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MAPS: An Actionable Model for Overcoming Challenges in Grounded Theory

Stefan Cronholm[1] and Ia Williamsson
University of Borås, Sweden

ABSTRACT
Grounded Theory (GT) is widely used in Information Systems (IS) research, yet there are many challenges in following the methodology, particularly for novice researchers. While prior work has extensively described challenges, concrete and practice-oriented solutions remain underdeveloped. This study addresses this gap by conducting a structured literature review and an in-depth qualitative analysis of two empirical GT projects that encountered significant methodological difficulties. Using a combined approach of Directed and Conventional Content Analysis, we identified eight interrelated themes spanning the phases of open coding, axial coding, and selective coding. For each theme, we developed problem–solution pairings to address issues such as: navigating large volumes of collected data, transitioning from specific details to abstract concepts, interpreting qualitative data, relating categories to construct logical theoretical explanations, determining when categories are sufficiently related, finding an appropriate generalization level, coaching and guiding single GT researchers, and choosing a GT approach These themes are integrated into a coherent model, MAPS, that reveals their causal relationships. Our study provides micro-level methodological guidance for GT practice and complements existing GT literature by offering empirically grounded and actionable solutions rather than high-level principles.

KEYWORDS: Grounded Theory, Grounded Theory Challenges, Grounded Theory Guidelines, Inexperienced users, Grounded Theory confusion

Grounded Theory (GT) is a widely used qualitative analysis method in information systems (IS) (e.g., Charmaz & Bryant, 2011; Goldkuhl & Cronholm, 2019). There are many contributions to GT after the seminal publication by Glaser & Strauss (1967), which often is referred to as classical GT. Some of the more important GT variants are the Straussian approach (e.g. Strauss & Corbin, 1990), constructivist GT (e.g., Charmaz, 2014), critical GT (e.g., Hadley, 2019), situational analysis (e.g., Clarke et al., 2018). Despite all these additions to the first version of GT, several scholars report methodological challenges when applying GT. Common challenges are: 1) a conflict in the understanding of GT, with a variety of grounded theory variants available (Matavire

[1]Corresponding author; Professor of Information Systems, University of Borås, Department of Information Technology, Allégatan 1, 50332 Borås, Sweden, Email: Stefan.cronholm@hb.se
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& Brown, 2013), 2) following rigor standards (O'Connor et al., 2008), 3) applying a strict inductive way of generating categories from empirical data (Goldkuhl & Cronholm, 2010), 4) pursuing theory through engagement with data (Timonen et al., 2008), 5) managing theoretical sampling (Glaser & Strauss, 2017; Oktay, 2012; Andersson, 2025), 6) theoretical saturation (Cutcliffe, 2000), 7) finding support for movements between abstraction levels (Cronholm, 2002), and 9) knowing when to read extant theories (Glaser, 1992; Walls et al., 2010; Hadley, 2017).

Several GT scholars have suggested excellent guidelines and solutions to address challenges (e.g., Urquhart, 2001; Urquhart et al., 2010; Charmaz, 2006; Goldkuhl & Cronholm, 2010; Timonen et al., 2018). However, these guidelines are often presented at a macro-level, which means they are broad and abstract. This makes it difficult for researchers to apply them in concrete research situations. We have also identified that previous research has primarily focused on identifying and describing challenges rather than developing concrete solutions. That is, the literature presents more challenges than actionable solutions. Hence, our study explicitly focused on a) identifying solutions to challenges that had not previously been fully addressed, and b) a complementary micro-perspective involving pairing of specific challenges and specific solutions. The reasons are that we wanted to advance theoretical depth, enhance methodological support, and practical relevance. More explicit guidance helps researchers avoid common pitfalls and enhances rigor and theoretical depth. Furthermore, the guidance should not be regarded as quick fixes applicable to any context in which GT is used. That is, they are not universal. Rather, we recommend adapting them to the specific context. Our research question is: *How can challenges experienced when conducting grounded theory be addressed?* The solutions are based on a literature review and analyses of two empirical GT projects that encountered several methodological challenges.

The contribution to theory is a model that outlines themes of paired challenges and corresponding solutions. The contribution to practice comprises detailed descriptions of these challenges and solutions derived from analyses of two GT projects. Note that the practice here refers specifically to research projects that use GT. Our primary audience is inexperienced GT users. We define an inexperienced GT user as a researcher who is new to the principles, practices, and decision-making processes of GT and therefore lacks the practical skills that come from prior exposure, mentoring, or hands-on GT research experience. However, we also recommend that more experienced GT researchers consider our findings.

We next present prior challenges regarding the practical use of GT, followed by a description of our research method. Then we present the empirical GT projects we analyzed and our findings, which are compared with prior knowledge identified in the literature review. Finally, we draw conclusions leading to actionable solutions to the identified challenges.

Literature Review

To identify challenges in GT, we conducted a literature review. The literature review method suggested by Webster & Watson (2002) supported us in presenting the findings according to a concept-centric structure. We searched the Scopus database for GT challenges and solutions and the search string ("grounded theory" and challenges and (solutions or guidelines)) resulted in 363 articles. Several of these articles provided valuable insights that we could build further on. We also identified that several of these articles referenced other interesting articles that were not part of the results from Scopus. Therefore, we complemented our search with backward and forward searching. In total, we identified 55 relevant articles. In a following step, we structured the articles into three overarching categories: pre-study challenges, in-study challenges, and post-study challenges. Each category presents several challenges

Pre-study challenges and solutions

Variety of GT approaches - The first identified challenge is that novice GT users struggle to gain an overview of the method (Timonen et al., 2018). This struggle stems from a lack of awareness of that different GT approaches have developed over the years. (Goldkuhl & Cronholm, 2019). Examples of such approaches are: Classical GT (Glaser & Strauss, 1967), Straussian GT (e.g., Stauss & Corbin, 1990; Constructivist GT (e.g., Charmaz, 2014;) and critical GT (e.g., Hadley, 2019).

Classical GT emphasizes that theory emerges from data and that the researcher is more detached yet reflexive (Timonen et al., 2018). It highlights that categories emerge naturally from the data and that theories are built through constant comparisons between data and categories. It justifies a combined inductive and deductive approach by allowing the theory to emerge from data while also guiding the emerging theory through theoretical sampling. One distinctive difference in the Straussian approach is the axial coding phase, which is defined as "A set of procedures whereby data are put back together in new ways after open coding, by making connections between categories. This is done by utilizing a coding paradigm involving conditions, context, action/interactional strategies and consequences." (Strauss & Corbin, 1990, p. 90). Several researchers have criticized the Straussian approach for *forcing data* into preconceived categories rather than allowing theory to emerge (e.g., Glaser, 1992). Strauss & Corbin (1990) emphasize the need for systematic coding and insist that the coding paradigm is not a rigid template, but a heuristic that helps researchers see relationships in the data.

