Chapter III
Employing A Grounded Theory Approach For MIS Research

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ABSTRACT

This chapter provides a brief introduction to the grounded theory (GT) approach to research, discussing how it has been used in information systems (IS) research, and how GT studies may be conducted to provide a significant theoretical contribution to the management information systems (MIS) field. The subject is of particular interest at a time when GT attracts frequent criticism for a lack of rigor. This chapter deals with what makes for a rigorous contribution to "grounded" theory in MIS. It addresses developments and controversies in the generation of grounded theories, examining the use of GT as a coding method vs. the use of GT as a method for generating theory. The discussion focuses mainly on the constructivist/interpretive perspective adopted in most qualitative data studies, as this is the way in which GT has been used most often in MIS. The chapter concludes with a roadmap for the use of GT in MIS research and a discussion of the contribution made by GT studies in MIS.

INTRODUCTION

The Grounded Theory (GT) research method has grown more popular in recent years. This is partly in response to an increasing awareness of the limitations of applying *a priori*, deductive theories to human transactions embedded in a social context, and partly in response to the immaturity of Management Information Systems (MIS) as a discipline. The GT approach is used to generate a *substantive theory* – a theory that is grounded in specific mechanisms, contexts or environments.

This fits well with the need to produce in-depth empirical studies that develop a dynamic body of theory that evolves with the MIS field itself. The construction of a *grounded theory* relies on a systematic analysis of qualitative data, to theorize about "what is it that is happening here?" The result is a theory that is grounded in empirical evidence, rather than developed from existing conceptual frameworks. The GT approach may be used to analyze qualitative data to produce quantitative data that are analyzed statistically, or it may employ a qualitative, interpretive data analysis throughout. The latter approach is the most frequently encountered in MIS and so this chapter will focus mainly on these studies.

Grounded theories are situated, not only in "the data," but also in the context in which data was collected. They may be considered *idiographic theories*, that are "concerned with the individual [case], pertaining to or descriptive of single or unique facts and processes" (Dey, 1999, pg. 217). Quality criteria for idiographic theories of action emphasize transferability or adaptation to different contexts, rather than the generalizability concerns that are applied to nomothetic or formal theories (S. . Gasson, 2003; Lincoln & Guba, 2000). The GT approach may be used over time to generate formal (nomothetic) theories, that are more generalizable as they are derived from multiple studies and contexts. This requires a substantial amount of time and relies on researchers who are capable of reflexive theoretical abstraction. The majority of GT studies contribute idiographic theories that provide deep insights into the research problem for a limited number of situations or contexts.

The aim of this chapter is to provide an overview of the GT method, to address controversies and issues surrounding its use, and to provide some guidance on how it may be used to contribute meaningfully to MIS research. The chapter is organized as follows. First, some background is provided on the GT approach to research and the GT "method." Secondly, I discuss controversies and developments in both the approach to, and the methods for Grounded Theory generation. Thirdly, the contribution of the GT approach to MIS is demonstrated by means of illustrative studies. The fourth section presents a roadmap for GT research in MIS, examining the unique challenges that our field presents to GT researchers, discussing the constraints presented by seed categories and *a priori* theoretical models, ethics, boundaries, and scope in MIS research, and issues of generalizability. The chapter concludes with a brief discussion of the contribution of GT to the MIS field.

BACKGROUND

The Grounded Theory Method

The Grounded Theory (GT) research method (Glaser & Strauss, 1967) was devised "to develop and integrate a set of ideas and hypotheses in an integrated theory that accounts for behavior in any substantive area" (Lowe, 1996). GT researchers avoid proposing a theory at the beginning of their study, instead deriving and refining the theory through cycles of data collection, analysis, and synthesis, as shown in Figure 1. This model provides an overview of the structured process underlying the Grounded Theory research method. It is synthesized from multiple texts by the originators of the GT approach (Glaser and Strauss, 1967; Glaser, 1978; Strauss and Corbin, 1990; Glaser, 1992; Strauss and Corbin, 1998). The dotted line box in Figure 1 refers to a stage introduced by Strauss and Corbin (1990), which many researchers find useful, but which was rejected by Glaser (1978, 1992).

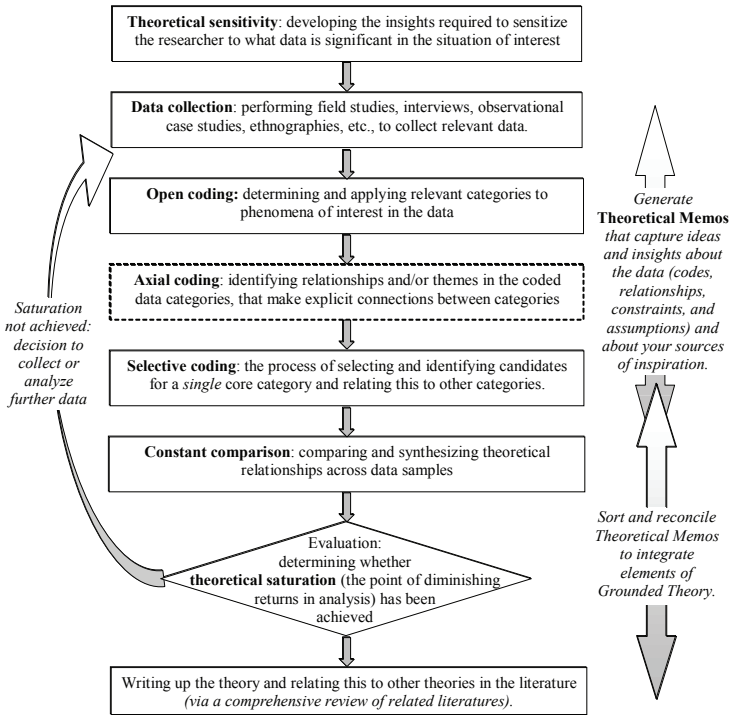
At its simplest, the core GT method relies on specific processes that are not found in other approaches to constructing theory (Glaser & Strauss, 1967). Both Bryant (2002) and Urquhart (2002) differentiate between the GT *coding method* and

the GT *method of generating theory*. It is the combination of these two elements that makes the GT method unique:

- **The Grounded Theory coding method.** Data are categorized according to an emergent set of *open codes* (category labels) that the researcher identifies to define key elements of the situation. Through iterative cycles of coding and analysis, data-categories are combined or split to define selective (*theoretical) codes*: abstract concepts that describe or explain themes related to the research phenomena of interest. Repeated iterations of coding result in an emerging theory which can be defined in terms of abstract conceptual categories, properties of conceptual categories, and relationships between categories, and/or their properties.

- **The Grounded Theory method of generating theory.** A substantive theory is generated when the researcher can define a core conceptual category in the data, and identify key patterns of relationships between the various theoretical and conceptual categories that apply across data samples. These patterns are made explicit through the generation of *theoretical memos* as the analysis proceeds. Analytical codes, relationships, and attributes are constantly compared across and between further data samples to understand how the emerging theory is reinforced or altered by new evidence. This process of *constant comparison* also guides further data collection, as inductive analysis suggests specific contexts or conditions in which the theory may apply, or reveals discrepancies between data samples that need clarification. Data collection and analysis continue

Figure 1. The Grounded Theory Research Method



in an iterative fashion until the researcher feels that *theoretical saturation* (the point of diminishing returns from further data analysis) has been reached.

