirements of their research. In addition, Strauss and Corbin (1998) warn researchers that rigid adherence to any procedure can hinder the analytic process and stifle creativity.

An example application that demonstrates how grounded theory was applied to an interpretive in-depth case study research is presented in the section titled application of grounded theory. Recording of data may be thought of as a pre-analytic step of grounded theory method and it is said to be essential to the successful generation of grounded theory (Hutchinson, 1988). The grounded theory approach involves coding the assignment of themes and concepts to a selected unit such as sentences taken from an interview transcript. The concepts are combined into related categories; links between categories are identified and verified against the data, and selective coding attempts to integrate the categories into a theory, which accounts for the phenomenon being investigated. The subsection below discusses the process of analysis in grounded theory which is coding data (that comprises open, axial and selective); memo writing and theoretical sampling.

4. Coding

Codes can take the form of a straight forward category label or a more complex one (example a metaphor) (Miles and Huberman, 1994). The coding of data such as field notes and interview transcripts poses questions such as what does this incident indicate? Coding gets the researcher off the empirical level by fracturing the data, and then conceptually grouping it into codes that then become the theory which explains what is happening in the data (Glaser, 1978). Researchers use codes to pull together and categorise a series of otherwise discrete events, statements, and observations which they identify in the data (Charmaz, 1983).

Open coding is the analytic process through which concepts are identified and their properties and dimensions are discovered in data. It is the part of analysis that pertains specifically to the naming and categorising of phenomena through close examination of the data. … During open coding the data are broken down into discrete parts, closely examined, and compared for similarities and differences, and questions are asked about the phenomena as reflected in the data (Corbin and Strauss, 1990). The researcher compares incident to incident with the purpose of establishing the underlying uniformity and its varying conditions (Glaser, 1978). Events, happenings, objects and actions/ interactions that are found to be conceptually similar in nature or related in meaning are grouped under more abstract concepts termed "categories" (Strauss and Corbin, 1998).

Glaser (1978) describes a set of three questions that should guide the open coding. What is this data a study of? This question continually reminds the researcher that his original intents on what he thought were going to study just might not be. What category does this incident indicate? The continual asking of this question keeps the analyst from getting lost in the re-experiencing of his data by forcing him to try and generate codes that relate to other codes. It forces code that earns its way into the theory by its grounding in the data. What is actually happening in the data? What is the basic social psychological problem(s) faced by the participants in the action scene? These three types of questions keep the researcher theoretically sensitive and transcending when analysing, collecting and coding the data. They force the researcher to focus on patterns among incidents, which yield codes, and to rise conceptually above fascinating experiences. It is important to emphasise that researchers' make codes fit the data, rather than force the data into codes.

Axial coding involves re-building the data (fractured through open coding) in new ways by establishing relationships between categories and their subcategories. It is termed "axial" because coding occurs around the axis of a category, linking categories at the level of properties and dimensions (Strauss and Corbin, 1998). Axial codes typically represent categories that describe the open codes. The researcher continues to code and compares the concept to more incidents (Glaser, 1978). Comparison enables the identification of variations in

the patterns to be found in the data. Data coding at this level is intended to elevate the data to higher levels of abstraction (Hutchinson, 1988). During axial coding, the analyst begins to fit the pieces of the data 'puzzle' together, which were fractured during open coding. Each piece (e.g., category and subcategory) has its place in the overall explanatory scheme. When building a puzzle, the analyst might pick up a piece and ask, "Does this go here or there?" The analyst's first attempts are often trial and error. Later, as he becomes more theoretically sensitive, making the fit between conceptual indicator and category becomes easier.

Selective coding: the aim of selective coding is to integrate and refine the categories into a theory, which accounts for the phenomenon being investigated (Darke *et al*, 1998) and validates the statements of relationships among concepts, and fills in any categories in need of further refinement. In selective coding the researcher reduces data from many cases into concepts and sets of relational statements that can be used to explain, in a general sense, what is going on (Strauss and Corbin, 1998).