Constructivist GT is rooted in the pragmatist tradition and views reality as social. The main idea is that data, meaning, and theory are co-constructed by researchers and participants, rather than discovered as objective facts (e.g., Charmaz, 2014). Another claim is that theory emerges through an interpretive process, not through mechanical coding. Moreover, it recognizes that reality is multiple, subjective and shaped through interaction. In other words, Constructivist GT emphasize that there are no neutral researchers and no single truth. Moreover, the concept of context is not regarded as background information but is an essential part of the meaning-making process. Critical GT highlights social processes and phenomena related to the problems of power, inequality, and discrimination in their varied manifestations (e.g., Hadley, 2019). Some basic ideas include revealing, critiquing, and challenging the power structures that shape social life. Furthermore, it highlights, for example the importance of applying different perspectives and maintaining a skeptical attitude towards assumptions, thinking logically, being sensitive to the unspoken implications in the data, and practicing self-reflexivity (ibid.). A brief comparison of these approaches shows that there are differences regarding the role of the researcher, which ranges from more neutral to co-constructor, the coding process can be flexible or systematic, and the views of reality are: single, multiple, discovered, or constructed. Given the diversity across GT approaches, novice researchers may find it difficult to understand ontological and epistemological differences.

Necessity of pre-knowledge of GT - Another challenge concerns the need for a high level of pre-knowledge. GT requires substantial methodological, substantive, and analytical pre knowledge because without it, a researcher cannot make the constant comparisons, theoretical decisions, and methodological judgments that GT depends on. Compared to other qualitative research methods such as thematic analysis and content analysis, GT is more abstract because it aims to build a conceptual theory (Glaser & Strauss, 1967), while thematic analysis and content analysis aim to interpret and categorize data into descriptive themes (Braun & Clarke, 2006; Hsieh & Shannon, 2005). This means that the use of GT requires a higher pre-knowledge about epistemology and ontology. It also requires a good capability to make abstractions and move between different abstraction levels. Cronholm (2002) states that novice GT users without adequate pre-knowledge tend to follow the GT's instructions uncritically and without adapting them to contextual conditions. Critical reflection is imperative in all academic studies and contributes to an ongoing learning process (Jones et al., 2000; Jenkins & Cutchens, 2011). This is also valid for GT and Charmaz (2006) advises researchers against using general GT guidelines as recipes and recommends GT users remain open and critical to developments in the field and be willing to grapple with them. In contrast, Aldiabat & Le Navenec (2018) argue that general guidelines and concrete examples are needed for novice researchers using GT. Moreover, Backman & Kyngnäs (1999) state that GT is a multi-faceted process that requires time and theoretical sensitivity to move from data to theory and back to data. We argue that the multi-faceted GT process could be challenging for novice users.

Lack of mentoring - The lack of adequate mentoring during learning GT can lead to problems with sampling and data collection (Pergert, 2009). Moreover, Finaly & Howard (2024, p.60) state that "using constructivist grounded theory is considered "the road less traveled" by most graduate students and their advisors" and emphasize the necessity of senior support. Novice researchers may struggle to determine appropriate data-collection tools, identify when saturation is reached, and understand the conceptual language. To address these issues, Pergert (2009) suggests that novice GT researchers should trust the method, utilize insider knowledge, and actively seek feedback from research teams, experienced grounded theorists, and manuscript reviewers.

Confusion regarding theory generation - One requirement stated by Glaser & Strauss (1967) is that GT should result in theories that fit, work, and are relevant. Charmaz (2014) emphasizes that theory is constructed, interpretive, and emergent, rather than discovered as an objective reality. It is constructed by the researcher through *interaction* with the data. Moreover, her view is that GT focuses on interpretive understanding, rather than merely explaining patterns.

Timonen et al. (2018) argue that generating theory can be intimidating for many researchers, especially inexperienced ones. However, the requirement to develop a theory is misunderstood, and a fully-fledged theory need not always be the outcome of a GT study (Timonen et al., 2018). The authors report that the most common outcome from GT studies is greater conceptual clarity or conceptual frameworks. Wiesche et al. (2017), who have analyzed 43 GT articles in major IS and related journals, state that 10 articles develop theory and 33 contribute with models and/or detailed descriptions of various phenomena. Similarly, Bryant (2017, p. 99) states, "The grounded theory method should, obviously, lead to the development of grounded theories, although these may also be termed *models or frameworks or conceptual schemas*." Moreover, Urquhart et al. (2010) encourage GT researchers to use a taxonomy of theory developed by Gregor (2006). The taxonomy includes the categories: theory for analyzing, theory for explaining, theory for predicting, theory for explaining and predicting, and theory for design and action. Urquhart et al. (2010) argue that GT can generate theories that span all these categories.

Engagement with existing literature - One frequently debated issue regarding GT is how inquirers' pre-understanding influences data collection, data analysis, and theory generation (e.g., Charmaz, 2014; Urquhart & Fernández, 2013; Goldkuhl & Cronholm, 2019; Seidel & Watson, 2020). For example, Glaser & Strauss (1967, p. 3) state the following: "the researcher does not approach reality as a tabula rasa. He must have a perspective that will help him see relevant data and abstract significant categories from his scrutiny of the data." This clearly indicates that the researcher could engage with theory before data is collected. However, the authors also state “at first, literally ignore the literature of theory and fact on the area under study” (p. 37). This statement could be interpreted to mean that the researcher should not engage with existing literature prior to data collection. Moreover, Nathaniel (2022, p.45) states that “They [Glaser and Strauss], however, did not lay out a clear and structured overview of how to use the literature” and argues that the literature review of a classic grounded theory study is a vital piece of a new theory, which enhances both emergent and old theory.

Urquhart (2001) states that *setting aside existing theoretical ideas* is not an accurate representation of GT. She emphasizes that the primary reason for the injunction against reading the literature is to ensure that researchers take an inductive rather than deductive approach. Morse & Clark (2019) argue that there is a risk of neglecting to sample the literature to ensure the uniqueness of a study. Similarly, Andersson (2025) states that reviewing the literature serves to discover that allied theories/concepts are similar yet different from your own work. Goldkuhl & Cronholm (2010) report that the reluctance to bring in existing theories implies a loss of valuable knowledge that could be used to a) formulate improved initial research questions, b) ask more informed questions during interviews, and c) compare and contrast the empirical findings and abstractions with other theories.

Approaches to coding of data - The four GT approaches (Classical GT, Straussian GT, Constructivist GT, Critical GT) suggest both similarities and differences in how data are coded. Primarily, they are all bottom-up oriented, and they treat coding as breaking data into parts and adding meaning to it. Moreover, all of them recommend constant comparison of data and category generation. However, there are some differences. One major difference is that the Straussian approach recommends a systematic approach in relating data and to use a coding paradigm consisting of the following pre-defined components: causal conditions, context, intervening conditions, action/interaction strategies, and consequences (Strauss & Corbin, 1990). The idea is that the categories created in the open coding phase should fit one of these components.

