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The Interplay Between Structural and Cultural Barriers to Knowledge Sharing in Project-Based Organizations

A Single Case Study from the Norwegian Construction Industry

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Julie Sjølie Baastad

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Executive Summary

The learning paradox, that is frequently associated with project-based organizations, is commonly linked to both structural and cultural barriers to knowledge sharing. While a significant amount of research has been conducted on organizational structure, learning culture, and their independent effects on knowledge sharing, relatively few studies have explored their mutual effects on knowledge sharing. This is despite research indicating that the two are highly interconnected. The aim of this research is, therefore, to investigate *how the interplay between organizational structure and learning culture affects knowledge sharing in project-based organizations*.

The research is conducted using a single case study of the Norwegian construction company Backe. We focus on the sharing of BREEAM-NOR related knowledge, a knowledge domain that currently holds few formal rules governing its sharing within the organization. We, therefore, argue that this focus will allow us to gain an understanding of how organizational structure and learning culture impact the sharing of this specific type of knowledge.

To investigate the research question, we conducted a total of 14 semistructured interviews with employees responsible for BREEAM-NOR and with headquarter employees. The results confirm the existence of eight structural and cultural barriers to the sharing of knowledge. Furthermore, we find that while these barriers have independent effects on knowledge sharing, they also have interrelated effects that result in self-reinforcing cycles.

Our research contributes to the current gap in existing literature on project-based organizations and knowledge sharing. Additionally, it offers implications for practice in pointing to the necessity of taking a holistic approach to knowledge management.

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Chapter 1: Introduction

A significant amount of research on project-based organizations (PBOs) has concentrated on the inherent "learning paradox" (p. 494) that exists in this type of organization (Bakker et al., 2011). A PBO is one that conducts the majority of its production, innovation and competition through projects (Hobday, 2000). The projects are organized as temporary autonomous organizational units intended to solve complex problems through the coordination of diverse knowledge resources (Bartsch et al., 2013; Prencipe & Tell, 2001; Sydow et al., 2004). This characteristic of projects as problem-solvers facilitates learning within the projects, which can be utilized in similar or even more complex projects in the future (Brady & Davies, 2004; DeFillippi, 2001). Therefore, the PBOs can develop their project capabilities, the knowledge and experience that allows them to create value in projects in the first place, through the execution of the projects themselves (Brady & Davies, 2004). The paradox, however, is that despite projects being well regarded to provide valuable learning, it is proven difficult for PBOs to achieve effective knowledge sharing processes needed to aggregate, retain and dissimilate the lessons from and between projects (Bakker et al., 2011; Bartsch et al., 2013; Pemsel et al., 2016; Pemsel & Wiewiora, 2013). Given the transient nature of projects, the absence of effective knowledge sharing hinders organizational learning, as the acquired knowledge and experiences are at risk of being lost once the project concludes, and its members move on to new initiatives (Bakker et al., 2011). As a result, the productivity of the organization is hampered due to projects frequently repeating the same mistakes and reinventing the wheel, which could have been avoided had knowledge from previous projects been reused (Pemsel & Wiewiora, 2013).

Literature typically attributes the difficulties of obtaining successful knowledge sharing in PBOs to both structural and cultural factors that prevail in this type of organization. The high degree of autonomy at the project level, coupled with the frequent distribution of projects along various subsidiaries and geographical locations, results in a high degree of fragmentation (Bresnen et al., 2005; Dubois & Gadde, 2002b; Lindkvist, 2004). This fragmentation, given that social ties between colleagues is found to be an important driver for both the opportunity and motivation to learn, serves as a barrier to knowledge sharing (Bartsch et al., 2013). In addition, the temporality and strong emphasis on the

uniqueness of projects often results in learning cultures that hinder knowledge sharing. Project teams often work on tight schedules to complete projects and are frequently distributed on new projects immediately after completing a project. This leaves limited time and motivation to document lessons learnt, which results in a culture that deemphasizes the value of knowledge sharing (Brady & Davies, 2004; Grabher, 2004). Furthermore, the perceived uniqueness of projects creates a mindset that deemphasizes the value of reusing knowledge (Brady & Davies, 2004).

Therefore, for organizations to overcome these barriers and achieve effective knowledge sharing, they likely need to make modifications to existing impeding structures and cultural assumptions. However, making such modifications is complicated by the fact that organizational structure and culture are found to be highly interconnected, such that alterations to one can result in unintended modifications to the other (Zheng et al., 2010). While there is a growing body of literature on organizational structure, learning culture, and their independent effects on knowledge sharing, we find few studies to have examined their mutual effect on knowledge sharing. In order to comprehend how organizations can take a holistic approach to overcoming structural and cultural barriers to knowledge sharing in PBOs, a deeper understanding of this mutual relationship is therefore necessary.

1.1 Research Question

Based on the identified gap in literature on the mutual relationship of organizational structure and learning culture on knowledge sharing we present the following research question:

> *How does the interplay between organizational structure and learning culture affect knowledge sharing in project-based organizations?*

To answer this research question, we will perform a single-case study of the traditional project-based organization Backe, a Norwegian construction company. In order to conduct our study within the timeframe of a master thesis, we have chosen to focus the research on a specific type of knowledge: BREEAM-NOR, the environmental certification standard in the Norwegian construction industry. Given that this can be defined as a distinct knowledge domain within the organization, such a focus will allow us to trace the instances of knowledge sharing more easily

within the organization. To understand the interplay between organizational structure and learning culture on knowledge sharing, we will first investigate the impact of structure and learning culture independently. Once this understanding is established, we will seek to understand how the interplay between the two mutually affect knowledge sharing of the identified knowledge domain on the company's available knowledge sharing arenas.

1.2 Structure of the Thesis

The thesis consists of a total of six chapters. Chapter 1, introduction, introduces the subject matter and the motivation for conducting the study, in addition to presenting the research question and the empirical setting. Chapter 2, literature review, presents an overview of the current body of research on the two most relevant themes, how organizational structure and culture relates to knowledge sharing. Chapter 3, methodology, describes the methods used to conduct the research. This chapter includes an overview of the research design, data collection and analysis strategy, along with a discussion of relevant ethical considerations and limitations. Chapter 4, empirical findings and analysis, presents the findings along with an analysis of how the interplay between structure and culture affects knowledge sharing in Backe. Chapter 5, discussion, discusses our findings in light of relevant literature. Lastly, chapter 6 concludes the thesis with theoretical and practical implications, limitations, and suggestions for future study.

Chapter 2: Literature Review

The purpose of this chapter is to review the academic literature on organizational structure and culture as they relate to knowledge sharing, the two most relevant domains of this study. The aim is to provide the reader insight into the current state of the relevant academic discourse. First, we provide an overview of the academic body of research on how organizational structure affects knowledge sharing. Secondly, we present a narrative of the academic discourse on organizational culture, before diving into the learning culture and the cultural barriers to knowledge sharing.

2.1 The Organizational Structure

According to Mintzberg (1979), "the structure of an organization can be defined simply as the sum total of the ways in which it divides its labor into distinct tasks and then achieves coordination among them" (p. 2). In the decades following the conception of this definition, it has become widely accepted that knowledge is among a company's most valuable sources of competitive advantage (Grant, 1996). The role of the firm, therefore, according to Grant (1996) is to integrate and coordinate knowledge. In order to achieve this, the choice of organizational structure, according to Claver-Cortés, Zaragoza-Sáez and Pertusa-Ortega (2007) is of vital importance, given that organizational structure determines the extent to which knowledge circulates within an organization. Recent research on the relationship between organizational structure and knowledge sharing is limited, despite the fact that the significance of knowledge and its effective management has not diminished over time. Consequently, the majority of identified literature is limited to the decade following the turn of the century.