In MIS research, most data collection is guided by the formulation of hypotheses that direct which "variables" in a situation should be measured or assessed. Even in qualitative, interpretive studies, the research design tends to employ a literature-derived conceptual framework to guide the collection and analysis of data. When employing a GT approach, a literature review is conducted mainly for the purposes of identifying research questions that remain to be answered. The researcher collects any and all empirical data that are relevant to the phenomena or situation of interest (interviews, observations, documents, etc.), then analyzes that data systematically, to derive a conceptual framework or theory by which we may explain, predict, or manage these real-world situations. By evaluating the emerging theory against more and more data, adapting the theory as new insights are realized, and testing these insights against previous data, we can generate theoretical concepts and models that are transferable to similar contexts. The emergent theory is developed by performing a secondary literature review, that searches for theoretical research employing similar concepts to those found in the data. In this way, a GT researcher formulates a *substantive theory* that makes an innovative contribution to knowledge because it is grounded in a specific situation and extended across comparable situations. We terminate the analysis at the point of diminishing returns, when no important insights are provided by analyzing additional data.

The term *grounded theory* has been misused in some studies to denote an absence of method or the generation of a theoretical contribution on the basis of vague inductive reasoning (Babchuk, 1996; A. Bryant, 2002). The following two core elements define the Grounded Theory research method:

- Generation of theoretical concepts and/or models through systematic data analysis, *and*
- Development and evaluation of the emerging theory by means of constant comparison across data samples until theoretical saturation is reached.

DEVELOPMENTS IN THE GROUNDED THEORY METHOD

This section covers the ways in which the Grounded Theory method has developed over time – and also addresses some issues, controversies, and problems encountered along the way. Definitions of the GT "method" have evolved and diverged as authors who espouse diverse research paradigms and philosophies of method experiment with and develop their own approach to generating theory which is grounded in an analysis of the data collected. In response to perceptions that the GT method as described in Glaser and Strauss (1967) was too ill-defined and open-ended to employ practically, both Glaser and Strauss presented developments of the method that they had evolved individually:

- Glaser presented a more systematic process for moving from open coding to selective coding (during which a theory of action is formulated). He suggested eighteen coding paradigms, that could be used to analyze different types of theory, spanning contingency-based theories of action, process theories, causal models, various forms of factor model, structural models, pictorial models, relational theories, and temporal ordering theories. This work described how a process of writing and sorting *theoretical memos*—memos that contain definitions of theoretical relationships between categories of data—are useful to clarify the emerging theory by making explicit the meanings of

categories, their properties, and relationships between them. The aim was to both explain the process of GT analysis and to ensure reliability by making the process of theory development auditable (Glaser, 1978).

- Meanwhile, Strauss was working on a social and transactive theory of action, based on symbolic interactionism (Blumer, 1969; Mead, 1934). He argued that social order can be seen as a trajectory of interactions between actors, or with various situational contingencies (Strauss, 1983). Strauss, in collaboration with Juliet Corbin, produced a detailed exposition of how to use the GT method *systematically* in order to deal with the reliability problems of interpretive, qualitative research. Strauss and Corbin explained how GT analysis can be used to develop theories of social agency by focusing on transaction-based action and interaction strategies, their causal conditions, and their consequences. They introduced an additional stage of analysis—*axial coding*—and suggested the framework shown in Figure 2, around which the search for a core category of human transactional behavior could be structured (Strauss & Corbin, 1990).

The publication of the Strauss and Corbin (1990) book initiated the well-known debate between Glaser and Strauss about what constituted the GT "method." Differences between the two have been analyzed by a number of authors (Annells, 1996; Babchuk, 1996; Dey, 1999; Smit & Bryant, 2000). The key differences between Glaser and Strauss appear to relate to two issues, one ontological (relating to beliefs about how we know reality) and the other methodological (relating to how the GT method should be structured).

The Ontological Issue

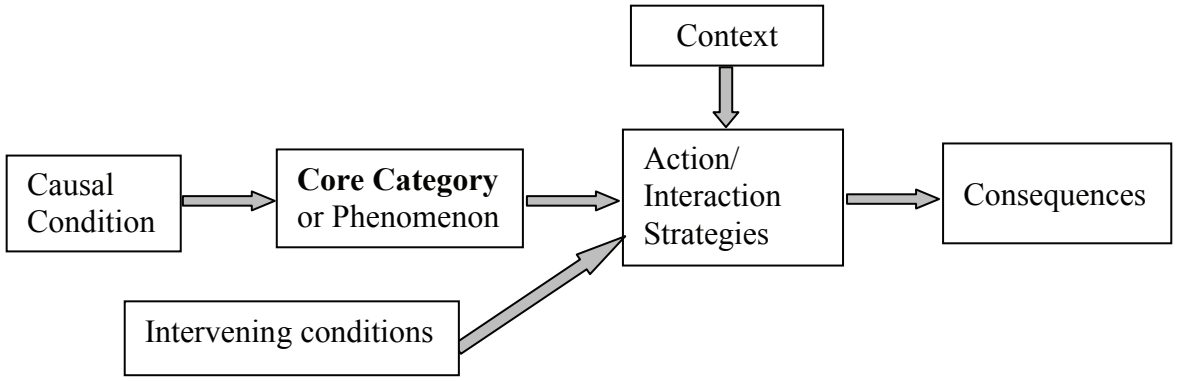
The ontological issue is whether the theory that is uncovered by means of a GT approach exists independently of the researcher and the specific context of the research, or whether it is socially-situated and subjective. Annells observes that Glaser (1978, 1992, 2002) appears to adopt a critical realist ontology, where the external world is viewed as existing independently of the researcher and capable of apprehension, albeit imperfectly. Strauss and Corbin, on the other hand, appear to adopt a relativist ontology, where reality is interpreted by the researcher (Annells, 1996). So we have two distinct worldviews applying in the two texts. Glaser (1978, 1992, 2002) argues that a grounded theory can be "discovered" in "the data," while Strauss and Corbin (1990, 1998) apply their method to the interpretation of a theory that reflects the prevailing consensus on what has occurred. Glaser emphasizes objective abstraction as the means by which we produce a "scientific" theory. He is concerned with data "accuracy," viewing the aim of constant comparison as triangulating data from multiple sources (Glaser, 2002). Strauss and Corbin emphasize the interpretive nature of the data collected and see the aim of constant comparison across data samples as providing a *relative* "verification" of the theoretical model between sources.

The Methodological Issue

The methodological issue was concerned about how the GT method should be structured to provide a systematic method for analysis. Glaser (1978) disagreed with what he saw as an unnecessary over-structuring of the method of generating theory by Strauss and Corbin (1990), who introduced an axial coding stage to integrate the fragmented categories produced by open coding. They suggested that this analysis should employ a conceptual framework based on Strauss' social and transactive view of human agency and interaction (Strauss, 1978, 1983). This is shown in Figure 2.