5. Memo writing

Memos are devices that depict the relationship among concepts. It is an important ways of keeping records of analysis. Martin and Turner (1986) and Strauss (1987) discuss the processes involved in detail. Memo writing takes place throughout the research process starting with the first interview. They serve a dual purpose of keeping the research grounded and maintaining awareness for the researcher. Memos provide an opportunity to generate and develop explanations of the emerging concepts, and to discern some of the interrelationships which exist between them. The memo informs what the code is about and provides the pivotal step of breaking the categories into components and elaborating the codes. Glaser (1978) considers writing of theoretical memos as the core stage in the process of generating theory. Glaser defines memo as "the theorising write-up of ideas about codes and their relationships as they strike the analyst while coding ... memo can be a sentence, a paragraphs or a few pages ... it exhausts the analyst momentary ideation based on data with perhaps a little conceptual elaboration". Memos don't just report data; they tie together different pieces of data into a recognisable cluster, often to show that those data are instances of a general concept.

Memos are one of the most useful and powerful sense-making tools at hand for researchers to use during analysis. The advice is to 'stop and memo' as coding sparks off ideas. You are writing memos to yourself, secondarily to colleagues. Memoing helps the analyst move easily from empirical data to conceptual level, refining and expanding codes further, developing key categories and showing their relationships, and building towards a more integrated understanding of events, processes, and interactions in the case. Memoing develops the core category around which the other categories integrate. The core category integrates the theory according to the emergent perspective of investigation and thereby defines its cut-off points.

However, the core category has earned its relevance through the grounding of the theory in the domain. 'It must be central, that is related to as many other categories and their properties as possible... and account for a large portion of the variation in a pattern of behaviour' (Glaser, 1978). It must also occur frequently, be completely variable, and 'have a clear and grabbing implication for formal theory' (Glaser, 1978). Memos are a rapid way of capturing thoughts that occur throughout data collection, data reductions, data display, conclusion drawing and final reporting. It saturates dimensions of the main categories that have emerged through coding, and constantly generates open questions for further coding and data collection. At the end of the process memos have to be sorted and integrated. Sorting memos simply means putting those that elucidate the same category together in order to clarify its dimensions and to distinguish it from the other categories.

6. Theoretical sampling and comparing

Two analytic processes contribute to raising categories to conceptual categories - *constant comparison*, which is central in generating grounded theory and *theoretical sampling* (Glaser and Strauss, 1967). Both of these processes are achieved through a process Glaser (1978) calls theoretical sampling and the selective sampling of the literature. Essentially, the researcher needs to confront the conceptual categories with more data in order to define them carefully, delineate their properties, explicate their causes, and demonstrate the conditions under which they operate, and spell out their consequences.

The constant comparative is central to the data analysis in generating grounded theory. The purpose is to build and clarify a category by examining all the data it covers and variations from it. The researcher takes a

limited set of codes that were developed in the initial phase and applies them to large amounts of data. The coded data are compared with other data and assigned to clusters or categories according to obvious fit. Glaser (1978) labels this process of comparison as the constant comparative method, where bits of data are compared with other data and where coded data is constantly confronted with new data for verification purposes. "Comparative analysis forces the researcher to 'tease out' the emerging category by searching for its structure, temporality, cause, context, dimensions, consequences and its relationship to other categories" (Hutchinson, 1988). Additionally, it is appropriate and desirable to compare the data categories and constructs that emerge between various groups of participants in the study. In this way the process of constant comparison is intended to generate a theory rich in detail. It moves the researcher more quickly away from describing the specifics of a case to thinking more abstractly about what the various cases share in common and what is different about them.