Formalization, centralization, and integration are typically categorized as the three organizational structure elements. Formalization refers to the degree of standardization and the use of rules and procedures within an organization to direct employees in their work (Chen & Huang, 2007). According to Moreno-Luzón and Lloria (2008), high levels of formalization can hinder knowledge creation, as employees are confined to standard ways of performing tasks. Chen and Huang (2007) argue that by eliminating the possibility for employees to perform tasks in a variety of ways, one is likely to eliminate discussions between employees on alternative methods. In their study of how organizational structures facilitate social

interaction, they find low levels of formalization to be positively related to social interaction. According to research by Tsai (2002), social interaction is positively related to knowledge sharing. Building on Tsai's (2002) findings, Chen and Huang (2007) argue that formalization, by default, serves as a barrier to knowledge sharing, an assumption that was later confirmed by Lin (2008). Additionally, Michailova and Husted (2003) find that a high emphasis on rules and procedures can constrain knowledge sharing, as it results in non-innovative behavior that logically results in a negative view of mistakes and failures. However, while a high degree of formalization is widely regarded as a barrier to knowledge sharing, Ardichicili (2008) argues that it is necessary to have clear rules and procedures for knowledge sharing, as this will contribute to creating knowledge sharing behavior and remove any associated uncertainty. Similarly, Willem and Buelens (2009) argue that the discussion on formalization is a bit more nuanced, with neither the absence nor strong formalization being optimal for knowledge sharing. Therefore, they argue that the optimal level of formalization must be determined on a case-by-case basis in order to maximize knowledge sharing.

The degree to which decision-making authority is located at the highest levels of a hierarchical structure is referred to as centralization (Chen & Huang, 2007). Tsai (2002) finds that centralization hinders knowledge sharing between units in an organization when the units offer similar products and services. This is due to the centralization of decision-making creating resource-based competition between the units. In the same vein, Gold, Malhotra, and Segars (2001) argue that decentralized decision-making facilitates knowledge sharing by increasing the collaboration between organizational units. Which, according to Willem and Buelens (2009), is particularly evident when decentralization is coupled with horizontal integration mechanisms, such as team work. The increased collaboration as a result of decentralized decision making, according to Walter et al. (2007), can be attributed to the fact that organizational units become more interdependent and share control over outcomes. Overall, the research on the relationship between centralization and knowledge sharing, therefore, finds that centralization serves as a barrier to knowledge sharing to the extent that it hinders collaboration within an organization.

The third structural element, integration, which refers to the degree of collaboration between a company's various divisions, is crucial for achieving

knowledge sharing (Chen & Huang, 2007). According to O'Dell and Grayson (1998), organizational structures that create separate silos across various locations, divisions, and functions are major barriers to knowledge sharing. This is due to the silo mentality that often emerges with such structures, in which separate divisions consciously or unconsciously hoard information for their own benefit, without considering the overall organizational benefit of sharing information. Furthermore, they emphasize that lack of interaction across physical boundaries within an organization hinders successful sharing of knowledge, as the separate silos are unaware of the expertise and abilities that exist across the organizational network. There are, therefore, according to Lilleøre and Hansen (2011) and McLaughlin, Paton, and Macbeth (2008), both social and physical barriers to knowledge sharing within organizations. To overcome such barriers, Wang and Raymond (2010), having investigated multiple studies, argue that organizations need to create opportunities for employees to interact with one another across all types of boundaries.

2.3 Organizational Culture

Although the concept of culture has a long-standing history within the scientific fields of sociology and anthropology, it was not until the 1980's that researchers within management and strategy started paying attention to this field of research (Feldman, 1986). At that point, researchers such as Schein, Feldman, and Lorsch began developing literature on culture in organizations, and how it related to important concepts of strategy and management (Mintzberg et al., 1998; Schein, 2017). In line with the theme of the thesis, organizational culture has repeatedly been found to hinder knowledge sharing in organizations (McDermott & O'Dell, 2001; Rosen et al., 2007). This section aims to provide an overview of the academic discourse on organizational culture and how it relates to knowledge sharing. We start by defining organizational culture, with particular emphasis on Schein's (2017) three levels of organizational culture. Second, we dive deeper into the organizational culture to look specifically at the organizational learning culture. We end this section by reviewing literature on the cultural dimensions that hinder and facilitate knowledge sharing.

2.3.1 Defining Organizational Culture

Organizational culture is a concept that has drawn significant attention in the more recent decades, yet there are still discussions related to its definition (Schein, 2017). Researchers suggest that culture can be viewed in one of three ways: Integrated, differentiated, or fragmented (Cummings & Worley, 2009; Meyerson & Martin, 1987). The integrated perspective sees culture as a set of shared beliefs that bring the members of the organization together. This perspective highlights the role of leaders to be responsible for providing direction and necessary change to the organizational culture (Meyerson & Martin, 1987; Schein, 2017) These beliefs are generally assumed to be stable and coherent across the organization, in contrast to the differentiated perspective. In this view, culture is studied on a more local level, acknowledging the potential presence of stable sub-cultures. While the integrated perspective looks for uniformity and consistencies, the differentiated perspective pays attention to diversity and lack of consensus across groups (Meyerson & Martin, 1987). Lastly, the fragmented perspective disregards stability, in favor of perceiving culture as constantly changing in the face of ambiguity. This view of culture differs on all levels of the organization, and it is therefore pointless to try and make sense of an organization based on this perspective.

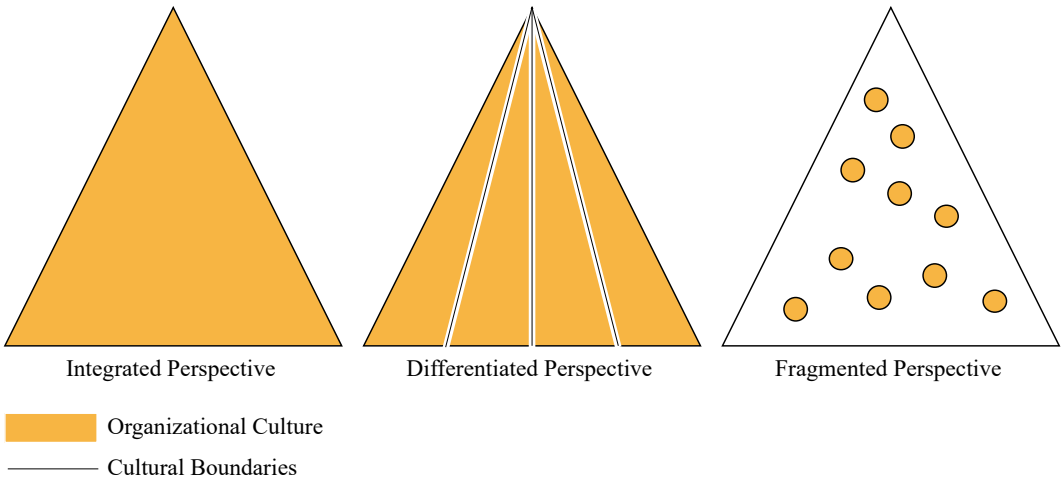

Figure 1: The three perspectives of organizational culture, adapted from Meyerson and Martin (1987)

Based on the three perspectives, Edgar Schein (2017) sought to establish a definition that could explain the concept of culture in any organization, regardless of whether it would best be explained by the integrated, differentiated, or

fragmented perspective. Resultingly, he focuses on consistent and stable shared beliefs, but disregards the level at which they are shared:

> The culture of a group can be defined as the accumulated shared learning of that group as it solves its problems of external adaptation and internal integration; which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, feel, and behave in relation to those problems. This accumulated learning is a pattern or system of beliefs, values, and behavioral norms that come to be taken for granted as basic assumptions and eventually drop out of awareness. (Schein, 2017, p. 6)

In other words, organizational culture is a set of assumptions that are widely held by the group members, which makes up the "life force of the organization, the soul of its physical body" (Mintzberg et al., 1998, p. 264).

According to Schein (2004), an organization's culture is neither inherently good, bad, nor effective, but must be evaluated in terms of its relationship to the external environment of the corporation. Culture formation is generally thought to occur through two different processes, depending on the life-cycle stage of the group. In unstructured groups, meaning newly established groups with little to no shared history, the shared basic assumptions are gradually established via spontaneous interactions (Schein, 2017). In established groups with an extensive shared history, culture can be maintained and changed through leaders imposing their own values and beliefs, which will influence the culture and become new shared assumptions, if they prove to be successful. While the integrated perspective focuses on the role of the learning leader as creator of culture or cultural change, the differentiated and fragmented perspectives proclaim that culture is influenced by sources both within and outside the organization (Meyerson & Martin, 1987).