In the light of classical GT, Glaser (1992) explicitly rejects the coding paradigm suggested by Strauss and Corbin. Glaser (1992) refers to it as a forcing of data into preconceived categories rather than allowing theory to emerge. The constructivist approach is less rigid and systematic than the Straussian approach but more interpretive. The focus is on co-construction of meaning. Moreover, the constructivist approach also disagrees with the Straussian approach of applying a coding paradigm because it is too rigid and formal (Charmaz, 2014). However, the constructivist approach acknowledges making connections between categories, but without following a template. Critical GT also rejects the coding paradigm suggested by Strauss & Corbin (1990) because coding should be done freely and flexibly. The overarching perspective in critical GT is to analytically interrogate and question data. As mentioned above the focus is often on power, inequality, and context (e.g., Clarke et al., 2018; Hadley, 2019. Corbin & Strauss (2008) defend this criticism of the coding paradigm and argue that axial coding a) reassembles data around an axis, and that it is not template filling, b) is a heuristic phase that is not mechanical, and c) is a thinking device and not a structure that should be followed rigidly.

In-study challenges and solutions

Biased interpretation - Biased interpretations are often caused by individual assumptions, patterns of thinking, and knowledge gained from experience and reading (Strauss & Corbin, 1990). Therefore, researchers make various decisions about how to comprehend the data (Walsham, 1993). One factor that impacts biased interpretation is the researcher's level of maturity (Cronholm, 2002). Moreover, Strauss (1987) adds that the recommendation to delay reading related literature applies less to experienced researchers, who are more skilled at testing and contrasting empirical data against their own biases, assumptions, and knowledge. Indeed, there are several ways to deal with biased interpretations. Strauss & Corbin (1990) state that making data comparisons helps researchers guard against bias (i.e., by continually challenging their assumptions against the data). Glaser (1992) adds that delaying reading in the research area could prevent contaminating the researcher's efforts to generate categories. Another possibility is to open the analysis to scrutiny by others, which not only helps guard against bias but also often leads to new insights and increased theoretical sensitivity (Urquhart & Fernandez, 2013; Masood et al., 2020). Furthermore, analyst triangulation is recommended to reduce or eliminate bias, meaning that two or more researchers jointly compare and analyze data (Johnson, 2017). Another solution is to apply method- and data triangulation, where multiple sources of data could be used to improve validity (Masood et al., 2020).

Methodological rigor - Maintaining methodological rigor in data collection can be challenging, given the iterative nature of data collection and analysis. For example, Abia (2020) reports difficulties securing respondents' time to participate in the research process. Moreover, Clement et al. (2023) encountered difficulties in developing structured interview protocols, conducting in-depth interviews, and maintaining coding accuracy. The authors state that solutions should focus on refining methodologies for data collection and analysis. For example, GT researchers should improve their skills in formulating open questions and re-coding after advice from senior researchers. Abia (2020) proposed a more structured approach to data collection, using codified procedures to ensure clear and reproducible results that should be aligned with the existing literature. Furthermore, Clement et al. (2023) adopted an iterative approach to improve question formulation and recommended incorporating advice from more experienced co-authors to refine coding protocols.

Time-consuming coding procedures - GT coding procedures have been criticized as extremely time-consuming and tedious, which may make researchers reluctant to adopt GT (Adolph et al., 2011; Cronholm, 2002). One reason for this experience is that some researchers believe they must initially code all data, even when the dataset is extensive (Timonen et al., 2008). Moreover, Cronholm (2002) reports that time-consuming processes created a reluctance to reorganize early-developed categories. He studied 12 PhD students using GT and found that data collected in the second and third iterations often did not fit the categories initially created. The reluctance to reorganize categories and data structures might lead to unsaturated theories. Aldiabat & Le Navenec (2018) stress that a lack of full saturation will not produce a good theory because it will: a) not fully raise the categories to the theoretical level, and this, in turn will influence its lack of trustworthiness, b) negatively influence fitting the new data into the categories that have already emerged (Bowen, 2008), and c) influence replication in categories and its verification, its comprehension and completeness (Morse et al., 2002). However, Timonen et al. (2008) state that GT coding procedures, even with large datasets, could be a smooth process when early connections among data are identified. The authors argue that these early connections lead the coding process forward in a focused manner.

Guidance - Charmaz (2012, p. 3) states that GT "Has certain distinctive features that distinguish it from other forms of qualitative analysis." These features are: providing explicit tools for studying processes, promoting openness to all possible theoretical understandings, fostering tentative interpretations of the data through coding and categorization, and building systematic checks and refinements of the researcher's major theoretical categories. The purpose of the features is to support GT users. Furthermore, Cathy Urquhart and Stefan Seidel have suggested guidance on GT. For example, Urquhart (2001) proposes seven rules of thumb for grounded theory (see Urquhart (2001) for a detailed description). Moreover, Urquhart et al. (2010) present five guidelines: constant comparison, iterative conceptualization, theoretical sampling, scaling up, and theoretical integration. Seidel & Urquhart (2013) build on the first two articles and propose three propositions and five guidelines. The propositions read: a) to use the coding paradigm in order to enhance theoretical sensitivity towards causal relationships and explainable theory, b) to make conscious about how the coding paradigm should be used, and c) to adhere to the basic principles of the method, such as constant comparison. The five guidelines are also general and concern the phase of axial coding: flexible use of axial coding, a rationale for adaptations, awareness of 'forcing' issues, theoretical sensitivity towards causality, and contextualization.

Generalization of Theory - Classical GT was designed to generate theory from data, not to test whether a theory holds across populations (Glaser & Strauss, 1967). Instead, the authors argue that grounded theory produces conceptual categories that transcend the specific empirical setting. Moreover, several GT scholars reject statistical generalization and instead emphasize analytic generalization, defined as the process of reasoning about similarities between a specific context and other contexts (Strauss & Corbin, 1998; Clarke, 2005). Cronholm (2002) reports substantial variation among PhD students in generalizing, which often depends on the PhD students' pre-knowledge of qualitative research and analytical skills. Moreover, Masood et al., (2020) raised concerns about the internal validity of their study on self-assignment in agile teams, citing issues with generalizability. In addition, Patel & Poston (2022) noted that subjective interpretations and preconceptions of the studied phenomenon/subject may bias research and limit generalizability, as the theory is heavily influenced by the researchers' perspectives. One solution that could ensure that findings are more universally applicable is to reflect on study settings and increase sample sizes (Patel & Poston, 2022). Based on these statements, generalization of GT studies is probably best practiced by scholars who have experience with other previous qualitative methodologies.

Post-study challenges and solutions

Publishing grounded-theory articles - Levina (2021) noted that researchers struggle to meet journal expectations, especially in fields where GT is not widely accepted. For example, one challenge is to integrate findings into the existing body of knowledge. Another challenge is meeting expectations for conducting proper literature reviews, particularly in selecting appropriate keywords to identify relevant articles and ensuring theoretical saturation (Pant et al. 2024). To address these challenges, Levina (2021) suggests modifying GT papers to better align with the standards of qualitative research journals. For example, the comparison of the emerging theory to existing theory should be made more explicit. If existing theories do not match the core emergent patterns or need to be extended to match them, it opens the way for a novel theoretical contribution (ibid.).