Glaser (1992) argued that the use of this framework resulted in "forcing" the data into a

Figure 2. Axial Coding Framework, Adapted From Strauss and Corbin (1990)



single paradigm and compared this to the eighteen paradigms that he had suggested (Glaser, 1978). The second edition of the Strauss and Corbin book reduced their axial coding framework to three processual elements: Conditions → Action/ Interaction → Consequences (Strauss & Corbin, 1998). The less structured approach reflected Strauss's search for "fluid organizational elements of negotiations" (Clarke, 2003, p. 556), permitting a wider set of analytical lenses to be applied to the emerging theory. It is clear that the major difference is that Strauss and Corbin envisaged dynamic theories of human agency and interaction resulting from their method, whereas Glaser's eighteen coding paradigms present a relatively static set of theoretical structures.

Constructivist Grounded Theory

Because of his less structured approach to theoretical coding, Glaser's variant of the GT method has been viewed as more amenable to constructivist theory generation. Glaser himself does not share this view. In a chapter that caused much controversy, Charmaz (2000) argues that the GT method is a particularly good fit with constructivist theory-building. She argues that the GT coding process is capable of reflecting an explicit acknowledgement of multiple actors' perspectives on what is the social reality in a situation. She suggests that a constructivist account of how data were collected, how they were analyzed, and how the resulting theory was derived would avoid the privileging of one subject's account over others (echoing a key concern of Klein & Myers, 1999), and would help identify researcher bias. Charmaz argues that an analysis process that relies on commonalities between accounts for "triangulation" of the data allows the researcher to avoid examining how they arrived at their definition of key categories and to avoid evaluating whether their findings would be meaningful to their subjects (Charmaz, 2000). Glaser (2002) misinterprets the constructivist position in his response to this view. He argues that the use of constant comparison discovers a "latent pattern" that is common to multiple research subjects or situations and that this, rather than accounting for differences between subject perspectives, resolves the "worrisome accuracy" problem of qualitative data collection. Glaser appears to equate a constructivist approach to imposing researcher subjectivities on the perspectives of research subjects:

So we can see that constructivism—joint build of an interactive, interpreted, produced data – is an epistemological bias to achieve a credible, accurate description of data collection – sometimes. But it depends on the data. If the data is garnered through an interview guide that forces and feeds interviewee responses then it is constructed to a degree by interviewer imposed interactive

bias. But, as I said above, with the passive, non structured interviewing or listening of the GT interview-observation method, constructivism is held to a minimum. (Glaser, 2002, para 10).

Multi-Grounded Theory

The positivist/constructivist debate is not the only development that is relevant to the use of a GT approach for MIS research. More recently there have been calls to generate *multi-grounded* theories of action in the MIS field (Lind & Goldkuhl, 2006; Tan & Hall, 2007). These approaches generally combine qualitative data collection with both qualitative and quantitative analysis. They employ a post-positivist approach to data analysis, using objectivist data coding (categorization) techniques to "convert" qualitative data to a form that may be analyzed quantitatively, or supplementing qualitative data with quantitative data (for example, supplementing interview findings with large-scale survey data). Findings from a quantitative data analysis are triangulated against findings from the qualitative data analysis, to provide a pragmatic approach to theory evaluation. This is a useful way of collecting large-scale support for a formal theory in a short period of time. But there are dangers that this approach may lead to reductionist theories of action, where only those elements of a theory that are capable of being assessed quantitatively are included in the theory, so this approach should be considered carefully to understand its contribution.

EXEMPLAR GT STUDIES IN MIS

The Grounded Theory (GT) method would seem to be particularly appropriate to MIS, which is a relatively new discipline and is thus in a position to welcome well-supported theories of action. But the GT approach has so far been used more as a *coding method* in MIS than as a *method of generating theory* through constant comparison across data samples until theoretical saturation has been achieved (Urquhart, 2002). This may well be because of the dominance of objectivist, "scientific method" criteria for evaluating rigor in MIS research studies. These criteria may lead many GT studies to be rejected for publication, or post-rationalized in ways that make them *appear* to be based on extant theory (A. Bryant, 2002). Yet it is clear that the approach generates original theory in MIS research, a critical issue as the field widens to embrace constructivist, situated, and community-oriented theories of action. As MIS journals become more open to qualitative and interpretivist studies, GT seems increasingly popular as a research approach in MIS. This section presents an overview of exemplar GT studies in MIS, discussing how a variety of studies have employed or developed the GT method. The discussion of these studies reflects applications of the GT approach in MIS over time.

A groundbreaking paper by Orlikowski (1993) raised the profile of the GT method in MIS. This study was awarded the MISQ best paper award for that year, legitimizing the use of the GT method for the field. Orlikowski studied the adoption and use of CASE tools in three organizations, to develop a theory that explains how organizational issues affect technology introduction. She categorized contextual and process elements to understand similarities and differences between CASE adoption and use in two different firms, concluding that differences between their experience of introducing CASE tools could be attributed to variations in the change process, the organizational context, and the intentions and actions of key organizational actors. Different impacts of CASE tool adoption and use were experienced according to whether the change was intended to be incremental or radical, and whether the objective of introducing the CASE tool was to affect the firm's products or processes. These distinctions led to identifiable variations in emphasis and project outcomes (Orlikowski, 1993). This study followed the Glaser & Strauss (1967) method, emphasizing

iterative data collection, coding and analysis, and constant comparison of findings across samples and between data sources to triangulate findings (Orlikowski, 1993). An interesting aspects of the study is that the author explains how "the iterative approach of data collection, coding, and analysis was more open-ended and generative" at the first research site than at the second site, as the emerging theoretical constructs guided data collection at the second site. While the process is also related to the open vs. axial coding stages of Strauss & Corbin (1990), none of the other concepts from this variant of the method make an appearance, leading to the conclusion that the distinction between open and axial coding was made to frame the iterative emergence of conceptual categories. However, the paper provides an excellent discussion of the iterative GT research method and its contribution to a theory that helps us to explain and manage a complex MIS problem.

At about the same time, Pries-Heje (1992) performed an investigation of the use of software tools in IS development projects across 19 firms in Scandinavia. His analysis revealed the existence of three barriers to the continued use of software tools: (i) a developer must have sufficient information to be able to evaluate its potential contribution (and to judge it positively), (ii) they must have a situation for which it will be useful (e.g. a project that requires automation, for a software automation tool), and (iii) the tool must fit with a variety of organizational or project-specific factors, e.g. be compatible with other software tools (Pries-Heje, 1992). This study provides an excellent exemplar of a systematic GT analysis, following the Strauss & Corbin (1990) method. The narrative describes the author's process of analysis in great detail that is really useful for the GT "novice." The author provides multiple examples to explain how he categorized interview data to derive categories, how he grouped and sorted categories to understand key concepts in the use of software tools for IS development, and how he developed a grounded theory through multiple iterations of conceptual analysis.