Based on Mintzberg's (1998) view of organizational culture as the soul of an organization, it is apparent that culture infiltrates all aspects, both physical and intangible, of the organizational setting. According to Schein (2017), culture is held at three levels: Artifacts, espoused beliefs and values, and basic underlying assumptions (Figure 2). The features of an organization that are either physical or visible and/or audible behavior patterns, are known as artifacts (Gagliardi, 1990; Schein, 2017). Common artifacts that hold cultural relevance are organizational structure, physical environment, office layout and dress code, products, manuals,

and routines. One school of thought, in which Schein and Van Maanen is placed, argues that the cultural relevance of artifacts can only be explained by group informants who share a common understanding of how an artifact's cultural relevance is to be interpreted (Cunliffe, 2010; Gagliardi, 1990; Schein, 2017). Another school of thought, which Gagliardi ascribes to, states that the researcher's response to the organization's artifacts may be just as useful as informants' insights (Gagliardi, 1990; Schein, 2017). As Gagliardi (1990) puts it, the informant cannot know "something he does not know he knows" (p. 12). Schein (2017) however, argues that the researcher's own response holds value when they are familiar with the broader cultural context of the organization, yet, ambiguous artifacts can only be truly understood by evaluating the underlying assumptions and beliefs. The second layer of culture is the espoused beliefs and values that are shared within the organization. These are the adopted truths that are generally not challenged, questioned, or tested, unless environmental changes take place. If a new behavior turns out successful, then the espoused belief may be adopted by the group as the new truth. Culturally relevant examples are strategies, goals, and philosophies that guide and justify decision-making and behavior (Schein, 2017). The third, and final, level of a culture is the most abstract and intangible, thus hard to discover by the researchers, and consists of the basic underlying assumptions of how things work. These assumptions are of a basic nature, such as whether the individual is more important than the group or not, if knowledge and problem-solving occur in an individual or if it is the result of teamwork, and whether people generally act self-servingly (Schein, 2004, 2017). It is only by uncovering an organization's basic assumptions that one can truly understand the organizational culture. In short, culture consists of three parts, from the more visible, yet less important artifacts, through the espoused beliefs and values, to the final layer of basic assumptions that make up the most stable and non-confrontable core of the organizational culture.

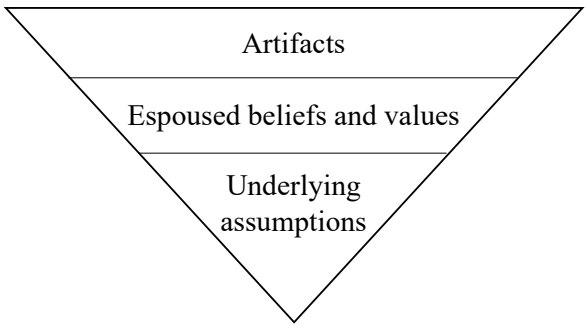

Figure 2: The three levels of organizational culture (Adapted from Schein (2017))

2.3.2 Organizational Learning Culture

As the world is changing at an ever-increasing rate, organizations are forced to constantly adapt and adopt new practices to remain competitive (Lin & Huang, 2021). In this regard, researchers speak of learning organizations that adopt an organizational learning culture that encourages the habit of learning among its employees (Watkins & O'Neil, 2013). For continuous learning to become a prominent feature of an organization's culture, certain basic assumptions should be in place. Literature on learning organizations speaks of cultures that promote experimentation, openness, and creativity, that proactively question their values and assumptions, based on a basic underlying assumption that their norms, routines, models, and theories in use, can always be improved through new discoveries (Baker & Sinkula, 1999; Cummings & Worley, 2009; Sinkula et al., 1997).

2.3.3 How Learning Culture Can Affect Knowledge Sharing

Organizations sometimes experience that they implement something that the employees express both a need for and a willingness to use, however, after implementation the rate of usage is almost zero (McDermott & O'Dell, 2001). Cultural barriers can explain this phenomenon where employees acknowledge that knowledge sharing through a digital platform is a good idea, but when push comes to shove, they are unwilling to prioritize the time to make use of it (McDermott & O'Dell, 2001; Rosen et al., 2007). Literature on learning culture points out that the stable characteristics of culture make it either a facilitator or barrier for knowledge sharing (Cummings & Worley, 2009; Schein, 2017). In other words, an organization either inhabits factors that facilitate learning and its accompanying processes, or it lacks the necessary facilitating factors to uphold continuous learning and development. In the following paragraphs, we present two sets of cultural dimensions for learning organizations, that are established by prominent researchers in this field of study, Schein, Marsick, and Watson.

In line with the learning orientation view, Schein (2017) presents ten assumptions that should underlie learning as an organizational process. First, the group members should assume that being proactive learners and problem solvers is most appropriate. Proactively engaging with the environment establishes the need for continuous learning. Second, investing in learning to master it as a separate skill should be seen as valuable. Thirdly, an important basic assumption is that humans

can evolve and learn and are not static in their level of skills and knowledge. The fourth assumption is in line with the first, as the members should hold the basic assumption that the environment can be managed, and to a certain extent controlled. This assumption is critical to motivate proactive learning. The fifth assumption that should be in place is that problem solving and the search for truth occurs through pragmatic inquiry, such that the answer never lies within any singly method or source. The sixth assumption is that the group members should sufficiently orient toward the future, by combining long-term consequences and short-term evaluation and assessment of solutions. The next assumption that members of a learning culture would hold is the belief that communication and sharing of information is critical for organizational success. This assumption is critical to establish a culture of knowledge transfer, as information should be allowed to flow uninhibited. The final three assumptions include commitment to diversity, systemic thinking (multiple causes to any effect) and cultural analysis. Based upon these ten assumptions, Schein (2004) argues that establishing and maintaining the necessary culture is the most important task held by the organization's leaders. The assumptions can either come about through unorganized discourse in unstructured groups, or by a leader imposing their personal beliefs and values (that are in line with the ten assumptions) onto an already structured group or organization.

Marsick and Watkins (2003) have also established a set of dimensions which are required to have a successful learning organization. The factors are conceptualized in their instrument, the Dimensions of the Learning Organization Questionnaire (DLOQ). The DLOQ measures the state of the organization against seven dimensions that are found through research to be central predictors of a learning organization. Contrary to Schein's ten basic assumptions, these seven dimensions are found on the two upper, more visible, layers of organizational culture, the artifacts and espoused beliefs. The first dimension Marsick and Watkins (2003) present in their instrument is that the organization continuously creates learning opportunities. This dimension investigates whether learning is made part of the employees' routines, so that they are given the time, resources, and opportunities to learn and develop on the job. The second dimension asks whether the organization promotes inquiry and dialogue. Similar to Schein's assumption of open, task-relevant dialogue, this dimension encourages questioning, experimentation and feedback through open dialogue. The third dimension asks

whether the organization encourages collaboration and team learning. Again, similar to Schein's fifth assumption that the truth does not lie within a single source, this dimension looks into the encouragement to problem-solve in groups, and whether collaboration is valued and rewarded. The fourth dimension of the DLOQ is the presence of systems to capture and share learning. Marsick and Watkins (2003) have found this dimension to be the most important predictor of a learning organization. The organization needs integrated technological platforms, whether it be low- or high-technology does not matter, where learning is created, accessed, and maintained. The fifth dimension is to establish a collective vision, where the employees are given responsibility to set goals and implement a joint vision for the organization. This way, the learning organization increases motivation and ensures collective agreement in what they are working toward. The penultimate dimension is creating ties between the organization and its environment. By helping the employees understand what role the organization plays in its environment, they are better suited to understand how their individual contribution plays into their environment. Lastly, a learning organization makes strategic use of learning for business purposes. The leaders must facilitate learning by modelling, championing, and supporting the processes, to have the employees follow suit.

Chapter 3: Methodology

In this chapter, we aim to present an in-depth description of our chosen research methodology, and a justification of the methods we have taken to answer our research question. We start by explaining our reasoning for selecting a single case qualitative study over other research methods. Secondly, we present and justify our data collection methods, before moving on to a presentation of the data analysis strategy. We end the chapter with a discussion of scientific quality, ethical considerations, and methodological limitations.