Moreover, Pant et al. (2024) suggest an iterative approach to develop search strings. Furthermore, they acknowledge that theoretical sampling may not always yield representative results and recommend broadening the literature search to enhance trustworthiness. In addition, Linden & Palmieri (2023) acknowledge that several core principles of classic GT pose challenges when writing the introduction and background. The challenges include selecting a topic rather than a problem, limiting preconceptions, and avoiding a preliminary literature review. The solution lies in writing an accurate study protocol that describes data collection and analysis, ethical considerations, and the potential risks and benefits.

Research Method

To address the research question, *"How can challenges experienced when conducting grounded theory be addressed?"*, we conducted a qualitative analysis to gain an in-depth understanding of GT challenges and solutions. We have collected data from two empirical GT projects (see Section 4), each involving one of the authors of this paper. One reason for selecting these two studies was that they were recently conducted, making them highly relevant and that challenges and solutions were easy to recall. Another reason was that we wanted full and first-hand access to project data to ensure that necessary details could be collected. A third reason was that both projects were fairly comprehensive and complex, which caused several challenges. Moreover, the fact that both authors of this paper were involved in the projects may have influenced the overall results. That is, there may have been blind spots, biases, and overlooked alternative interpretations. To minimize the authors' influence, we (the authors) served as critics for one another. This meant that we questioned each other's assumptions, provided feedback on each other's interpretations, and asked each other for clarifications when needed. We analyzed project documentation (e.g., notes, meeting protocols, video recordings) and project results (e.g., scientific publications, reports).

Our data analysis followed Content Analysis (e.g., Mayring, 2004). One variant is Directed Content Analysis, which is appropriate when the existing theory is incomplete or would benefit from further description (Hsieh & Shannon, 2005). In our case, we used the challenges presented in our literature review as a lens to identify complementary solutions in the analyzed GT projects. This meant that we applied a deductive approach. At the same time, we sought to remain open-minded and identify additional challenges and solutions beyond those identified in the literature review. Hence, we also applied the variant Conventional Content Analysis, which is appropriate when researchers seek to avoid preconceived categories and instead allow categories to be inductively derived from the empirical data. Using both Directed Content Analysis and Conventional Content Analysis meant that we alternated between deductive and inductive inference strategies. It also provides good opportunities to build further on existing knowledge.

To structure and establish logical relationships between the identified challenges and solutions, we created themes using the "problem-solution pairing" technique (e.g., Dorst & Cross, 2001; Von Hippel & Von Krogh, 2016). A problem can represent a challenge or a need, and a solution can be an action, design, or idea that addresses the problem. Problem-solution pairing entails clearly linking a specific problem to a specific solution designed to address it. Presenting problems alongside their solutions is a technique that dramatically improves clarity, learning, and decision making (e.g., Atkinson et al., 2000).

Moreover, we integrated the themes consisting of problem-solution pairs into a coherent model that followed Problem Diagrams suggested by Goldkuhl & Röstlinger (2003). The purpose was to suggest relationships among the themes and to determine whether some themes could be considered symptoms of underlying causes. Finally, to highlight the contribution of the model, we compared and positioned it to prior knowledge presented in the literature review.

Description of the Analyzed GT projects

Our empirical analysis unit comprised two GT projects. We selected two projects with different characteristics, and they contrasted each other in several aspects. Although the projects differed, the purpose of our study was not to compare them. Instead, we wanted diversity to increase the likelihood of identifying challenges and solutions across a wide range of areas. For example, the GT project A was conducted as a PhD project involving a single researcher. GT project B constituted a research project staffed by several researchers with varying GT experiences. The projects were chosen for their size, complexity, manning, researchers' prior GT knowledge, and availability, which provided good opportunities to identify both challenges and solutions. Below, the GT projects are described with respect to purpose, duration, participants, data collection, data analysis, and knowledge contributions.

GT Project A

The first analyzed GT project was a PhD study that examined the diffusion of software process models in academia and practice (Williamsson, 2023) In software development, selecting appropriate models is critical to project success. It helps meet timelines, budgets, and quality standards. Moreover, as IT-system development becomes more complex and collaborative, selecting the best approach becomes increasingly challenging. A persistent problem is that academia continues to produce new software development models that are rarely adopted in practice (ibid.) Although academic research is expected to generate useful knowledge, many of the models developed in research settings never make their way into real-world software projects.

Previous academic research on models has primarily focused on improving existing models and on developing and testing new models in laboratory settings (ibid.). When practitioners seek to adopt new models, they look to practice. The phenomenon indicates that models are disseminated differently in academia and practice, influenced by factors such as practical relevance, the origins of model development, the criteria for selecting models for research, the methods used for testing and validation, and the processes for model improvement. Investigating how and why software process models diffuse, or fail to diffuse, across these two domains is important because it can provide a more robust foundation for future research and for developing models that are genuinely useful in practice.

The project lasted for eight years, indicating that the entire study was conducted by a single PhD student with no prior experience with grounded theory methodology before initiating the project. The PhD student independently developed the research idea, collected the data, and analyzed the data. Moreover, the supervisory group lacked experience with GT. The PhD student completed a course in grounded theory, which primarily focused on learning through discussions and hearing about others' experiences.

The study comprised three sets of data collection. The first data collection included 16 interviews with project managers from software development companies and academics involved in developing such models. The second data collection involved a focus group consisting of two academics and two practitioners. The third data collection was conducted within a software development quadruple helix project and involved 11 participants, all of whom were interviewed individually. In total, 27 individual interviews were conducted, along with one focus group.

Moreover, the data analysis was highly interpretative (Walsham, 1995), applied rigid and pragmatic types of questions suggested by Corbin and Strauss (2008), adopted the coding paradigm from Strauss and Corbin (1990), and used the seven theory components suggested by Gregor (2006).

The project resulted in three key insights for practical application: the existence of multiple patterns of model diffusion, the influence of dynamic context, and the importance of research relevance. Moreover, a substantive theory was developed to explain the multifaceted, nonlinear, and unpredictable patterns of model diffusion. These patterns arise because stakeholders are simultaneously exposed to multiple models, conditions, requirements, and experiences when deciding on model adoption.

GT Project B

The second case was conducted as a design science project (e.g., Hevner et al., 2004) and guided by the method Action Design Research (ADR) (Sein et al., 2011). ADR consists of four stages:

1) Problem Formulation
2) Building, Intervention and Evaluation
3) Reflection and Learning
4) Formalizing of Learning

The aim of project B was to enhance companies' skills regarding service innovation and data-driven analytics (Göbel, 2019). The project sought appropriate digital tools to improve their innovation skills but found nothing useful. Hence, the project decided to develop a digital tool to support them in improving their services and data analytics.

The development of the digital tool relied heavily on theories such as: service-dominant logic, resource-based theory (Conner et al., 1991), Service-Dominant Logic (Vargo & Lusch, 2004), Co-design (Umapathy, 2007), and Capability Maturity Model Integration (CMMI Product Team, 2002). Moreover, the project developed general design principles prescribing how digital tools of this type could be constructed.