Theoretical sampling begins during the data collection phase of the study and involves searching the transcripts for emerging categories that characterise the narrative and seem significant. "*Theoretical sampling* is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses... data and decides what data to collect next and where to find them, in order to develop... theory as it emerges. This process of data collection is controlled by the emerging theory, whether substantive or formal (Glaser, 1978). Theoretical sampling primary function is to provide the researcher with the opportunity to discover properties of the core variable under study by collecting new data to check, fill out and extend conceptual categories. Theoretical sampling and constant comparison reflect cyclical processes which are fluid and flexible, but at the same time they ensure that the analysis is planned and well grounded in the data, rather than haphazard, which can lead the analyst down to unproductive paths and away from the focus of study.

Maximising opportunities for comparing concepts along their properties for similarities and differences enables researchers to densify categories, to differentiate among them, and to specify their range of variability. Once the analyst has some categories, sampling is aimed at developing, densifying and saturating those categories. It is also related to the sensitivity that a researcher has developed to the emerging concepts. The more sensitive a researcher is to the theoretical relevance of certain concepts, the more likely he is to recognise indicators of those concepts in the data. Sensitivity usually grows throughout the research project and enables the researcher to decide what concepts to look for and where he might find indicators of them.

As constructs are derived from the data, repeated theoretical sampling can be used to increase the depth of focus and to ensure consistency; that is, to ensure that data are gathered in a systematic way for each category (Strauss and Corbin, 1990). "Theoretical sampling is used as a way of checking on the emerging conceptual framework rather than being used for the verification of preconceived hypotheses" (Glaser, 1978). After developing a set of focused codes into categories the researcher has to weave them together in developing a grounded theory. The emerged-grounded categories, derived from the data, are the basic building blocks for the theoretical understanding of the area under study. The conceptual framework developed from the conceptual categories is tested by collecting data which provides support (or not) for the framework hypotheses and reveals the relationship between the categories, which forms the basis for the subsequent emergent theory.

An important issue in reaching closure is when to stop sampling. Ideally, researchers should stop sampling when theoretical saturation is reached (Glaser, 1992; Eisenhardt, 1989). Theoretical saturation is the point at which incremental learning is minimal because the researcher is observing phenomena seen before (Glaser and Strauss, 1967). The general rule when building theory is to gather data until each category is saturated (Glaser, 1978; Glaser and Strauss, 1967). This means until (a) no new or relevant data seem to emerge regarding a category, (b) the category is well developed in terms of its properties and dimensions demonstrating variations and (c) the relationships among categories are well established and validated. Unless a researcher gathers data until all categories are saturated, the theory will not be evenly developed and it will lack density and precision. The next section presents justification for using grounded theory to collect and analyse the case study data.

7. Justification for using grounded theory method for interpretive case study research

Grounded theory is chosen for collecting and analysing the case study data, with the aim of generating a descriptive and explanatory theory of the adoption of Internet rooted in the experiences of Small to Medium-sized Enterprises. Strauss (1987) emphasises the usefulness of the case study approach when used with grounded theory. It is an inductive, theory discovery method that allows the researcher to develop a theoretical account

of the general features of a topic while simultaneously grounding the account in empirical data (Martin and Turner, 1986; Glaser and Strauss, 1967). This generative approach seems particularly useful here given the objective of the study was the discovery of theory that explains the adoption and use of Internet in Small to medium-sized enterprises.

Grounded theory offers a way of attending in details to qualitative material in order to develop systematically theories about the phenomena being studied. Turner (1981) suggests that grounded theory is particularly well suited to dealing with qualitative data of the kind gathered from participant observation, from the observation of face-to-face interaction, from semi-structured or unstructured interviews, from case-study material or documentary sources. Typically, these particular kinds of inquiry generate large amounts of data, which accumulates in non-standard and unpredictable formats. The grounded theory approach offers the researcher a strategy for sifting and analysing material of this kind. A particular strength of utilising grounded theory is that a documented record of the progress of the analysis is generated. Hence, it is always possible to trace the derivation of any concept or model by checking back through the data and memos.