A paper by Galal and McDonnell (1997) proposed using the GT method as a method for requirements analysis in defining organizational knowledge-based systems (KBS). They argue that statements of both requirements and assessed outcomes from a KBS prototype may be viewed as substantive theories of action. A GT approach can therefore be employed systematically to derive formulations about system requirements and change outcomes. GT core categories could be used to construct "vision scenarios" for the KBS, and system prototypes could be formally evaluated against these scenarios. This is an intriguing idea that builds on the use of ethnographic data (for example in human-computer interface research). As GT can be used to construct theories that explain how knowledge is used in organizations, this approach might have a great deal of potential if used reflectively.

Gasson (1999) explored the reasons for a non-user-centered outcome in a project based upon a user-centered development approach. The analysis compared the intended and the actual processes of development then explored reasons for the differences and an understanding of project constraints in interviews with project participants and managers. Gasson employed a critical incident analysis of the project (Flanagan, 1954), triangulating across informant interviews and supplementing these with an analysis of project documentation to avoid recall bias, then employed the GT method (Glaser & Strauss, 1967) to iteratively analyze interview data and guide identification of critical incidents to be explored in further interviews. The iterative coding, analysis, and constant comparison process identified a set of themes that were based upon the analyst's interpretation of participant perspectives and validated in further interviews with informants. The findings identified two barriers to participation that were experienced by user-representatives and explicitly controlled

by technical systems developers. The first barrier was one of system visibility, where technical developers were able to hide the evolving system specification from users because of their control of prototype releases. The second barrier was one of participation legitimacy, where technical developers were able to redefine team participation roles because of interdependencies between user representative tasks and system development tasks (S. Gasson, 1999).

Urquhart (1999, 2001a) analyzed differences in the frames of reference employed by IT system requirements analysts vs. system users. From this analysis she constructed a theory that demonstrated how various organizational influences (such as management reporting needs), professional relationships (such as age and power differentials), and interactions between these direct the requirements agenda. Urquhart's work is groundbreaking as it takes a constructivist approach to data analysis, following Schwandt (1994) in arguing that "reality" is the product of complex interactions that reflect different individual constructions of meaning. While Urquhart cites both Glaser (1978, 1992) and Strauss & Corbin (1990) as her influences in these articles, in a later discussion of the GT method she describes how she found that Glaser's less structured approach to analysis helped her to evolve an emergent theory. Following Klein and Myers (1999), she asserts that the key task of research is to seek meaning in context. Urquhart suggests that Dey's (1999) explanation of the method as describing, categorizing, and connecting was helpful in achieving this, fuelling the realization that there was a difference between description (identifying elements of the data through assigning descriptive codes) and analysis (the iterative process of identifying relationships between categories of data—which may include families or groups of "open" codes—and developing more complex thematic codes to understand these relationships). This aided her in progressing between the various levels of abstraction required to generate a multi-level conceptual model of situated user-analyst interactions (Urquhart, 2001b, 2002).

A relatively recent study by Hansen and Kautz (2005) on the same topic as the Pries-Heje (1992) paper (the use of IS development tools by practitioners) develops the analytical coding techniques used in GT by using visualization tools to support inductive theory construction. The authors performed twelve semi-structured interviews with systems developers, project managers and staff in three IS development projects in the same organization, to investigate the use of software development tools. The authors followed the Strauss and Corbin (1998) method in using open coding, axial coding, and selective coding to derive categories of interest from a large quantity of qualitative data (interview transcriptions). However, rather than defining a single core category, they used a variety of visualization techniques (arranging categories on posters, color-coded according to the respondent, for various stages of coding) and debate/brainstorming between the two researchers to guide data analysis, constant comparison of data, and to guide further data collection following the analysis of initial interviews. In this, they appear to be following the original Glaser and Strauss (1967) thematic analysis method, supplemented with their own visual analysis techniques. The visualizations allowed them to identify "constellations of results," which sensitized them to relationships between five core categories (universality of the development tool, confidence in project progress, individual's experience of development, co-determination of needs by managers and developers, and method introduction), and 16 sub-categories in their data. The use of visualization techniques permitted the research team to synthesize analytical categories and themes into four "lessons learned,' that had more of a process focus. For example, the lesson that the use of software development methods is adjusted in action, so no universal method exists (Kautz, Hansen, & Jacobsen, 2004).

Levina & Vaast (2008) employed a GT method when investigating how differences in country context and organizational context affected collaboration between offshore project team members. Citing Glaser and Strauss (1967), they describe how data collection and analysis were intertwined. Analytical field notes were produced after each interview that focused on what was learned. These notes provided emergent conceptual themes and propositions that were explored by adding new interview questions for subsequent informants who were chosen to confirm or challenge perspectives collected so far, so that they could confirm, explain, or deny emergent propositions. This stage ended when theoretical saturation was reached, in obtaining a set of context-related issue categories. The second stage of analysis complicated the emerging theory by generating and analyzing short descriptions of each project to generate a set of analytical themes. These were used to code the interviews, which generated new themes. The results were shared with key informants and academic colleagues; their feedback led to further data collection and analysis until theoretical saturation was reached. This approach demonstrates the iterative, exploratory nature of GT by using specific process examples and provides a rich description of how theoretical relationships and themes were validated and developed as part of GT data collection and analysis (Levina & Vaast, 2008).

So we see a trajectory of GT studies in MIS, from Orlikowski's (1993) legitimation of the method and Pries-Heje's (1992) discussion of the difficulties in identifying a core category, through Galal and McDonnell's (1997) appropriation of the method as a way to generate situated ontologies for knowledge management systems. This is followed by Gasson's (1999) use of the method to identify critical incidents that guided further data collection, and Urquhart's (1999, 2001a) use of GT to identify processes and issues in understanding between IS analysts and their clients. More recently, we see Hansen and Kautz (2005) supplementing a textual GT analysis with visualization techniques to sensitize them to relationships between categories of data, and to synthesize analytical categories and themes relating to software development processes. Levina and Vaast (2008) employed two cycles of GT analysis, based on different views of their data, to generate and cross-validate themes and relationships between contextual issues and categories of collaboration. This set of studies illustrates the diversity and richness of GT applications in our field and demonstrates how attitudes and understandings of the GT method have developed over time.

THE UNIQUE CHALLENGES OF MIS FOR GT RESEARCHERS

Publishing Conventions and Genres in MIS

As the field of MIS is relatively new, the tensions between MIS as an established "discipline" and MIS as an evolving field of knowledge can make it difficult to publish GT studies. When GT studies are presented as journal papers—the usual MIS genre—they suffer from limitation imposed by the paper length. When a very complex study is described in a single paper, there is often not space for a complete description of how the analysis led to the findings. When a comprehensive description of the analysis is provided, the findings frequently appear superficial, as so much space was devoted to the analysis rather than the complexity and depth of the findings. The MIS field has also evolved a theory-driven approach to formalizing research studies that can make it hard to reconcile the findings of GT studies with the expectations of journal editors and reviewers. This is because GT studies generate substantive theories rather than the formal theories emphasized in the majority of the MIS literature, and because the conventions of structure employed by MIS journals do

not permit authors to communicate the emergent nature of GT.