3.1 Research Design

Creswell (2009) states that a study's research design involves the intended plans and strategies that are selected to answer the research question. The decisions that must be made range from minute details regarding data collection and analysis, to broad assumptions that underlie the research. The chosen research design is also often implied by the nature of the research question being addressed (Yin, 2013). There are three types of research design: Qualitative, quantitative, and mixed methods (Creswell, 2009). While the first two are often regarded as polar opposites, with mixed methods somewhere in the middle along a continuum, Creswell (2009) argues that they are not as mutually exclusive as we are led to believe. There are, however, certain important distinctions between them. Quantitative research design is generally found in studies that aim to objectively test and examine relationships between variables. This design usually makes use of deductive theory testing, and aims for high levels of generalizability and replicability through statistical methods and rigor (Creswell, 2009; Eisenhardt et al., 2016). Moreover, the quantitative design is mostly preferred to answer research questions of "what" or "to what extent" (Yin, 2013). Qualitative design, on the other hand, aims to explore and make sense of phenomena, often related to social or human scenarios and settings. This design tends makes use of inductive theory-building, to let theory emerge from the data (Creswell, 2009; Eisenhardt et al., 2016). This design is preferred when answering research questions of "how" or "why" (Yin, 2013). Lastly, mixed methods research, as the name implies, makes use of both designs in tandem, to improve the strength of the study beyond that of either qualitative or quantitative on their own (Creswell, 2009).

To investigate how knowledge sharing is affected by the interplay between organizational structure and learning culture, we need to interact with employees to understand how they are affected by these factors. The combination of a "how"-phrased research question and the need for exploration of a phenomenon in an organizational setting calls for the use of a qualitative research design.

3.1.2 Qualitative Strategy of Inquiry

After selecting a qualitative research design, the researcher selects a strategy of inquiry, which provides direction for the researcher on the procedures that must be implemented in the research design (Creswell, 2009). Some examples of widely used qualitative strategies include ethnography, phenomenology, and case studies. Ethnography is an immersive strategy where the researchers insert themselves in a group's natural setting to explore their lived experiences over an extended period of time (Creswell, 2009; Herbert, 2000). Phenomenology is quite similar to ethnography in that it studies lived experiences, however, they differ mostly in their unit of analysis where ethnography studies the experiences of a group, and phenomenology studies individual experiences (Cilesiz, 2011; Creswell, 2009). Lastly, case study is a strategy of inquiry that is mainly used for in-depth exploration into a specific group, organization, activity etc. The focal case is usually bounded in time and scope, and data collection is therefore generally performed through various means to gain a detailed account of the case (Creswell, 2009; Eisenhardt & Graebner, 2007). Furthermore, a case study can either be made up of one single case or multiple cases. Single cases are chosen based on their ability to explore phenomena in-depth, to provide powerful accounts of the phenomenon in particularly significant scenarios (Eisenhardt & Graebner, 2007; Siggelkow, 2007). Multiple-case studies, on the other hand, provide multiple datapoints for comparison, and is therefore regarded by many as more suitable for theory-building (Eisenhardt & Graebner, 2007; Yin, 2013).

We will conduct a single case study to address our research question and to further investigate the identified phenomenon. According to Eisenhardt and Graebner (2007), a case study provides a particularly detailed empirical description of the specific occurrences of a phenomenon, as the phenomenon itself is studied in its real-life context. Thus, case studies are well-suited for addressing questions about "how" something unexplored unfolds itself in a real-world context

(Edmondson & McManus, 2007; Eisenhardt & Graebner, 2007). We have also chosen to perform the study based on a single case for two reasons. Firstly, the part-time position held by one of the researchers provides unusual research access to the corporation. Secondly, analysis of corporate culture requires in-depth analysis, and time-restraints for the master thesis does not provide sufficient time to analyze multiple cultures for comparison.

3.2 Scientific Approach

For our study, we have chosen Gioia's approach to qualitative, inductive research. The main reason for selecting this approach is the method's departure from theoretical constructs, toward a focus on less theoretically established concepts, to explain phenomena of interest (Gioia et al., 2013). In our effort to study how the interplay between culture and structure affects knowledge sharing, the Gioia method allows us to identify emerging concepts in dialogue with the employees, explore themes and the overarching dimensions of those themes, and also account for their "dynamic interrelationships" (Gioia et al., 2013, p. 22).

Gioia's inductive approach seeks to provide meaning and insights on two levels: Firstly, for the people in which the study is about, those living in the phenomenon of interest, and secondly, on a scientific level that allows for theorizing (Gioia et al., 2013). It does so by implementing a holistic approach to research methodology, which affects every stage of the research process from the development of a research question to the structure of discussion and conclusion. The Gioia method starts off with constructing a "how"-phrased research question to guide the study. The question should be specific enough to provide guidance and direction, but general enough to allow for slightly unexpected twists and turns. Furthermore, the approach makes it a point that researchers should refrain from studying relevant literature in detail prior to conducting the study, as is usually the case in approaches such as systematic combining (Dubois & Gadde, 2002a). This self-selected ignorance is a critical aspect of the Gioia method, as prior knowledge is thought to potentially inflict biases and blinders on the process, therefore, they state "there is value in semi-ignorance or enforced ignorance of the literature" (Gioia et al., 2013, p. 21).

The Gioia method requires us to make two basic assumptions for the approach to hold up to academic rigor. The first assumption we must make is that

the interviewees are "knowledgeable agents" (p. 17) that are aware of their actions and able to verbalize their intentions, reasons, and behaviors (Gioia et al., 2013). Initially, our job as researchers is to listen intently and report the interviewees' experiences as they are stated, to avoid reading into their statements and imposing academic and theoretical constructs or meaning. The second assumption we must make is that we are knowledgeable researchers that are able to identify trends and patterns, and that we can discover and explore relationships that are not directly formulated by the interviewees (Gioia et al., 2013).

3.3 Data Collection

In qualitative studies, data is usually gathered from multiple sources, which offers the possibility of triangulation (Creswell, 2009). Triangulation is a tool that researchers use to increase the validity of their findings, by searching for converging evidence across multiple data sources. Making use of multiple data sources is also encouraged in the Gioia method, however, the most critical source is the semi-structured interview (Gioia et al., 2013). In our research, we made use of three main sources of data: Semi-structured interviews, organizational documents, and organizational systems.

3.3.1 Interviews

In qualitative research that employs the Gioia method, semi-structured interviews are the preferred mode of data collection, due to their ability to provide both "retrospective and real-time accounts" (Gioia et al., 2013, p. 19). According to Yin (2016), interviews can be split into two groups: Structured and qualitative. In a structured interview, the researcher adheres to a list of questions and tries to act consistently, in a scripted manner, across all interviews. Qualitative interviews, on the other hand, are characterized by their more informal, more dialogue-like conversation between the researcher and the participant (Yin, 2016). Semi-structured interviews fall in the second category of qualitative interviews, with a prepared list of open-ended questions and topics to cover, but with every intention of following up on any related issues the participant may bring up (Gioia et al., 2013).

To gather data related to how organizational structures and culture affect the participants' involvement in knowledge sharing, we prepared an interview protocol

that ensured alignment with Gioia et al.'s (2013) three criteria for interview protocols:

- **Focused on the research question**: We made sure that every question (aside from the first few to gather background information on the participants) was related to the research question, and that we were able to argue for the use of the question.
- **A thorough list of questions**: We tried to predict the answers, subjects, and themes that the participants would bring up in response to our questions. This allowed us to dig deeper into the issues that were considered relevant by the interviewee.
- **Open-ended questions**: We made sure to avoid asking "leading-the-witness questions" (Gioia et al., 2013, p. 19). This could impact the interviewee to provide biased responses, and it would also yield answers that provided little to no value to the analysis.

Additionally, we continuously revised the protocol by dropping questions that proved to be of little value, and we also added questions about issues that were frequently brought up that we wanted to study more in detail. To ensure that we asked questions that would allow us to analyze the basic underlying assumptions of Backe's learning culture, we initially crafted the questions around Schein's (2017) ten assumptions of a successful learning culture. An example of the interview protocol can be found in the appendix (Appendix A.2).

The interviews were conducted either face-to-face or over video call (MS Teams). For practical reasons, we offered the option of face-to-face and video call interviews for the participants that were located at the headquarter, and only video call to the participants that were located elsewhere. The face-to-face interviews were audio-recorded, while the video calls were recorded (video and audio) using the "record meeting" function in Teams. This allowed us to be more present in the dialogue and also allowed us to transcribe verbatim afterward. We noticed no significant difference in the responses between the two interview formats.

Prior to the first interview, we established the division of responsibility between the two researchers. Due to the part-time position held by one of the researchers, we split the tasks as follows:

- Researcher A (holding a part-time position) was responsible for keeping in contact with all participants, introduced the researchers and the thesis at the

start of the interview, led the interview by being responsible for the interview protocol and making sure we covered important topics.

- Researcher B (external, holds no position in the company) was responsible for taking the outsider perspective and dig deeper into responses that needed added clarification or follow-up for other reasons.