The project was conducted over a period of three years and involved four researchers and nine organizations. The organizations belonged to multiple sectors, varied in size (small, medium, and large), and were classified as service providers or customers in the private or public sector. The sectors represented were automotive, telecommunications, and IT. The roles of the participating practitioners were as follows: IT Quality Manager, Head of Architecture and Solutions, IT consultants, Manager of Consumer Services, Business Manager, CEOs, IT Process Framework Manager, Software Developers, and Manager of Consumer Sales. The researchers comprised two professors and two PhD students in the field of IS. One of the professors was highly experienced in GT, one was moderately experienced, and the two PhD students were novices.

The digital tool was iteratively developed by collecting feedback from all nine companies. The project conducted 30 interviews and three workshops. The data were analyzed by using open, axial, and selective coding (Strauss & Corbin, 1990). The project resulted in a digital tool supporting service innovation and data-driven analytics. Moreover, the project developed general design principles to guide the development of future instances of this kind of tool.

Analysis of the GT projects

As noted in Section 1, we have applied content analysis to identify GT challenges and solutions, and our analysis of the GT projects focused particularly on challenges that had not previously been fully addressed. Below, we present eight themes identified in the GT projects. The identified themes are structured according to the three phases: open, axial and selective coding (Strauss & Corbin, 1990). Each theme involves descriptions of challenges and solutions identified in GT projects.

Open coding

Theme 1: Navigating large volumes of collected data

Both projects A and B collected substantial amounts of data through interviews and focus groups, and workshops. Initially, the projects struggled with how to approach the data, which strategies to apply, and where to start the analysis. The reason was that there were simply too many details, making it difficult to see the big picture. In order to make sense of the data, project A initially searched for additional details, which resulted in an overwhelming volume of data, creating cognitive load that needed to be managed.

To address this challenge, both projects employed reading techniques from applied linguistics, such as skimming and scanning (Mariam, 2016). The idea of skimming is to identify the general idea or big picture, while scanning is to find specific information or details. The project alternated continuously between these two techniques, resulting in a reciprocal movement. The result of applying the skimming technique informed where to look for details. At the same time, the results of the scanning technique contributed to the overall picture. This mechanism is similar to the hermeneutic circle, which emphasizes that learning occurs through movements between the whole and its parts (e.g., Gadamer, 2013).

We also found that a decision process was involved. In qualitative studies, researchers often collect substantial amounts of data, some of which may not be relevant to the purpose of the study. This meant that the project members had to decide what mattered and what did not. As a result, much data had to be ignored, which was uncomfortable for the researchers, who viewed it as a form of discarding valuable data. However, disregarding irrelevant data was necessary in order to see the big picture.

Theme 2: Transitioning from specific details to abstract concepts

Abstraction and interpretation are core to the analytic process (Lindgren et al., 2020). The move from specific observations to abstract concepts is a fundamental cognitive process (Diamond, 2013) that requires training (Lake et al., 2017). One purpose is to identify patterns in empirical data and develop broader conceptual concepts or theories. This move can be challenging, especially for novice GT users, who often require demanding skills.

Both projects involved novice GT researchers who sometimes struggled to create abstract categories. Another observation was that some categories were presented at an overly high level, indicating overgeneralization. That is, finding a generalization level that corresponds to the data can be challenging. One reason for this challenge is that it is metacognitive, meaning that you are not only analyzing your data but also reviewing your reasoning. GT provides excellent support on how to analyze data, but not on how to reflect on or analyze your previous reasoning.

The projects used analytical questions to support the move between specific observations and abstract concepts. The move from the specific to the abstract was supported by asking the questions, "What is this about?" or "What is this and an example of?" The answers to these questions unequivocally are more abstract concepts. Similarly, the projects asked, "What examples exist for this concept?" to move from the abstract to the specific. In addition, project A followed the advice to allow categories to emerge from the data, often summarized as letting the data speak (Glaser & Strauss, 1967) and to remain attuned to what the data suggest (Charmaz, 2014). These analytical questions and advice helped the projects move between different abstraction levels in both top-down and bottom-up ways. Moreover, we found that abstraction involves inhibiting irrelevant details that could impede abstraction, shifting between perspectives to identify alternative possibilities for abstraction, and the ability to cognitively elaborate on several instances simultaneously. Regarding the lack of method support for reflecting on your previous reasoning, project A actively a) engaged GT experts as speaking partners, and b) made different analytical steps transparent, including arguments for subjective interpretations. Exposing underlying thoughts, assumptions, and decisions increased the possibilities of providing constructive criticism. This exposure of the researcher's own underlying thoughts and assumptions caused some discomfort and a sense of vulnerability.

Theme 3: Interpreting qualitative data

The GT researcher is encouraged to make sense of data to generate meaningful insights. This process involves interpretation (Patton, 2002). Interpretation means understanding and explaining something. It is a concept closely related to hermeneutics, which is defined as the art of understanding and of making oneself understood (Zimmermann, 2015). Moreover, qualitative interviews are inherently subjective, meaning that both interviewers and interviewees bring prior experiences, assumptions, and expectations that affect responses and interpretations.

To further learn the art of interpretation, project B consulted Ödman (1979), who discusses two strategies: uncovering interpretation and assigning interpretation (our translations from Swedish). Uncovering interpretation means to:

a) bring forth the meaning that is already present in the material
b) hold back your own assumptions, so as not add meaning that is not actually in the material
c) remain as descriptive as possible
d) reconstruct the interviewee's original intentions or underlying structures

Assigning interpretation means to:

a) add meaning based on the interviewer's pre-understanding, and existing theories or perspectives
b) make interpretations beyond what is explicitly given
c) make abstractions of statements

The project found these two strategies to be complementary, which is also acknowledged by Ödman (1979). He states that the strategy for assigning interpretation should be based on the strategy for uncovering interpretation. In addition, the projects acknowledged that qualitative research is inherently subjective because it depends on human interpretation. Hence, the result of the qualitative analysis could be seen as a function of the researcher's analytical skill and biases, and, of course, the quality of the data.

Furthermore, Walsham (1995) states that, in interpretive approaches such as Grounded Theory, the analyst makes various decisions about how to comprehend the data, thereby risking biased interpretations. We identified that one project used researcher triangulation to reduce potential bias in data interpretation by involving two researchers in developing abstract categories. The two researchers analyzed the collected data independently and subsequently compared and reconciled their results.

Axial coding

Theme 4: Relating categories to construct logical theoretical explanations

Relating categories to one another is essential to theory building, as theory is defined as the sum of all categories and their relationships (Strauss & Corbin, 1990). The purpose is to create a logical structure that provides understanding, meaning and explanation. This is usually conducted by creating superior categories by relating sub-categories to each other, and also to relate superior categories to one and another. We identified that several difficulties were associated with this challenge.

One significant difficulty both projects faced was organizing the categories into meaningful and logically coherent structures. This meant determining how categories were connected through conditions such as contextual influences, interventions, participant actions, and the consequences of those actions. Creating these relationships required substantial interpretations and theoretical sensitivity. Another difficulty was avoiding overinterpretation or forming too superficial relationships. That is, analytical precision was desirable in both projects, but sometimes difficult to achieve. Moreover, a third difficulty was that too much focus on literature can lead to theoretical contamination. A fourth difficulty was handling ambiguity and overlap between categories, which led to some redundancy.