In addition, most MIS journals employ a convention of presenting research as progressing from the conceptual underpinnings arising from a detailed review of literature, through a description of the research method, followed by a presentation of findings, and an interpretation of findings in the light of the original literature. While the majority of journals and conferences in our field are generally accepting of studies based on either deductive (hypothesis-testing, quantitative) or inductive (exploratory, qualitative) data analysis, they are less accepting of studies whose narrative follows a different genre of presentation. As a consequence, most GT studies are presented as conventional qualitative research, where protocols or schema for both data collection and analysis are based on an *a priori* conceptual framework. As discussed above, this conforms with the GT method when that framework is defined at a sufficiently high level that it acts as a data collection guide, rather than a constraining framework for analysis. But this results in the GT process becoming hidden from view and a confusion about what constitutes "grounded theory" in our field. It would be very easy to misunderstand the GT method from published work, as the narrative conventions enforced by editors and reviewers conceal the process by which a new theory was derived.

Descriptions of the search for theoretical relationships and core categories, and the development of an emergent theory through constant comparison between data samples are extremely rare. Even when these are included, they tend to raise objections from reviewers who see this process as "unstructured." This was the case with a paper by De Vreede et al. (1999), that is discussed by Bryant (2002). In a footnote, Bryant tells how the authors communicated to him that they wanted to present their findings as emergent, but were forced to relate their findings to an extant theory of user intentions (the Technology Acceptance Model) by the paper's reviewers (A. Bryant, 2002). The author of this chapter has experienced reviewer objections to even including a reference to Strauss and Corbin (1998), as this "has overtones of the lack of rigor communicated by the use of Grounded Theory." This is a critical issue if we are to develop the potential of our field for innovation and synthesis across disciplines and conventions. A systematic data analysis and synthesis does not rely exclusively on deductive thinking. Instead, it relies on a hermeneutic circle of understanding the whole by decomposing it into individual parts, then understanding those parts and the relationship between them to move to a new understanding of the whole (Gadamer, 1975). The GT method systematizes these cycles of deductive-inductive thinking. While the GT research method draws on relevant literature, this is generally achieved once an emergent theory has been identified, to relate the findings to theoretical accounts in similar fields or situations. The GT method is most useful for situations where there *is* no extant theory – or in situations where existing theories are perceived as inadequate. Accounts of theory generation in all fields, including the physical sciences most closely associated with deductive methods, abound with references to the theorist's process innovation as a result of their refusal to think within existing paradigms. Perhaps we need more editors and reviewers in MIS who are willing to acknowledge the role of serendipity and induction in generating new theories in our field.

Employing *A Priori* Theoretical Models and Seed Categories

The GT method provides an excellent way of investigating areas of the emerging MIS field that have not yet been explored. This approach to data collection and analysis is not a good fit with theory testing or modification. Yet the conventions of leading MIS journals require that findings are related to existing paradigms and knowledge. This leads to frequent variations of a "grounded"

theory method that depends upon seed categories or *a priori* theoretical models.

A GT study on the use of IS development tools and methods was performed by Fitzgerald (1997). This study was unusual in that its author—an experienced software developer—used the concept of "seed categories" to derive an interview protocol, following the Miles and Huberman (1994) approach to qualitative data collection. This study analyzed semi-structured interviews of one IS manager and one IS developer from each of eight organizations, pre-defining the two core categories of interest as *Formalized methodology vs. Methodology in action*, and *Methodology usage*. The use of seed categories to guide data collection was also employed in a study by Hughes and Wood-Harper (1999). This appears to conflict with Glaser's argument that analytical categories should not be forced (Glaser, 1992). But if one sees these two abstract categories in terms of Glaser and Strauss' (Glaser & Strauss, 1967) *data collection guide* that defines topics of interest for the research study, the seed categories simply focus data collection rather than analysis. (Glaser & Strauss, 1967). Eisenhardt (1989) argues that an *a priori* definition of constructs can shape the initial design of [grounded] theory-building research and can guide data collection. The key issue appears to lie in whether the research method supports processes of research for generating theory, or whether it generates theory by logical deduction from preexisting assumptions

This is not the case when an *a priori* framework is used to direct the *analysis of data*. For example, Bryant criticizes a study by De Vreede et al. (1999), which reported using the GT method to extend a pre-existing theory: the Technology Acceptance Model (TAM). Bryant suggests that this study is flawed because the authors were relating their findings to an existing theory. He argues that this type of reconciliation de-sensitizes the researcher to alternative theories that might be applied to the situation and that use of an *a priori* theoretical framework to determine which data are "significant" or not reflects the positivist, deductive approach of traditional methods, rather than the inductive construction of knowledge claimed for the GT method (A. Bryant, 2002). A similar approach is employed by Maznevski and Chudoba (2000) in their study of the processes and performance of three virtual, global teams over time. After reviewing the literature, they defined "open" codes by means of a coding template that was based on their initial literature review. They performed a second-level, axial coding analysis to "uncover relationships among categories and subcategories," then they performed a third-level analysis that "looked for changes, adaptations, and evolutions, and tried to discern patterns associated with global virtual team effectiveness" (Maznevski & Chudoba, 2000, pg. 479). The authors argue that the use of an *a priori* conceptual framework permits a comparison across multiple case studies to be conducted more rapidly than is usual with the GT method. This critique is not intended to deride the process reported in this paper, which reflects a deeply insightful and explicit account of their analytical process. But as the resulting theory was grounded in the literature, it is difficult to see this as a "grounded" theory, even if the authors employed the constant comparison method of analysis. While Maznevski and Chudoba employ the construct of theoretical saturation to explain how to determine the point at which to stop adding new cases to the study, this reflects the use of theoretical saturation as the gold standard in evaluating qualitative research reported by (Guest et al. (2006). The paper develops a discussion of how to develop theory across multiple case studies from a straightforward inductive, qualitative analysis, rather than employing the GT mechanisms of category abstraction, theoretical sampling, constant comparison, and core-category identification. In common with Bryant (2002), I am skeptical about the degree to which a research design that is predicated on an *a priori* conceptual framework can be said to generate a grounded theory. On the one hand, the use of an *a priori*

framework permits data collection and analysis to be constrained and directed so that it is clear what is being analyzed. But this also closes off the possibility that *unexpected* phenomena, processes, or structures will be identified.

Ethics, Boundaries, and Scope in MIS Research

Bryant (2001) argues that GT in its original form as conceptualized by Glaser and Strauss (1967) tends towards an objectivist ontology that ignores the major subjective concerns of our field. These include the ethical implications of selecting one boundary for analysis over another (which may include or exclude key stakeholders or activities), a failure to address issues of "knowledge-power and social transformation" (Flood, 1999, p. 72), and taking account of social actors, acting in social contexts, as key constituting factors (A. Bryant, 2002). Bryant suggests employing a *systemic* philosophy of inquiry (Checkland & Holwell, 1998; Churchman, 1979), that makes explicit judgments that affect the boundary of analysis and what is – or is not – relevant to a grounded theory. As Charmaz (2000) notes, initial descriptions of the GT method have the implication that there is only *one theory* to be fitted to the "facts" of the situation and that empirical data is somehow collected objectively, with no judgments of relevance, or fit with the emerging theoretical framework of the researcher. While Urquhart (2002) argues that GT can be ontology-neutral, MIS researchers tend to privilege objectivity in documenting and accounting for their data analysis process (a key success factor in publishing MIS research). Bryant's point is a good one: the GT "method" (in its original form) does not include processes that are explicitly designed to engage the researcher in reflection about value-judgments or boundary decisions (Antony Bryant, 2001; 2002).