Grounded theory makes its greatest contribution in areas in which little research has been done. Little or no research has been conducted specifically into adoption of innovations in SMEs context. Most of the research in this field has tended to focus on descriptive Internet usage and on demographics, or some other form of Internet pattern (Abell and Lim, 1996; Abell and Black, 1997). The paucity of research about Internet usage and adoption in SMEs means that many of the variables relevant to the concepts of this phenomenon are yet to be identified.

Grounded theory is an appropriate method for this study as it generates theory that can be used as a precursor for further investigation of this phenomenon and related issues. Other qualitative research techniques, quantitative methods, or a combination of both can then be used in subsequent studies to test, verify or extend the qualitative propositions that emerge from this research.

A major premise of grounded theory is that to produce accurate and useful results, the complexities of the organisational context have to be incorporated into an understanding of the phenomenon, rather than be simplified or ignored (Orlikowski, 1993; Martin and Turner, 1986; Pettigrew, 1990). This mode of research requires that broader, contextual issues, which are shown to influence the phenomenon under study, be given appropriate recognition in the development of theory. Rather than focusing the investigation by disregarding these broader conditions, every effort was made to acknowledge and account for them.

A number of theoretical approaches emphasise the criticality of organisational context in shaping technology use in organisations, such a conviction also informs this research, and the use of a grounded theory method allows the inclusion and investigation of this key organisational element. This inductive approach relies on the researcher systematically collecting, coding, categorising and analysing data to derive the theory that explains the phenomena. The method facilitates "the generation of theories of process, sequence, and change pertaining to organisations, positions, and social interaction" (Glaser and Strauss, 1967).

Most Information Technology usage models tend to neglect the contextual aspect of technology use in literature. An approach that specifically includes elements of process and context is thus particularly appropriate here. The three characteristics of grounded theory inductive, contextual, and processual fit with the interpretive orientation of this research. The focus here is on developing a context-based description and explanation of the phenomenon, rather than an objective, static description expressed strictly in terms of causality (Boland, 1979, 1985; Chua, 1986; Orlikowski and Baroudi, 1991). The research develops theory which describes and explains the adoption and usage of Internet in terms of an interaction of contextual conditions, actions, and consequences, rather than explaining variance using independent and dependent variables (Orlikowski, 1993). This section has discussed the reasons for using grounded theory as analysis tool for the case study. The next section presents by way of illustration a piece of practical research project in the interpretive tradition in which grounded theory was used.

8. A practical application of grounded theory in the context of IS research

The discussion in this section is based on Lawrence (2002). The research concerned a case study that focused on in-depth understanding of the factors that influence SMEs decision to adopt and use the Internet in

business. The aim of the study was to describe, interpret, analyse, and understand Internet adoption and usage from SMEs' perspective.

The number of SMEs that were approached to participate in the study was 26. The criteria for inclusion were based on a need for each participating SME to conform to the definition of SMEs and a willingness on the part of the SME owners/mangers to disclose details of their business. Several potential SMEs were rejected on the grounds that they did not satisfy the criteria. Seven SMEs that satisfied the criteria were chosen to participate in this study, amounting to total of seven separate field studies which were carried out within the broad tradition of interpretive case study (Zuboff, 1988; Orlikowski, 1991; Walsham, 1993). The case study involved extensive interviewing of key participants (e.g. company owner or manager in each of the SMEs), coupled with the use of documentary evidence such as company reports.

The primary details of the participants are shown in table 1 in no significant order. These SMEs were chosen across business sectors so that the study could investigate the existence of sector-independent issues. This was important to avoid observations specific to a particular sector. The first SME was selected at random from the seven SMEs that participated in this study, to provide the first body of data. Then subsequent data collection was guided by the theoretical sampling principle of grounded theory as defined by Strauss and Corbin (1990); that is sampling on the basis of concepts that have proven theoretical relevance to the evolving theory. In a grounded theory theoretical sampling cannot be fully planned before the study commences.