To address these difficulties, project B used meta-categories as recommended by Strauss & Corbin (1990). These meta-categories are conditions, actions/interactions, and consequences. A condition describes the specific circumstances for an action or interaction, and it answers the questions of why, what, and when. An action/interaction is carried out under specific conditions and answers the questions of how and who. A consequence is a result that depends on specific conditions and actions and answers the questions of what the action has led to or what happens if the action is carried out. This meant that each identified category was classified into one of the meta-categories, thereby enabling the project to relate categories to one another. To address the ambiguity and overlap among categories, the project returned to the collected data to compare overlapping categories in greater detail. The project followed the recommendations of Strauss & Corbin (1990) and asked the following question: In what ways is this data instance similar to or different from data instances in other categories?

Theme 5: Determining when categories are sufficiently related

The phase axial coding does not define a strict endpoint. Hence, novice users may struggle to determine when to move on to focus on theory generation. We found that the projects analyzed had difficulty determining when categories were sufficiently developed and when logical relationships rendered further data collection redundant.

To address this challenge, the projects were inspired by two concepts: theoretical sampling and theoretical saturation. Theoretical sampling is a technique for data collection (Glaser & Strauss, 1967) that aims to refine underdeveloped categories. That is, the emerging theory guides the researcher in deciding what data to collect next and where to find them. Theoretical saturation is the point at which data collection stops (Urquhart & Fernández, 2013), meaning that new data collection adds nothing substantive. Similarly, Gummesson (1993) states that data collection stops when marginal utility is low, indicating theoretical saturation. By using these two concepts, the projects were more confident that the emerging theory was sufficiently stable and that additional data collection would not yield new conceptual insights. This meant that the use of these two concepts justified ending axial coding without concern that important data had been overlooked.

Selective coding

Theme 6: Finding an appropriate generalization level

As mentioned above, Strauss & Corbin (1990) define theory as the sum of all categories and their relationships. Moreover, a theory should be generalizable, extending beyond the specific setting in which it was evaluated (Lee et al., 2011). One challenge identified in both projects was the different interpretations of the concept of theory. Some researchers viewed the concept as grand theories, which are often highly abstract and comprehensive frameworks that typically aim to explain universal aspects of social life or human behavior. Other researchers in the projects defined theory more pragmatically and valid for a specific context. We found that one reason for the ambiguity is that GT rigorously discusses theory development, which many beginners interpret as requiring the production of large-scale theories that explain an entire domain. In fact, most GT researchers develop substantive theories that usually concern context-specific and process-oriented theories rather than broad universal theories (Charmaz, 2014).

To develop theories valid for a specific domain, the projects were guided by the concepts of context and boundary conditions. Project A was also inspired by Gregor's (2006) taxonomy of theories, which served as a guiding structure for the formulation and organization of the emerging theory. Context is defined as the empirical, structural, interactional, temporal, and interpretive conditions that influence the emergence, development, and variation of a phenomenon (Strauss & Corbin, 1990; Charmaz, 2014). Moreover, context is a critical concept in GT because it not only describes the background of the phenomenon under study. It is also an analytic condition essential for understanding conditions, actions, and consequences.

Boundary conditions are the contextual factors that constrain a theory's generalizability (Seidel & Watson, 2020). Moreover, boundary conditions typically pertain not to a single situation but to a set of situations that share the same boundary conditions. We found that applying these two concepts helped the projects avoid treating theory generation as a panacea and instead view it as knowledge that may be valid beyond the studied case. Moreover, the projects continually re-evaluated the boundary conditions as the theory evolved. These two concepts also inspired the projects to identify additional specific contexts in which the developed theory could be applied. One crucial criterion for including other contexts within the boundary conditions was that they should share comparable characteristics (Wieringa, 2014).

General

Theme 7: Coaching and guiding single GT researchers

In project A, the analysis was conducted by a PhD student as a single researcher. Working alone in GT is not unusual, and many studies have been conducted by a single person. However, it introduces several methodological difficulties. One such difficulty in project A was the limited conditions for an analytic dialogue with co-researchers. For example, the researcher lacked a speaking partner to discuss interpretations, category development, assumptions, and emerging relationships among categories. The absence of a speaking partner sometimes resulted in underdeveloped categories that were accepted too quickly. Moreover, being a lone researcher meant that additional perspectives were missing. A third difficulty was the increased risk of biased interpretation, which could have been reduced through researcher triangulation (see above). A fourth difficulty consisted of becoming overly close to the study domain. In the project, it was sometimes difficult to maintain a critical stance toward the emerging theory because multiple researchers can provide a distance and additional perspectives. Undoubtedly, all these challenges prolonged the study.

In order to address these difficulties, the researcher took several measures, such as:

a) articulating thoughts into written words in order to make oneself criticizable
b) analyzing and exposing underlying perspectives
c) learning about well-known GT challenges by reading the literature
d) participating in GT conferences
e) joining GT communities, and asking colleagues and external GT experts for help

Theme 8: Choosing an appropriate GT approach

Project A mainly followed Classic GT (Glaser & Strauss, 1967). The reason was that the project sought a discovery-oriented approach to allow theory to emerge directly from data. However, the project realized during the development of categories that a more systematic support was needed to relate categories to each other. Hence, the project used the coding paradigm suggested by Strauss and Corbin (1990) as a complement. In project B, the Straussian GT approach was chosen because it:

a) was established within the research group
b) offered a systematic approach to construct theories
c) allowed for a combined inductive and deductive approach

In project B, the pre-knowledge of different GT approaches was higher than in project A. This means there was an active choice of a GT approach in project B. Our analysis of project B also revealed that the research purpose played a role in the selection of a GT approach. As mentioned in section 4.2, they wanted to develop a digital tool to support the organizations in improving their services and data analytics. This means there was a need to justify and explain how the tool could support the companies. Thus, the coding paradigm consisting of conditions, actions, and consequences, as suggested by Strauss and Corbin (1990), was identified as appropriate because the result is a type of explanatory theory. Moreover, the concept of context was identified as crucial because it was essential that the digital tool fitted the organizations specific conditions and challenges.

MAPS – a coherent model integrating the themes

To integrate the themes, we created a model Methodological Assistance through Paired Solution (MAPS), which reflects the grounded themes and problem-solution pairs, and its relationship to GT. MAPS encompasses two overarching dimensions: horizontal and vertical. The horizontal dimension represents "problem-solution pairing" (e.g., Dorst & Cross, 2001; Von Hippel & Von Krogh, 2016), meaning we explicitly linked specific challenges to specific solutions for each theme. These links represent logical relationships that describe how challenges could be addressed.