A systemic philosophy of inquiry often reveals emergent relationships between phenomena that are absent if we see boundaries of action or analysis as predefined. For example, we can view the Sarbanes-Oxley Act of 2002 as a response to a number of recent accounting scandals. But if we take a longer-term, historical view of the legislation as part of a larger pattern of interaction, we see that there were many problems with corporate accountability calls for regulation for many years prior to the scandals and that legislation and regulation tended to favor whichever interest group was dominant at any point in time. The Sarbanes-Oxley Act of 2002 generated a conflict between the interests of financial controllers and directors (whose activities and claims about their companies were subject to greater oversight), independent auditor firms (for whom a broad interpretation of the legislation brought additional business income), and corporate IS managers (who incurred extra work and costs in developing systems to support broad interpretations of the legislation). From this perspective, the Sarbanes-Oxley legislation is no longer pivotal in restoring consumer confidence, but just one element in a trajectory of interactions between members of various interest groups (Latour, 1987). In this context, the legislation becomes one more "immutable mobile" that is employed and then subverted by corporate directors, accounting professionals, and IS professionals in their attempts to align the need for corporate accountability with their professional interests. This sheds new light on more recent calls by large companies for the SEC to implement the legislation less rigorously – and on the reasons why the Sarbanes-Oxley Act of 2002 failed to rein in the investment misrepresentations that led to the wider economic problems of 2008. The resulting view depends on the boundary of analysis. A *systemic* inquiry, reflecting multiple perspectives of problem-situation boundaries and "ideal world" solutions allows situations to be viewed in a broader context, experimenting with alternative boundaries in order to develop a deeper theory of action than is usual with MIS research (Checkland & Holwell, 1998). This permits explicit recognition of the emancipatory, critical theory

research paradigm, identified as noticeably absent from research that employs the Grounded Theory method (Annells, 1996; Charmaz, 2000).

A ROADMAP FOR GT RESEARCH IN MIS

Employing The GT Coding Method Vs. The GT Method of Generating Theory

When not discussing specifics of the Glaser or Strauss method in this chapter, I have used the term GT *approach*, rather than GT *method*. This is because the "method" has been the subject of so much debate between its originators -- and because the method itself has developed and evolved with various authors and over time (Dey, 1999). Many studies in MIS claim to employ a grounded theory method without following the systematic abstraction and theory-generation process that is characterized by Glaser and Strauss (1967) as the GT research method. Bryant observes that many recent studies which claim to use a GT method do not follow the later systematic methods of either Glaser (1978, 1992) or Strauss and Corbin (1990, 1998), but employ a process of "loose induction" to derive their findings. He argues that this is an indicator of sloppy research that has no place in MIS, potentially leading to weak theories being derived in these studies (A. Bryant, 2002). Urquhart responds that the GT approach has so far been used more as a *coding* method than as a *research analysis* method, in that researchers infer theoretical relationships between data categories without employing the constant comparison approach to data collection and analysis, or without structuring their theory around a single core category. She observes that this is a valid use that evolves the method: it is still possible to be systematic in one's analysis without employing the GT research method in full (Urquhart, 2002). But it could be argued that without employing the constant comparison method of evaluating and developing emergent theory, the researcher is applying an inductive, qualitative research method for *bricolage* (Denzin & Lincoln, 2005), rather than employing a grounded theory method for systematic analysis. Of course, the GT method has evolved through many different applications in many fields, so that it can no longer be viewed through the epistemological lens of its originators (A. Bryant, 2002). This is demonstrated vividly in the discussion of exemplar studies, above. But the differentiating aspects of the GT *research analysis* method appear to lie in the combination of: (i) the generation of theoretical concepts and/or models through systematic data analysis, and (ii) development and evaluation of the emerging theory by means of constant comparison across data samples until theoretical saturation is reached.

Many MIS researchers struggle to follow the GT method of generating theory. This may be because researchers who are new to GT tend to read the earlier works by each author, attempting to understand the rather rambling descriptions of Glaser and Strauss (1967), whose book was more a defense of this approach to generating theory than a detailed workbook. Novice GT analysts may attempt to fit their work into one of Glaser's (1978) eighteen coding families without understanding the differences between these, or attempt to conform to Strauss and Corbin's (1990) initial theoretical framework without understanding that this is intended to represent a transactional, dynamic theory of action at a *really* abstract level. Later descriptions of the GT process present the GT method of generating theory in terms of iterative cycles of:

i. **Coding:** Categorizing data to ask "what is going on here?"
ii. **Analyzing:** Moving from open codes to selective codes by combining and relating

data-categories to produce useful concepts or models, followed by splitting/redefining conceptual codes where these don't work;

iii. Generating theoretical memos to record the rationale and origin of themes and relationships discerned in the data;

iv. **Evaluating:** Comparing the emerging concepts and models against further data.

These cycles employ constant comparison between data samples and end at the point of theoretical saturation. Dey (1999) provides an excellent overview of how to "do" Grounded Theory analysis and why some things work better than others for specific types of question.

One of the most problematic aspects of the GT method of generating theory lies in identifying a single core category. Pries-Heje describes his experience using the Strauss and Corbin (1990) method of data analysis, during which he constructed and discarded multiple theoretical models. He tells of his many unsuccessful attempts at identifying a single core category, with a great deal of iteration between the three coding stages, before "all the pieces fell into place and I could formulate a consistent theory" (Pries-Heje, 1992, pp. 122-124). While both Glaser and Strauss emphasize the identification of a single core category, recent work in GT questions whether this is really necessary, arguing that complex theories of social action may involve *multiple* core categories, especially when focused at the community level. For example, Dey argues that the identification of a single core category allows the researcher to limit the analysis, but questions whether this resolves the trade-off between complexity and parsimony that is a core aim of GT (Dey, 1999, pp 42-43). My own experience would indicate that this is a matter of abstraction. Defining a single core category is difficult when one is categorizing the data at too detailed a level. If you can conceptualize an overarching theme in the data, defining a core category is much easier. For example, in analyzing IS development processes, you can view these as a set of stages that produce different outputs: a business specification, a functional requirements specification, a logical design, a physical design, a set of software modules, or an integrated information systems. If you think about what all these outputs have in common (for the research objective of understanding IS development as a coherent process), it is possible to define all of these process outputs in terms of partially-realized instantiations of an "IS design structure." So the definition of a core category relies on puzzling over what is the research objective at a high level of abstraction, as well as puzzling over what your multiple "core categories" have in common. But it may be that the subsequent theory becomes too complex to understand, with abstractions that are too abstract to be useful. So there could be a good argument for retaining multiple core-categories, that reflect instances of a meta core category.