Table 1: SMEs that participated in the case study

SMEs	Type of Business	Size (employees)
BIL	Peugeot cars franchise holder	20
BPC	Publishing	25
SAH	Health care	200
MGL	Manufacturer of contract carpets	9
AL	Manufacturer and seller of educational engineering equipment	40
FP	Specialist flooring manufacturer	110
CLR	Cigarette paper manufacturer	180

Source: Lawrence, 2002

The detailed write-up of the cases and all the data generated by interviews, and documentation were examined and coded by focusing on the factors that influence adoption. This technique uses open coding (Strauss and Corbin, 1990) where the data were read and categorised into concepts that are suggested by the evidence rather than imposed from outside (Orlikowski, 1993).

Some of the initial codes that emerged from the open coding process were *promotional and advertising, communication medium to improve organisational efficiency, easy entry into new markets, and the Internet generates new business opportunities,* all these codes contributed to the category 'benefits of using the Internet'. Once all the evidence were examined, the codes were organised by recurring theme, for example benefits of using the Internet, cost effectiveness, compatibility and perceived usefulness. These themes became prime candidates for a set of stable and common categories, which linked a number of associated codes. This is known as axial coding (Strauss and Corbin, 1990) and it relies on a synthetic technique of making connections between subcategories to core categories to construct a more comprehensive scheme. The categories of benefits of using the Internet, cost effectiveness, compatibility and perceived usefulness became subcategories of the technological (Internet characteristics). The first SME case data were then re-examined and re-coded using this proposed scheme, the goal being to determine that set of categories and concepts covered as much of the data as possible. This iterative examination yielded a set of broad categories and associated concepts that described the salient conditions, events, experiences, and consequences associated with the adoption and use of the Internet in the first SME case, see table 2.

These initial concepts guided the remaining field study, allowing the process of data collection, coding, and analysis to be more targeted. Following the constant comparative analysis method (Glaser and Strauss, 1967), the remaining SMEs case's experiences were systematically compared and contrasted with those of the initial SME case. This analysis also used Miles and Huberman's (1984) technique for across-case pattern comparison and clustering that involves matrix displays to compare key events, triggers, and outcomes.

The iteration between data and concepts ended when enough categories and associated concepts had been defined to explain the factors that influence SMEs decision to adopt and use the Internet in business, and when no additional data were being collected from the SMEs to develop or add to the set of concepts and categories, a situation Glaser and Strauss (1967) refer to as 'theoretical saturation'. The resultant theoretical model is empirically valid as it can account for the unique data of each case in the study, as well as generalise patterns across the cases (Eisenhardt, 1989). The participants in the study provided commentary, correction, and elaboration on drafts of the findings and theoretical model.

Table 2: Sample of the initial concepts that emerged from the analysis of the first SME case

Emergent Core category	Subcategory	Codes
Technological	Benefits of using the Internet	*Global markets reach* *Communication medium to improve organisational efficiency* *Promotional and advertising* *Better customer service* *Easy access to global information* *The Internet generates new business opportunities*

Source: Lawrence, 2002

The case study findings provide new insights into the factors that influence SMEs decision to adopt and use the Internet in business. The result shows that many of the factors that influenced adoption of the Internet in SMEs were similar to the factors identified in large organisations (Igbaria *et al*, 1997; Davis, 1989; Kwon and Zmud, 1987). However, technological, organisational and environmental factors emerged from the case analysis and were supported by the literature as significant in influencing SMEs decision to adopt and use the Internet, while barriers hindered adoption of the Internet. This result highlights the fact that SMEs have special needs due to their unique organisational characteristics. The categories constituting these factors were combined to formulate a framework to serve as a summary for SMEs Internet adoption, see table 3 for across case comparison. The presence of these categories is indicated by a 'Yes' in the table. The results indicated a positive relationship between technological, organisational factors and the decision to adopt the Internet and less for environmental and barriers to Internet adoption. In all the cases, technological and organisational factors (management support and organisational resources) were congruent with the adoption decision, except for one SME that did not indicate a yes for organisational resources.