We kept this task division throughout all the interviews to ensure consistency. We found that the duality in the level of familiarity with the company enabled us to probe both when researcher A knew there was more to uncover and when researcher B thought something was unclear and "culturally assumed" by both the participant and researcher A.

Sampling. In a study, sampling is the act of selecting which, and how many, units to include (Yin, 2016). According to Yin (2016), there are several methods of sampling, the most popular being purposive, convenience, snowball, and random sampling. Purposive sampling is performed when the units are selected in an intentional manner, to achieve the broadest range of relevant and insightful data. An important factor to keep in mind when deliberately selecting interviewees is to seek out participants that may hold opposing views. This allows the researcher to minimize the risk of biased findings (Yin, 2016). Moreover, convenience sampling is performed when participants are selected based on easy availability, hence the term "convenience". This sampling method can yield higher risks for bias, as the sample may be skewed toward a particular view or otherwise lack relevant insights (Yin, 2016). The third sampling method Yin (2016) brings up is snowball sampling. This method is used when the researcher identifies and selects participants based on information provided by existing ones. This form of sampling may be useful in certain scenarios where it is done purposefully, but it may yield equal levels of bias if done out of convenience. Lastly, random sampling is done by statistically defining the sample from a population that is known, and it is mostly used in quantitative studies to allow generalizability from sample to population.

We made use of purposive sampling in our study, to ensure that we covered views on the culture and organizational structure that covered the entire range of age, time in the company, and positions. There were two main factors that were used to identify relevant participants:

- Recent/ongoing responsibility for BREEAM-NOR in a construction project OR

- Completed BREEAM-NOR Accredited Professional (AP) certification

Furthermore, to ensure that we covered a broad range of views that may have opposing opinions on barriers to knowledge sharing, we sought to interview employees:

- From as many subsidiaries as possible
- From a range of positions within the company

The short-listed candidates were contacted via email, along with a presentation of the study, the NSD form, and three options for available time slots. Most candidates self-selected into one of the three suggested time slots, while we made accommodations for those who were unavailable at those times. We were redirected on two occasions, as those employees were not the ones actually responsible for BREEAM-NOR, we were then able to contact candidates of higher relevance to the study.

We interviewed 14 employees in total, 12 subsidiary employees with either AP certification and/or BREEAM-NOR experience in projects, and two employees from the corporate headquarter. We covered six out of nine contractor subsidiaries, and interviewed employees of various levels of seniority.

Subsidiary	Position	Interview
-	Backe HQ employee	Face-to-face, 45 minutes
-	Backe HQ employee	Video call, 30 minutes
Bergen	Project Manager	Video call, 60 minutes
Rogaland	Project Engineer	Video call, 50 minutes
Romerike	Construction Site Manager	Video call, 35 minutes
Stor-Oslo	Project Planning Manager	Video call, 30 minutes
	Project Planning Manager	Video call, 40 minutes
	Construction Site Manager	Video call, 40 minutes
	Construction Site Assistant	Face-to-face, 60 minutes
Trondheim	Project Engineer	Video call, 30 minutes
Østfold	Management position	Video call, 45 minutes
	Project Manager	Video call, 60 minutes
	Project Planning Manager	Video call, 40 minutes
	Project Engineer	Video call, 35 minutes

Table 1: Overview of sample

3.3.2 Organizational Documents

The second data source we made use of was internal, organizational documents. The Total Quality System (TQS) was used initially to establish an understanding of which routines, if any, existed for knowledge sharing within the corporation. Throughout the interview process, the TQS was consulted frequently

to triangulate statements made by the participants regarding the lack and existence of routines and procedures.

3.3.3 Organizational Systems

Lastly, internal organizational systems, such as Teams, Workplace, the Project Portal, and SharePoint, was used to observe how knowledge sharing took place in practice. These platforms serve as meeting and communication spaces for the organization and were therefore valuable sources to triangulate the participants' experiences of the use of such platforms for knowledge sharing.

3.4 Data Analysis Strategy

Data analysis involves transforming compiled raw data to insightful patterns, using a combination of methodic procedures (Creswell, 2009; Yin, 2016). Due to the critique posed by quantitative researchers that qualitative research lacks the scholarly rigor to justify its findings, Gioia established his approach that calls for systematic combination and presentation of the informant-centric 1st-order concepts and the researcher-centric 2nd-order themes (Gioia et al., 2013). Consequently, our data analysis strategy consisted of five steps (Figure 3), inspired by Yin (2016) and Stigliani and Ravasi (2012).

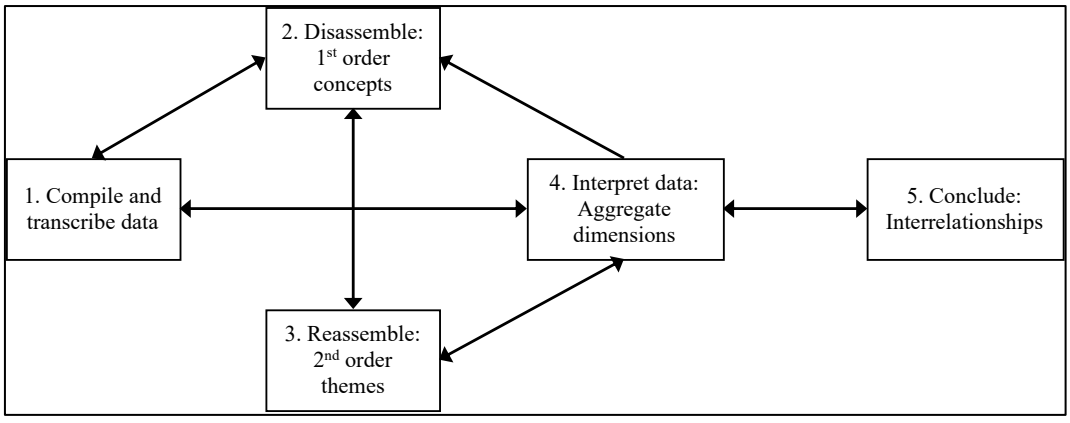

Figure 3: Summary of the data analysis process. Adapted from Yin (2016) and Stigliani & Ravasi (2012)

3.4.1 Step 1: Compilation and Transcription

The recorded interviews were transcribed manually, shortly following the time of the interview. Subsequently, both researchers read through the transcripts to ensure equal levels of familiarity across all interviews. The transcripts were

critically analyzed, and annotations were added to save any preliminary interpretations that came up either during the interviews or while studying the transcription afterward. This was done continuously throughout the process, to ensure proper revision of the interview protocol as new discoveries were made (Gioia et al., 2013).

3.4.2 Step 2: Disassembling the Data

After compiling, transcribing, and reading through the transcriptions, we used the data analysis software NVIVO to code the data according to Gioia's approach to grounded theory development (Gioia et al., 2013). At this stage, we adhered to the terms, phrases, and issues that the participants brought up, which led to a large number of 1st-order codes. The large number of codes were placed into more manageable categories along the way, as similarities and patterns occurred. In this step, one must make sure to use an informant-centric approach by using their terms, so that the participants' lived experience is portrayed to the best of the researcher's ability. To ensure that coding was done similarly across all interviews, the coding was performed by both researchers together. This way, any uncertainties could be discussed immediately. To provide efficiency and direction for the coding, we only coded data that informed our research question. We created a conceptual framework (Figure 4) to guide our initial understanding of the necessary coding structure, which allowed us to focus on the relevant data, while not limiting our coding within those elements.