Generalizing From Grounded Theories

Focusing on a substantive theory of action introduces problems in generalizing studies across contexts. It is helpful for GT researchers in MIS to focus on transferability rather than generalizability. The findings of a study performed in one context may be transferred to a different context where key elements of the context are similar (Lincoln & Guba, 2000). As GT studies investigate the same research problem in different contexts, a formal theory may be defined by comparison across contexts and across studies. Generalizability concerns should not deter MIS researchers from employing a GT approach to their study. Rather, they should focus on the relationships between the phenomena, actions, and interactions analyzed in the study, and the properties of the *context* of that study, to develop a framework for the transferability of findings. When studying context, it is helpful to ask the following ques-

tions, to determine what data to collect and the extent to which those data are situated within a specific community of practice:

- **Situation:** What is the situation within which the study is located?
- **History:** What is the history of this situation and of the phenomena under study?
- **Language:** How do specific language terms control or define the meaning of phenomena or actions for participants?
- **Membership:** Which community of practice is significant in defining local meanings; who is a member of this group and who is excluded from membership?
- **Culture:** What are the community's conventions, norms, values, genres of communication, and expectations, and how do these affect members' interpretations of the situation?
- **Boundaries:** What boundaries do participants in the situation see as relevant to their own work and what is included or excluded by applying these boundaries?
- **Practices:** What work-processes are viewed as relevant to the local community of practice and how does the group define that these should be performed?

For example, in arguing that their results were generalizable, Orlikowski and Gash (1994) argued that their data was collected from members of two communities of practice – technologists and technology-users – who otherwise shared a common culture. Members of both groups worked for a high-tech company, performed similarly complex work involving similar customers, and shared common genres of communication, norms of work, and value-systems. Therefore, the only differentiating factor in their attitude to technology was their role in respect of either developing or using technology.

Evaluating Grounded Theory In MIS Studies

The evaluation of theory is especially difficult when applying a GT approach, as there is no design research, in the traditional, top-down sense, so there can be no feel for what are the "expected findings." The original work by Glaser and Strauss (1967) was an attempt to legitimize the generation of theories from qualitative data within the positivist standards of scientific proof that were current at that time. In academia generally, but especially in the MIS field, the acceptance of alternative research ontologies such as interpretivism and critical theory has been accompanied by a recognition of alternative criteria for evaluation (Lincoln & Guba, 2000). The original work on GT argued that validity in its traditional sense was inappropriate as an evaluation criterion for qualitative findings that were derived inductively (as distinct from the deductive processes of statistical sampling and analysis). Glaser (1992) suggests that an effective GT should satisfy six key criteria that are concerned with the theory generated:

- **Fit:** does the theory fit with the data collected?
- **Work:** does the theory work in explaining behaviors or phenomena in the study?
- **Relevance:** is the theory relevant to the concerns of participants in the situation studied?
- **Modifiability:** Is the theory amenable to modification when new data is compared with prior data – and is it the result of modification through the constant comparison of data?
- **Parsimony:** Does the theory explain the data without unnecessary complications and alternative scenarios?
- **Explanatory scope:** Can the theory be applied to other, similar situations?

Strauss and Corbin, on the other hand, discuss a set of evaluation criteria that support a reflexive research process and theoretical product. They suggest two sets of evaluation criteria:

- *Criteria for the research process* are presented as a set of questions that are concerned with the approach to theory generation. These are concerned with the grounding/ rationale, and the development of criteria for theoretical sampling, data analysis, and theory-construction.
- *Criteria for the empirical grounding of the study* guide how the researcher may evaluate the theoretical concepts, their relationships, the conditions under which the theory may vary, processes embedded in the theory, and the significance of the theory. (Strauss & Corbin, 1998, pp. 268-272)

Very few Grounded Theory studies discuss evaluation criteria explicitly. This is probably due to the problems of fitting a GT study within the length constraints of a standard journal article, but may also be a result of the general perception discussed above – that the GT method is weak and so one should not draw attention to its limitations. A notable exception is a fascinating paper by Guest et al. (2006) that discusses how many qualitative interviews are "enough" for theory generation. The authors argue that guidelines for determining non-probabilistic sampling strategies are virtually nonexistent and so they explore the question by analyzing the records from a GT study. The paper is so interesting because its authors observe that the GT concept of *theoretical saturation* has become the "gold standard" in qualitative research, regardless of whether a GT approach is employed. However, the concept of theoretical saturation is frequently not operationalized in ways that can be understood by novice researchers. In a search for evaluation criteria, the two lead researchers documented and analyzed the development of a GT coding scheme after analyzing each of ten rounds of six interviews, split evenly across female subjects of two nationalities (Ghanaian and Nigerian). The interview protocol included six structured questions collecting demographic information, sixteen open-ended main questions, and fourteen open-ended sub-questions, providing a total of 60 interviews A codebook was developed by two data analysts, with the lead analyst creating a content-based coding scheme for each set of six interviews. Intercoder agreement was assessed for every third interview, with coding discrepancies discussed and resolved by the analysis team. Code changes were documented as these occurred.

So how many interviews were enough? The authors discovered that the team had created 92% (100) of the total number of codes developed for the first national group after **twelve** interviews. At this point, they had 88% (114) of the final codes for both national groups, and had identified all of the "most important" codes used in reporting the findings. The second national group (set of 30 interviews) added 5 new codes, bringing the total to 119. But the number of interviews required for theoretical saturation was relatively small because the study focused on a relatively homogeneous population (the two national groups were close in culture) and had a fairly narrow focus which provided a well-structured coding scheme. While their analysis at the end of *six* interviews had identified the four overarching themes that emerged from their findings, the authors comment that the researcher-team were unlikely to be sufficiently sensitized to the importance of these themes to identify them at this point. It was the process of analyzing, comparing, and collaboratively puzzling over sixty interviews that provided the deep insights required to interpret the significance of their themes.

Guest et al. also observe that theoretical saturation may require a great deal more analysis for those researchers who typically develop hundreds of codes from a micro-analysis of the data, then painstakingly analyze patterns and relationships,

grouping, discarding, then regrouping categories to derive themes in the data. Theoretical saturation is reached more quickly for analyses that employ a loose inductive process to detect a few broad-brush themes. But the former researchers are more likely to arrive at deep insights and theories that explain the interior workings of a situation than the latter. So while a broad-brush analyst might well have arrived at a working theory after six interviews, this would have been less insightful – and less credible – than the process of iteratively analyzing the whole sample. Unsurprisingly, the authors' answer to "how many interviews is enough for theory construction?" is that it was twelve interviews for them, but that this small number could only be justified for the type of purposive sampling underlying "quick and dirty" research (Guest et al., 2006). The requisite sample size for a GT analysis depends upon what type of theory you want – and also how much effort you are prepared to invest in theory construction.