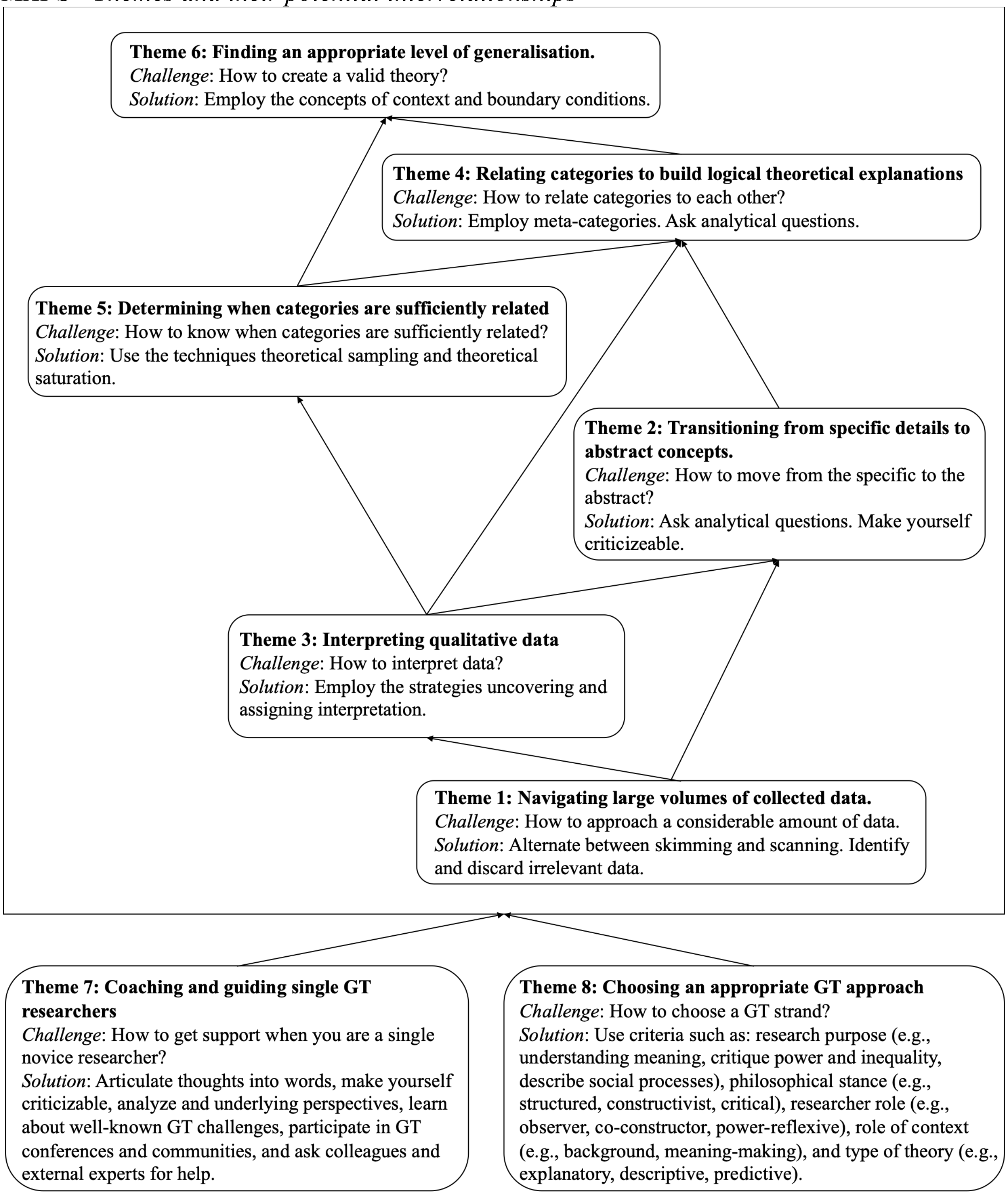
However, these links only describe relationships between challenges and solutions, not between themes. In order to create a coherent model that also accounts for relationships between the themes, we added a vertical dimension using Problem diagrams (Goldkuhl & Röstlinger, 2003). In other words, relationships are expressed as cause-and-effect across the themes (see Figure 1). These relationships should not be regarded as definitive explanatory statements in the sense that "If A exists, then B is always true". Rather, they should be interpreted as: "If A exists, then B is plausible". That is, there is a clear possibility that effect B will arise. The identified relationships align with those identified in the analysis of the GT projects. As depicted in Figure 1, the themes explicitly contain pairs of challenges and solutions and show how they are related.

At the bottom of the figure, we positioned "Theme 7: Coaching and guiding single GT researchers" and "Theme 8: Choosing a GT approach", which are regarded as the root causes because they affect all the other themes. It does not mean that the other themes are less important. On the contrary, challenges and solutions in these other themes need to be fully considered. Next, "Theme 1: Navigating large volumes of collected data" can negatively affect "Theme 3: Interpreting qualitative data" because when datasets are large or heterogeneous, researchers experience cognitive overload, which can slow interpretation and reduce confidence. "Theme 1: Navigating large volumes of collected data" also influences "Theme 2: Transitioning from specifics to abstract concepts" because if interpretation is uncertain, researchers struggle to elevate the data to conceptual levels.

Discussion

The goal of the study was to identify factors associated with breast and cervical cancer screenings in SGD populations. Overall, results from our thematic analysis showed variables that have consistently been associated with screening behaviors across populations, such as knowledge, perceived risk, and structural barriers (insurance, healthcare access). However, sexual and gender-identity related stressors (trauma, identity concealment, heteronormativity in healthcare practices) emerged as a factor impacting cancer screenings that were unique to this population. While each of these stressors has been viewed separately as a barrier to cancer screenings, we conceptualize these psychosocial factors as part of a larger construct that is inherently tied to the SGD-identity. This conceptualization is aligned with the minority stress model (Meyer, 1995), which posits that minorities experience unique stress as a direct result of their identity.

Figure 1
MAPS - Themes and their potential interrelationships



Moreover, “Theme 3: Interpreting qualitative data” affects the themes “Theme 2: Transitioning from specific details to abstract concepts”, “Theme 4: Relating categories to construct logical theoretical explanations”, and “Theme 5: Determining when categories are sufficiently related” because if the researcher has weak or ambiguous interpretations, the continuous coding will probably lead to unclarity about abstractions, logical explanations difficulty in deciding about saturation or sufficiency. In addition, “Theme 5: Determining when categories are sufficiently related” will also impact “Theme 4: Relating categories to construct logical theoretical explanations” since underdeveloped axial coding will reduce the quality of logical explanations. Finally, Theme 4: Relating categories to construct logical theoretical explanations” and Theme 5: Determining when categories are sufficiently related” influence “Theme 6: Finding an appropriate generalization level” because ambiguous interpretations easily result in under- or over-generalizing.

Theoretical Grounding

Theoretical grounding involves relating and comparing the knowledge contribution to existing knowledge (Goldkuhl, 2004). We followed these recommendations to strengthen MAPS’s credibility and legitimacy. This meant that MAPS was compared and positioned against the conceptual statements of challenges and solutions presented in Section 2.

One related article is presented by Seidel and Urquhart (2013). As mentioned in Section 2, the authors propose five explicit guidelines for the GT phase, Axial Coding, which are: flexible use of axial coding, a rationale for adaptations, awareness of ‘forcing’ issues, theoretical sensitivity towards causality, and contextualization. We find these guidelines very helpful. However, they are limited because they guide researchers only through the phase Axial Coding phase, which corresponds to our step “relating categories”. In addition, the guidelines are described at a macro level, whereas our themes are presented at a micro level. Hence, we state that our model complements the guidelines presented by Seidel and Urquhart (2013).