Table 3: Across case pattern comparison

Core categories	Subcategories	Small to Medium-sized Enterprises						
		AL	*SAH*	*BIL*	*BPC*	*FP*	*MGL*	*CLR*
Technological	Compatibility	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Cost effectiveness	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Benefits of using the Internet	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Perceived usefulness of the Internet	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Perceived richness of the Internet	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Perceived ease of use of the Internet	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Organisational	Management support	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
	Organisational resources	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*		*Yes*
	Organisational size						*Yes*	
Environmental	Competitive pressure	*Yes*			*Yes*	*Yes*	*Yes*	*Yes*
	External pressure			*Yes*	*Yes*		*Yes*	
Inhibiting	Security	*Yes*	*Yes*				*Yes*	
	Lack of Internet knowledge		*Yes*	*Yes*			*Yes*	
	Cost of investment		*Yes*				*Yes*	
	Complexity			*Yes*				
	Limitation of infrastructure					*Yes*		*Yes*
	Uncertainty about the Internet			*Yes*	*Yes*			
	Limitation of personal contact			*Yes*				*Yes*
	Lack of universal electronic payment systems							*Yes*

Source: Lawrence, 2002

The results confirmed that organisational factors (management support and organisational resources) played a critical role in the adoption decision of the Internet. Adoption and use of the Internet tended to take place in the firms where the management was enthusiastic about Internet technology and had the necessary organisational resources. The result shows that SMEs were generally very enthusiastic in their involvement with the adoption and use of the Internet in business. They viewed the advent of the Internet as a useful business tool that provided global connectivity; access to low-cost information and its use enabled them to be involved in electronic commerce. The low financial commitment required implied a high level of perceived trialability among SMEs; an important consideration since smaller firms tended to have more limited financial resources.

Table 3 shows a less positive relationship between environmental factor, barriers to Internet adoption and the decision to adopt the Internet, in all the cases, only four cases indicated yes for competitive pressure and three indicated yes for external pressure, especially from trading partners. The barriers to adoption showed various categories that inhibited the adoption of the Internet in SMEs. The strongest barriers to Internet adoption were security and lack of Internet knowledge with three yes each, and two yes for cost of investment, limitation of infrastructure, uncertainty about the Internet and limitation of personal contact. While complexity and lack of universal electronic payment systems have only one yes each.

Finally, the research has highlighted the issues of Internet uptake among the examined SMEs. This study has built on existing research on innovation adoption by showing the factors that influence their decision to adopt the Internet. The results showed that technological, organisational and environmental factors were very important factors that influenced SMEs decision to adopt and use the Internet while barriers to Internet adoption hindered adoption. The findings suggest that the adoption of Internet technology was influenced to a greater extent by the technological and organisational factors than by environmental factors.

9. Conclusion

In organisational research, methods grounded theory can be useful in providing deep insights and understanding of social life that is consistent with interpretive case-based field studies dealing with social and organisational contexts. The interpretive approach and the research methods chosen for this study were described and the justification for choosing grounded theory method was discussed. The grounded theory as a practical tool for qualitative data collection and analysis was presented and a description of the procedures involved in doing data analysis in grounded theory was discussed.

The use of grounded theory helped in providing useful data in original and rich research findings and theory because of its close tie to the data and the rigour in the method. The method explicitly seek to discover the underlying assumptions, the contexts and the experiences of those involved in the IS phenomenon under study. This research study has illustrated that grounded theory, a method more commonly associated with the social science perspective, can indeed assist with rich, context-based interpretive IS research. The empirical work has illustrated that it is possible to successfully use grounded theory in qualitative IS adoption studies where the social aspect is paramount.

The paper reveals that grounded theory is no longer a preserve of particular field of study. It can be employed in both social and natural sciences. Further, methodologies should be seen as means to an end; any discipline could employ specific methodologies in so far as such methods could be transparently applied.

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