CONCLUSION: THE CONTRIBUTION OF GT TO MIS RESEARCH

The chapter discussed the Grounded Theory (GT) method and also covered research approaches that are based on the GT method, found in the MIS literature. Differences between the two originators' operationalizations of the method were covered, together with issues and controversies related to the use of the GT method. Key exemplars from the MIS literature were discussed, to give an overview of how its use has been developed an evolved in our field. A discussion of the unique challenges of MIS for GT researchers was followed by a roadmap of how GT may be used to generate rigorous, substantive theories in MIS research.

The adoption of a GT approach is best suited to situations where there is no extant theory, or where existing theory is felt to be insufficient for the contingencies of the situation being studied. As an emergent field of research, MIS has many research problems for which there is no accepted theory. One of the challenges – but also one of the rewards – of working in a field such as MIS is that the absence of a single disciplinary paradigm provides an opportunity to explore alternative theories of action to those suggested by prior research. MIS researchers often tackle research problems that have not previously been explored. The GT approach provides a way for researchers to make truly original contributions to the field. There is a tradition of systematic method in MIS research that is often absent from other fields, where narrative accounts of research are more usual. What distinguishes the GT approach from bricolage is the systematic, painstaking analysis that the GT approach requires.

Given the conventions of our field, it can be difficult to justify the timescales of a qualitative, grounded theory study in MIS. The typical expectation is that most research studies will be performed with much shorter timescales than those required for GT research. While it may take a few weeks to complete a quantitative survey, or an applied study of MIS, it may take several months or years to complete the iterative cycles of data collection, open coding, theoretical coding, and constant comparison that are required for grounded theory generation. This chapter has demonstrated that writing up qualitative GT research presents a fresh set of challenges for MIS researchers. The method is complex and so it can be difficult to fit the required explanations within a standard journal article page-count. This approach to theory generation requires a high degree of commitment to rigor of process and a good understanding of what granularity of analysis is required for the type of contribution envisaged. While quantitative research has its shorthand ways of communicating reliability or validity, citing specific statistical tests in 3-4 words, a GT article can take 1-2 pages to satisfy reviewers and readers that the findings are dependable, confirmable, and were arrived at through a rigorous process of analysis. This requires journals

and editors who are tolerant of the longer papers that GT necessitates. The deep understanding of phenomena that accrues from GT research cannot be underestimated. It has been said that qualitative researchers live, breathe, and dream of their data. In addition to all of these, the GT researcher nurtures and raises their findings until they reach the age of independence(!).

As discussed, qualitative GT studies do not follow the narrative conventions of a typical MIS study, meaning that a choice must be made between producing a narrative that reflects the GT process, or employing a normative article structure that falsely implies links between extant theories and the research design. Major decisions about the boundary of analysis and the philosophical stance to be taken to the research must be made and then revisited as new findings emerge. Such reflexive decisions are especially pertinent to our field, where theory increasingly relies upon a systemic approach to situated data analysis and to appreciating the study's wider impact. The future of theory-generation in MIS lies in making unique contributions to knowledge that are not feasible in other academic fields. We are privileged that our field permits the synthesis of ideas, concepts, and theories across the boundaries of disciplines. Grounded Theory has an important role to play in this synthesis, as we struggle to understand the MIS world and the place of human action, interaction, and knowledge within that world.

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KEY TERMS AND DEFINITIONS

Grounded Theory: A theory that is generated from patterns in, and relationships between, elements of the data collected, rather than based upon extant theories of action. The Grounded Theory *method* is based upon Glaser and Strauss (1967) and requires two key process elements:

(i) Data are categorized (or coded) according to an emergent set of categories that define key elements of the situation. These are related together by means of code integration to derive families of codes, or code splitting to derive sub-categories. A substantive theory is generated when the researcher can define core categories in the data and important patterns of relationships between categories, that apply across data samples. These patterns are made explicit through the generation of theoretical memos as the analysis proceeds.

(ii) A constant comparison method is employed to analyze which elements of the emerging theory apply across multiple data samples, at which point the emerging theory may change. Constant comparison ends when theoretical saturation is reached (see below).

Epistemology: Our beliefs about the nature of knowledge and our relationship to the "real world" (i.e. *how* we know reality). The most common positions are:

- **Interpretivist:** Reported experience, phenomena, and observations are seen as social constructions: filtered through the interpretations that result from the individual's prior experience. This approach attempts to account for interpretations by research subjects and the researcher, in suggesting findings from a research analysis. The resulting theories are seen as contestable and context-specific, providing explanatory power, rich descriptions, and in-depth understanding of how and why to act, rather than providing prescriptive rules for action.
- **Positivist:** Observable, measurable experiences can contribute to knowledge. Theories result from the application of scientific methods of analysis to data, resulting in a research approach that emphasizes quantitative data collection and statistical analysis methods to ensure the validity of findings.
- **Post-Positivist:** Based on the belief that most knowledge is conjectural, this research paradigm emphasizes deductive logic, or warrants, in supporting theory generation. .Post-positivism admits reported experience (for example, surveys), sociological or psychological experiments (where the data must be inferred from other phenomena) and observed human behavior as data. Because of the wider criteria for data acceptability than is the case for positivism, post-positivism is often used to describe an approach to research where large amounts of qualitative data are categorized to produce quantitative data to be analyzed using statistical methods.

Idiographic: An approach to research knowledge that is concerned with the study of individual or specific cases, pertaining to contingent and often subjectively-perceived phenomena that relate to an identifiable context. This may be contrasted with the **nomothetic** approach most usually employed in positivist research studies which are seen as representing a population of individuals and focus on the variables and behaviors that characterize a generalizable set of contexts.

Ontology: Related to how we view the nature of the external world. The two extreme positions are:

- **Realist:** Where the individual views the external world as having an existence independent of their own.
- **Social Constructivist:** Where the individual views the external world as represented by a set of names, concepts, and labels that are used to structure reality. We understand the world by socially-situated processes of framing and filtering that employ consensus concepts, names, and labels. *Very few people* ever adopt these extreme positions in totality.

For example, researchers who describe their position as social constructivist would admit to some parts of physical reality as having an existence independent of their own. Similarly, researchers who describe their position as realist (the epistemological term "positivist" is more often employed), admit to some elements of their understanding of the external (to them) world as resulting from subjective perceptions.

Substantive Theory: A theoretical model that provides a "working theory" of action for a specific context. A substantive theory is considered *transferable*, rather than generalizable, in the sense that elements of the context can be transferred to contexts of action with similar characteristics to the context under study (for example, studies of small-group IS design in US management consultancy companies). This contrasts with **Formal Theory**, which is based upon validated, generalizable conclusions across multiple studies that represent the research population as a whole, or upon deductive logic that uses validated empirical theories as its basic axioms.

Systemic Inquiry: This is a philosophy of research and action that relates elements of the situation together, viewing a problem-situation as an interrelated set of cause-effect relationships or phenomena. This philosophy was proposed by Churchman (1979) and operationalized in the Soft Systems approach advocated by Checkland (Checkland and Holwell, 1998).

Theoretical Saturation: The point at which analysis of additional data through constant comparison across data samples, cases, or situations provides no new insights into the substantive theory of action generated from the data.