Another relevant article published by Charmaz (2012) states that GT “Gives you tools to answer “why” questions from an interpretive stance. By interrogating our data - and emerging ideas - with analytic questions throughout the research, we can raise the level of conceptualization of these data and increase the theoretical reach of our analyses.” (p. 4). Based on this statement, several subsequent questions are suggested: “What is this data a study of?”, “What do the data suggest? Pronounce? Assume”, “From whose point of view?”, “What theoretical category does this datum indicate?”, and, “When, how, and with what consequences” are participants acting?”. These questions are clearly analytical rather than descriptive, which can help GT researchers to make significant interpretations. We find these interrogative questions very helpful in interpreting data. Theme 2 in MAPS, “Transitioning from specific details to abstract concepts”, also involves suggestions for analytical questions. However, the purpose of theme 2 is to explicitly support a move between specific observations and abstract concepts by asking questions such as: “What is this about?”, “What is this an example of?”, and “What examples exist for this concept?” These questions prompt movements between different levels of abstraction. Hence, MAPS advances prior knowledge about guiding questions.

Moreover, another related article discusses the challenges posed by a lack of mentoring (Pergert, 2009). This challenge resembles MAPS theme 7, “Coaching and guiding single GT researchers”. A situation in which no expert is present to teach and guide GT is known as minus mentoring (Glaser, 1998). The purpose of the article published by Pergert (2009) is to share experiences of learning GT. Pergert (2009) emphasizes that the lack of adequate mentoring can lead novice researchers to struggle to determine appropriate data-collection tools, identify when saturation is reached, and understand the conceptual language. Pergert (2009) has identified several important challenges in the absence of mentoring. We argue that MAPS explicitly complements Pergert (2009) by addressing these challenges and adding a few solutions.

Finally, Timonen et al. (2018) present four core principles that should be applicable for different GT approaches: taking the word "grounded" seriously, capturing and explaining context-related processes and phenomena, pursuing theory through engagement with data, and pursuing theory through theoretical sampling. We find these core principles very interesting and an important contribution to GT knowledge. Unquestionably, there are overlapping concepts with MAPS such as: context, theoretical sampling, and pursuing theory. However, one difference is that MAPS relates specific challenges to specific solutions. Another difference is that MAPS is grounded in both theory and empirical evidence, whereas the principles presented by Timonen et al. (2018) are merely based on a theoretical analysis of different GT approaches.

To summarize, the primary contribution of MAPS lies in its scope, level of detail, and purpose. Seidel and Urquhart (2013) focus exclusively on the Axial Coding phase and offer macro-level guidelines, whereas MAPS provides detailed, micro-level support across all three GT phases. Charmaz (2012) presents broad analytic questions to foster interpretive thinking, but MAPS differs by offering explicit, structured questions designed to help researchers systematically move from concrete data to abstract concepts. Pergert (2009) emphasizes the challenges of learning GT without mentorship, whereas MAPS not only recognizes these issues but also provides practical solutions. Moreover, Timonen et al. (2018) articulate high-level theoretical principles applicable across GT approaches, derived from analyses of existing publications, whereas MAPS is based on combined empirical and theoretical grounding and offers more operational, theme-based guidance. Overall, the key distinction is that MAPS is more detailed and solution-oriented than the prior works.

Discussion and Conclusion

This study addresses a gap in the GT literature regarding the pairing of concrete challenges and solutions. Many scholars have thoroughly described the challenges faced by GT users. However, far fewer have offered concrete and practice-oriented solutions. By analyzing two empirical GT projects, we identified eight interrelated themes that capture both the practical challenges GT researchers encounter and the solutions that can effectively mitigate them. These themes are integrated into a coherent model, MAPS, which provides a structured, micro-level set of problem–solution pairings spanning all three phases of open, axial, and selective coding.

We argue that the MAPS model advances prior knowledge in several important ways. First, it offers detailed and actionable themes for addressing methodological challenges, such as navigating large volumes of collected data, transitioning from specific details to abstract concepts, interpreting qualitative data, relating categories to construct logical theoretical explanations, determining when categories are sufficiently related, and finding an appropriate generalization level. Second, it highlights the foundational role of coaching and guiding single GT researchers, demonstrating how limited support for novice researchers can cascade into challenges throughout the analytic process.

This study demonstrated that many of the challenges associated with GT are cognitive and interpretive. Hence, we state that novice GT users could benefit from our findings. The solutions identified serve not as prescriptive rules but as actionable guidance that can be adapted to the specific context, variant, and purpose of a GT study. Our theoretical contribution consists of a model that pairs problems and solutions and integrates themes into a coherent, logical whole. This model provides insights into how GT can be taught, learned, and applied more effectively. Our contribution to practice, in this case consisting of GT projects, is a transparent account of the methodological difficulties encountered in two empirical GT projects and the concrete actions taken to resolve them. We hope that MAPS will inspire future work to refine, extend, and empirically validate the model in additional contexts and GT approaches. For example, future work will create opportunities to reflect on MAPS in order to make appropriate adjustments.

Declarations

Author Contributions

Both authors contributed to the data collection for this study. Stefan Cronholm took a leading role in research design and analysis of the study. Ia Williamsson substantially contributed to revising and reframing of the manuscript. Both authors reviewed and approved the final version of the manuscript.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Institutional Review Board Statement

An institutional review board statement is not necessary because the data does not disclose any sensitive information about employees. All data collection and analysis are based on the two authors' participation in the two analyzed projects. The involved companies are anonymized.

Informed Consent form

The study collected data from project documentation (e.g., notes, meeting protocols, video recordings) and project results (e.g., scientific publications, reports). No interviews with employees were conducted. These documents and project results were produced by the authors of this paper.

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Notes on Contributors

Stefan Cronholm is a professor in Information Systems (informatics) at the University of Borås, Sweden. He specializes in AI and management, design science research, digital workplaces, design and evaluation of information systems, requirement specification, information systems development methods, digitalization of retail, IT Service Management, qualitative research approaches, and lifelong learning. He has published more than 150 scientific papers. He is the head of the Research Group InnovationLab. Besides doing research, Stefan Cronholm is engaged in research and undergraduate education programs as a supervisor and lecturer. He has supervised more than 200 master's and bachelor's theses and developed a vast range of pedagogical material.

Ia Williamsson is a senior lecturer at the University of Borås whose research focuses on information systems, digital innovation, artificial intelligence, digital inclusion, and the diffusion of digital innovations. Her work examines how digitalization-related innovations, such as models, methods, and systems, are disseminated, adopted, and institutionalized within organizations and society. She has a particular interest in Grounded Theory Methodology (GTM), which informs both her research and teaching. Ia is a member of the InnovationLab research group within the Business and IT research area and serves as Programme Director for the Bachelor's Programme in IT and Business Informatics.

ORCID

Stefan Cronholm, https://orcid.org/0000-0002-1452-4206
Ia Williamsson, https://orcid.org/0000-0002-9814-3311