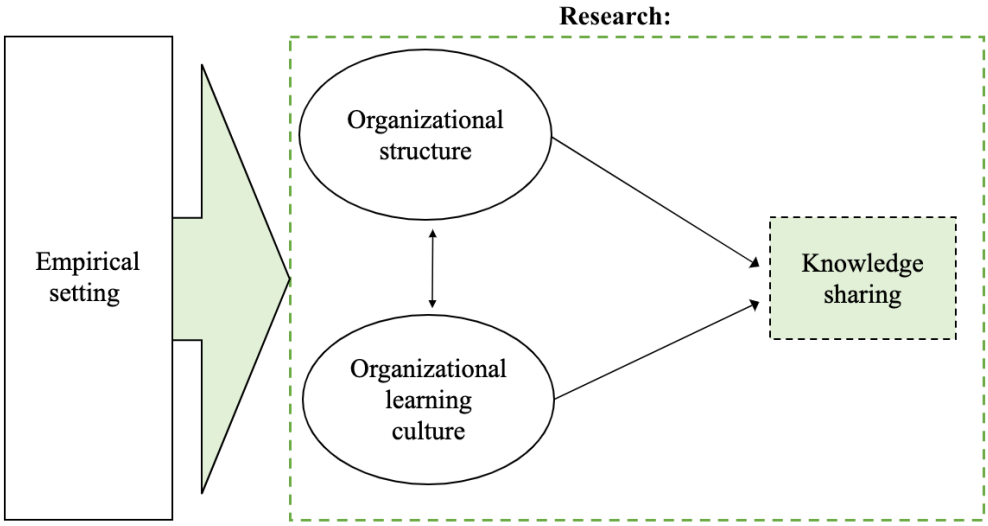

Figure 4: Conceptual Framework

3.4.3 Step 3: Reassembling the Data

Once the data is coded in 1st-order concepts, researchers can make use of their theoretical background to establish "broader, and theoretically relevant second-order categories" (Stigliani & Ravasi, 2012, p. 1240). At this point, the researchers should view the 1st-order codes and try to make sense of what is going on from their knowledgeable perspectives (Gioia et al., 2013). In our analysis, this is the point where we categorized the 1st-order codes, which were based on the terms and phrases used by the participants, into theoretically relevant 2nd-order themes.

3.4.4 Step 4: Interpret the Data

This step of the analysis involved distilling the 2nd-order themes into aggregate dimensions. In practice, this meant that we categorized the 2nd-order themes into the relevant categories we found to affect knowledge sharing. Afterward, we were able to construct our data structure (Figure 5) which provided a visual presentation of the findings, and their progress from informant- to researcher-centric (Gioia et al., 2013). This allowed us to start interpreting and analyzing our findings in light of relevant theory and frameworks. This is the most critical step in the Gioia methodology, as a complete data structure is what shows the academic rigor in the grounded theory.

3.4.5 Step 5: Concluding

The final step of our data analysis involved the formulation of the relationships between our 2nd-order themes. To answer our research question, it was important to identify the "dynamic interrelationships" (Gioia et al., 2013, p. 22) between the themes, to account for how the *interplay* between culture and structure affects knowledge sharing.

3.5 Ensuring Scientific Quality

Qualitative studies are often critiqued for their potential lack of consistency, thus a common cause for concern is the reliability of the researcher's approach (Creswell, 2009). There are two forms of reliability, internal and external. External reliability relates to the study's ability to be consistently replicated by other researchers or across different cases. We have employed two techniques to increase the external reliability of our study. First, we have provided a detailed account of our research design, including the focus of our study, the sampling criteria, and the

data collection. Second, we include a detailed step-by-step overview of our analysis, following the Gioia approach to inductive research. Internal reliability, on the other hand, refers to the consistency in coding and analyzing the data. To reduce the risk of inconsistencies in coding, we frequently went over the codes to ensure that we had the same understanding of their definition. Additionally, we coded every interview together, so that any inconsistencies or drifts from the original definition could be clarified right away.

A second cause for concern in the credibility of qualitative studies is validity (Yin, 2016). A valid study presents accurate findings that properly reflect the lived experiences of the participants (Creswell, 2009; Yin, 2016). In order to ensure that the themes we identified properly reflected the reality of our case, we used triangulation to find converging evidence for our interpretation. Additionally, we made sure to include diverging perspectives in our analysis when there were large discrepancies in the views of the participants (Creswell, 2009).

3.6 Ethical Considerations

Ethical considerations are critical when designing and conducting social research. As researchers, we have an obligation to ensure the intellectual integrity of our work and to prioritize the pursuit of truth over personal gain. This requires us to be entirely candid about our research and to disclose any potential errors or omissions that might alter the study's findings (Cournand, 1977). Additionally, researchers need to take into account ethical considerations in their handling of human beings participating in the research project. This is done to ensure that all participants are treated with dignity and are protected from potential harm by participating in the study (Straits & Singleton, 2018). The following section will address the ethical considerations relevant to our study, regarding the handling of human subjects and how the research design will address these concerns.

The research project has been approved by the NSD as part of the "DigiBuild" project at BI Norwegian Business School, and as such all personal data is handled in line with NSD guidelines.

3.6.1 Harm

While it is improbable that human subjects may sustain physical harm during social science research, they may sustain personal, psychological, or social harm as a result of their involvement in a research project (Straits & Singleton,

2018). To understand how various employees interact to share knowledge, it was necessary to obtain the individuals' private perspectives during the interviews. However, respondents may be apprehensive of sharing controversial opinions out of concern for social and/or professional penalties and repercussions. We recognize that this may be especially true for subjects at lower organizational levels. Thus, to limit any potential harm, we made certain to maintain participant anonymity, by not linking any identifier to the quotes used in the analysis. We further offered to alter details to provide anonymity, granted that this did not alter relevant data. However, because we are conducting a single case study within an organization, with the focus on a unique learning process involving a small number of important actors, we understand that complete anonymity may be impossible to provide.

3.6.2 Informed Consent

Participation in the study was entirely voluntary, and all participants were sent all essential information prior to participating, which enabled them to make an informed decision about whether or not to participate. Furthermore, written consent was required prior to conducting the interview (Straits & Singleton, 2018). Additionally, participants were given the option of withdrawing from the study at any time before publication.

In the information letter and consent form, participants were provided all necessary information regarding the purpose of the research project and what participation would entail. The letter clearly stated that participation was voluntary and that consent may be revoked at any moment for any reason. Additionally, all potential participants were informed that all personal data would be managed in accordance with NSD guidelines, as well as their rights regarding their own personal data, and who to contact if they wished to alter or delete their personal data that was collected.

3.7 Methodological Limitations

We acknowledge that the choice of building theory based on a qualitative single-case study may be critiqued. Eisenhardt and Graebner (2007) discuss the lack of generalizability from case studies and argue for the use of cases due to their ability to "richly describe" (p. 27) the phenomenon in question. To explore how knowledge sharing is hindered by the interplay of organizational structure and learning, we needed to gain a rich understanding of the elements involved, and thus

a single-case study was the most appropriate choice, given the time and capacity constraints posed by the master thesis process.

A second limitation of our research is our exclusive study of knowledge sharing involving BREEAM-NOR-related knowledge. This focal area was chosen to narrow the scope of the study, but the negative attitudes toward BREEAM-NOR certification (sense of certification being forced onto them, and negative stance on the necessity of certifications) may have skewed the data in a negative direction relative to knowledge sharing on more central elements of construction projects. We, therefore, acknowledge that our choice of empirical setting may reduce the transferability of our findings to other aspects of knowledge sharing both within Backe and in other organizations. However, the findings may still be transferable to other cases of knowledge sharing where the area of knowledge feels forced (Gioia et al., 2013).

Chapter 4: Empirical Findings and Analysis

The following chapter presents the empirical findings of our research combined with an analysis of the presented data. The aim of our thesis is to investigate how the interplay between organizational structure and learning culture affects knowledge sharing in project-based organizations. Prior to presenting the empirical findings and analysis of our research, we will first provide a description of the case that constitutes the empirical setting of our research.

4.1 Description of the Case

The empirical setting of our case study is the Norwegian construction company Backe. This organization was chosen for two reasons: firstly, due to an unusual access to the organization, and secondly, due to the company being an exemplary case of a project-based organization that struggles with achieving knowledge sharing.

The corporation consists of a small top management, with four business areas structured as subsidiaries. Below the largest subsidiary, Backe Entreprenør, are 11 step-down subsidiaries consisting of local contractors that operate throughout the country. Since 1979, the corporation has pursued an acquisition-based growth strategy, with integration based on the principles of independence and autonomy. This integration strategy has resulted in a decentralized organizational structure, with high levels of decision-making authority delegated vertically down the organization and into the projects.

The decentralized organizational structure of Backe is viewed as highly favorable by both the top management and employees. From the perspective of management, the organizational structure is viewed to enable Backe to deliver customer-tailored projects that leverage local autonomy and adaptability. The employees, on the other hand, are motivated by the high degree of autonomy the decentralized organizational structure affords them in carrying out their responsibilities, and they view it as an important factor for their own professional development. Nonetheless, both the top management team and the employees recognize that the organization struggles to achieve effective knowledge sharing across projects. In discussing the theme of the thesis with employees from various levels of the organization, we discover that the reasons for this lack of knowledge sharing might have both structural and cultural explanations. Furthermore, the

organization suspects that the two have self-reinforcing effects on one another, further complicating successful implementation of knowledge sharing initiatives. We therefore consider Backe to be an exemplary empirical setting for examining the mutual effects of organizational structure and learning culture on knowledge sharing.

Given that construction projects vary in size, degree of complexity, and uniqueness, and involve a range of technical subjects, knowledge sharing can occur in a wide variety of contexts and between a wide range of project participants. Therefore, in order to conduct our study within the timeframe of a master thesis, we chose to focus the research on the sharing of a specific type of knowledge: BREEAM-NOR certification in construction projects (in the following text, BREEAM-NOR and BREEAM will be used interchangeably). The certification program establishes stringent technical and documentation requirements for the environmental compliance of construction projects (Kodjeykova-Merriman, 2021; WSP, n.d.). Those responsible for BREEAM in projects must make timely decisions to ensure that the project is on track to meet all requirements necessary for the final building to be certified. However, due to the relatively high speed of BREEAM's increased popularity and establishment as an industry standard, Backe has yet to establish a proper knowledge inventory for project insights of completed BREEAM projects, nor effective knowledge sharing routines between those with BREEAM experience. Consequently, those responsible for BREEAM often must navigate the complex framework of requirements on their own. We, therefore, argue that given the limited formalization of knowledge sharing on this particular knowledge domain, the knowledge sharing between employees with BREEAM experience is likely to be heavily influenced by organizational structure and learning culture. As such, this setting is chosen as an extreme case to investigate our research question of how the interplay between organizational structure and learning culture affects knowledge sharing in a project-based organization.

4.2 Empirical Findings and Analysis of the Case Study

The following section will go through the empirical findings and analysis of our case study. Based on our empirical findings (first-order concepts), we have derived at eight second-order themes, that together constitute the identified aggregated dimensions of structural and cultural barriers to knowledge sharing, as

demonstrated in the data structure below (*Figure 5*). In the following sections, we will go through our analysis of each second-order theme and how they relate to knowledge sharing. The analysis will consist of three parts that follow the outline of our conceptual framework (Figure 4). We start with two separate analyses of how organizational structure and learning culture each affect knowledge sharing. Finally, we will end the chapter by analyzing how the interplay between organizational structure and learning culture affects knowledge sharing, by looking at how they collectively influence the use of knowledge-sharing arenas for BREEAM-related knowledge.

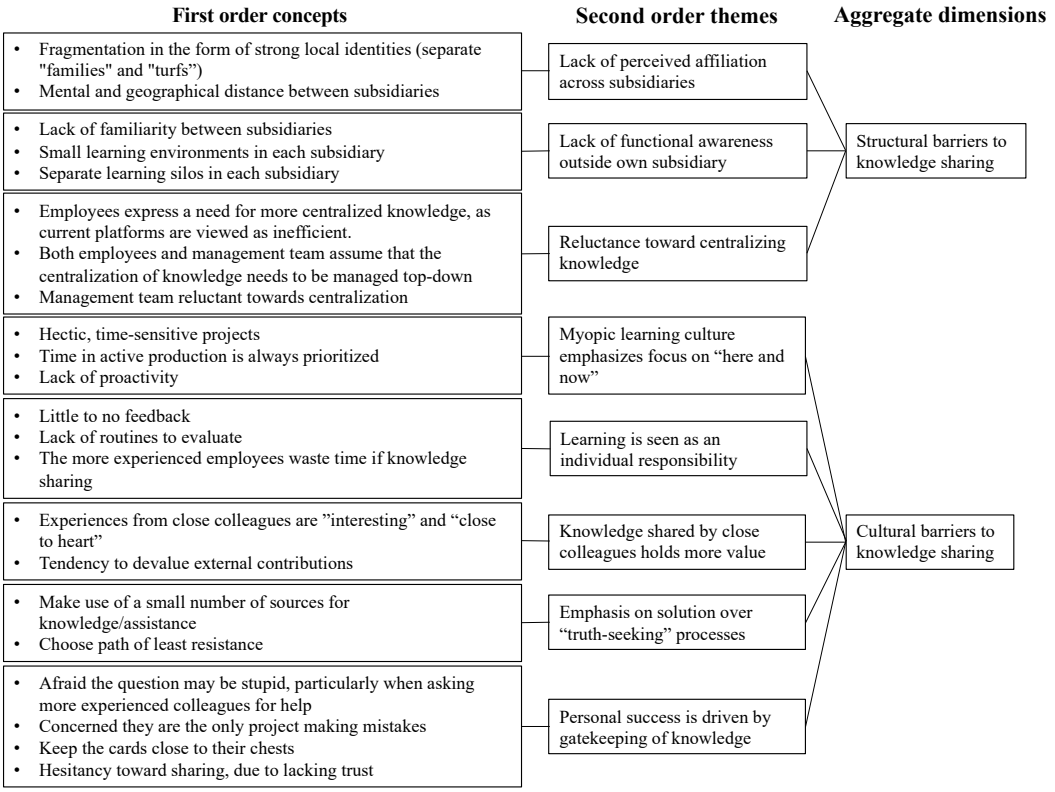

Figure 5: Data Structure (Gioia et al., 2013)

4.2.1 Structural Barriers to Knowledge Sharing

This section of the thesis explores the relationship between organizational structure and knowledge sharing. Backe’s chosen decentralized organizational structure is recognized by the management team as a barrier to knowledge sharing between subsidiaries:

> *There are some major disadvantages* [with our way of organizing], *among others related to knowledge sharing. You get ten different companies with*

ten different peculiarities and specialties. It's a challenge. Some of them are insanely good at some things, and others are bad at some things.

Through analyzing the semistructured interviews of both employees and the management team, we identified three second-order themes that can explain how the organizational structure serves as a barrier to knowledge sharing. The identified themes are: Fragmentation and lack of association between subsidiaries, lack of functional awareness outside own subsidiary, and reluctance toward centralizing knowledge. The identified themes are based on the aggregation of our empirical findings that make up the identified first-order concepts. We will in the following section go through the analysis of our empirical findings and the resulting identified themes.

Lack of Perceived Affiliation Between Subsidiaries. Through our interviews with employees across the subsidiaries, we have determined that the vast majority of employees express a lack of affiliation between the subsidiaries. This conclusion is based on our observation that the organizational structure generates fragmentation in the form of strong local identities and a mental and geographical distance between the subsidiaries. In the following section we describe the empirical findings behind these concepts and how they, together, hinder knowledge sharing in Backe by creating a lack of affiliation between the subsidiaries.

The decentralized organizational structure is found to create fragmentation within the corporation, with strong local identities. When asked about their affiliation (project, subsidiary, or corporation), the vast majority of employees express a stronger connection to the projects in which they are involved and to their local subsidiary, than to Backe as whole:

It is in that order, it is first the project, then [subsidiary]*, and then Backe. Even though we say that we are one Backe, it is true to a certain extent, but you do not have much to do with the other subsidiaries in Backe.*

In addition, the employees frequently refer to each subsidiary as separate "*turfs*" or "*families*". As explained by this employee: "*It becomes a bit like who do you see every day, who are you talking to and who do you work with*". It is therefore evident that there exists fragmentation between the subsidiaries, with an "us" and "them" mentality. The employees mostly affiliate with those inside their own subsidiary and express a lack of perceived common agenda with the other subsidiaries.

Furthermore, we identify there to be a mental and geographical distance between the subsidiaries, resulting from the decentralized and geographically dispersed organizational structure. In explaining the relation across subsidiaries, an employee points out that "*if there is someone you really only know the name of, have never talked to or seen face to face, then it is difficult to imagine that is a person you work with*". This indicates there to be a mental distance between the subsidiaries, in which the employees do not view the members of other subsidiaries as their direct colleagues. This mental distance is further exacerbated by the geographical distance between the various subsidiaries. While the subsidiaries are geographically dispersed, the subsidiaries themselves are also dispersed, with employees working on a variety of projects. This requires the subsidiary to make an effort to maintain unity within the subsidiary, as highlighted by this employee:

> *You are associated with a project for many years, so in a way, you form a small family during those years…* [Therefore] *we work quite a lot on keeping the extended family* [the subsidiary] *together,* [to ensure] *that we know each other well also across projects.*

Consequently, the project-based organizational structure creates two levels of separation between other subsidiaries and the employees, increasing the likelihood that the distance, both mentally and geographically, will be perceived as greater.

Therefore, we conclude that the fragmentation between the subsidiaries, with strong local identities, and the perceived mental and geographical distance between the subsidiaries, results in a lack of perceived affiliation between the subsidiaries. This is found to hinder knowledge sharing, as the limited affiliation between the subsidiaries, results in the subsidiaries mostly regarding each other as separate companies with a lack of common agenda.

Lack of Functional Awareness Outside Own Subsidiary. The second identified theme and barrier to knowledge sharing is the lack of functional awareness between the subsidiaries, as a result of the decentralized organizational structure. This second-order theme is derived from an analysis of the interviews that revealed a lack of familiarity between the subsidiaries, small learning environments, and separate learning silos in each subsidiary. These first-order concepts and their relationship with the identified theme will be described in the section that follows.

The vast majority of interviewees report to have limited familiarity with the BREEAM projects and expertise of the other subsidiaries. As highlighted by one employee: "*I would probably have to take a few rounds to figure out who I could call*". According to another employee, this lack of familiarity makes it difficult to reach out across subsidiaries:

> *It is difficult. Who has had BREEAM projects, how do I know who they are, who should I contact to come in contact with them…and then it is a bit like, how much do you bother… one actively need to search for the information. It is not like the information will automatically fall into your lap.*

Which, according to a third employee, results in him instead opting to search for expertise within his own subsidiary, where he is familiar with everyone's expertise:

> *As long as we have the expertise internally* [in our subsidiary]*, you go to those you know, even though someone is probably sitting with a load of expertise elsewhere* [in other subsidiaries]*. I do not know of them or who it could be. Here I know the expertise of everyone.*

It is therefore evident that there is a lack of familiarity between the subsidiaries, which hinders knowledge sharing, as the employees lack an overview of the resources that exist across the organization.

Moreover, the data indicates that each subsidiary has small learning environments and separate learning silos in relation to BREEAM. While Backe has an extensive portfolio of completed BREEAM projects at the corporate level, several interviewees report having felt relatively alone in tackling BREEAM-related tasks due to a lack of knowledge within their subsidiary: "*I guess I felt a bit alone* [when working with BREEAM]*, because we did not have the knowledge, not within the subsidiary*". Another employee explains that her options for seeking advice within her subsidiary are limited, given that she has the most experience on the subject. Due to the limited learning environment for BREEAM within each subsidiary, many employees report seeking advice from external sources: "*I do not know of others* [with BREEAM experience] *in the other subsidiaries. We have bought services* [externally], *from those with experience. We rather spend a few kroner on it, to get the experience ourselves*". This again results in each subsidiary learning in separate silos.

Consequently, our findings indicate that there is a lack of functional awareness between the subsidiaries, isolating the subsidiaries and impeding knowledge sharing on BREEAM, leaving each subsidiary with limited knowledge and the need to seek external assistance to develop the required competence in the area.

Reluctance Toward Centralizing Knowledge. The third and final identified theme on how the organizational structure is found to serve as a barrier to knowledge sharing is the reluctance toward centralizing knowledge. This theme is derived from interviews with both subsidiary and headquarter employees in which we discovered a misconception regarding the need for top-down management of knowledge centralization. Due to the perception that such initiatives would conflict with the current decentralized organizational structure, the corporate headquarter is reluctant to centralize knowledge.

In interviews with headquarter employees, we learned that a number of steps have been taken to increase knowledge sharing throughout the organization, with the establishment of mutual digital communication channels at the center (e.g. Workplace). Such efforts enable the employees to organize knowledge sharing across the subsidiaries without involvement from above. Nonetheless, a number of employees argue that the established platforms are ineffective at storing and organizing knowledge, due in part to the platforms' functionality and in part to a lack of perceived bottom-up initiative to share knowledge. In contrast, the overwhelming majority of employees express a desire for knowledge to be centralized in the form of databases containing experiences, BREEAM documentation frameworks, and checklists. The majority of employees also emphasize the need to centralize such a function: "*There are experiences* [from others] *that we would like to know. These experiences should be highlighted by those at the headquarter*" or by "*a permanent expert on BREEAM* [at the headquarter]". However, when we confronted a member of the corporate headquarter with the employees' expressed desire for more centralized knowledge, he argued that the management team had not prioritized such a central function:

> *We have to take self-criticism, because the reason why they keep reinventing the wheel out there, is because we have concluded centrally that they can reinvent the wheel* [with regards to BREEAM] … *We have to make some choices. We have our Environment Manager, but there are limits to what*

she can do with BREEAM. It is a question of resources, and maybe we have made a mistake by concluding not to have a central resource on BREEAM responsible for having a complete overview, sharing, and making such checklists.

The same employee maintains that they do not want excessive centralization of knowledge, as they want BREEAM expertise to remain in the subsidiaries:

It is also that we do not want too much centralization. We want the BREEAM expertise to be out in the subsidiaries, because [BREEAM] *will become part of our core business. However, it is also stupid that everyone keeps having to reinvent the wheel.*

Consequently, it appears that both the corporate headquarter and the employees agree that knowledge must be centralized through a central resource. We argue that this assumption is likely due to the corporation's high degree of decentralization and fragmentation, which leads to the belief that any initiative intended to be corporate-wide must result from a top-down initiative. As a result, the centralization of knowledge is perceived as a centralizing measure that generates resistance, as it conflicts with Backe's fundamental values.

However, the centralization of knowledge does not necessarily need to be organized as a top-down initiative that takes away expertise and autonomy within the subsidiaries. It can be organized as an IT system that collects, organizes, and stores knowledge in a systematic manner, which can be managed bottom-up, in which the subsidiaries themselves are responsible for maintaining the system. The centralization of knowledge, therefore, does not necessarily need to be in opposition or a threat to the existing decentralized organizational structure.

Thus, we find that the organizational structure hinders knowledge sharing by fostering a reluctance toward the centralization of knowledge, based on the belief that unifying initiatives necessitates top-down management. By viewing the centralization of knowledge as equivalent to a centralizing initiative, knowledge is hindered form being effectively managed and shared across the subsidiaries.

4.2.2 Cultural Barriers to Knowledge Sharing

This section of the thesis explores the relationship between learning culture and knowledge sharing. Through analyzing the semistructured interviews, we

identified five second-order themes that can explain how the learning culture affects knowledge sharing. The identified themes are: Short-sighted orientation toward time, learning is an individual responsibility, knowledge shared by close colleagues is more valuable than knowledge from other sources, emphasis on solution over process, and lastly, personal success is driven by gatekeeping of knowledge. To analyze the learning culture, we made use of Schein's (2017) three levels of organizational culture: Artifacts, espoused beliefs and values, and underlying assumptions. In the interviews, we gathered data related to the first two levels, such as examples of structure, routines, norms, et cetera. According to Schein, these levels are more visible to the employees than assumptions, and therefore more easily communicated. The identified themes (second-order concepts) make up the basic underlying assumptions of the company's learning culture, which in turn affects behavior and decision-making. The goal of this section is to identify the basic assumptions that are taken for granted by the employees and explore how these assumptions affect knowledge sharing.

Myopic Learning Culture. Throughout the interviews, we found that the concept of time was frequently used to explain the reasoning behind engaging in certain activities and not others. The majority of the participants contrasted "value-creating production time" in projects with all other activities they engaged in. When probed about the reasoning that all other activities are then "non-value creating", the interviewees indicated that there is a "here and now" focus in the time-sensitive and hectic projects, which is further amplified by the factors by which project success is measured. This suggests the theme that the learning culture has a short-sighted orientation. Based on further discussions with the employees, we identified two ways in which this basic assumption hinders knowledge sharing. Firstly, the myopia affects the perceived value of engaging in knowledge sharing, as the future value is not taken into account when deciding between "production" or knowledge sharing. Secondly, the short-sightedness leads to a lack of proactive behavior, further contributing to the hectic schedule during production.

When asked about the perceived value of knowledge sharing, most interviewees brought up time constraints as reason for the low value perception. The general perception seems to be that knowledge sharing "*would probably be valuable to an extent, but it may be difficult to go through with in reality*", and when probed further, most reference the "here and now" short-sighted orientation toward

the value of time. As stated by one interviewee, "*yes, I could share, but I would need to have enough time to do it*", which emphasizes how time in production is valued over knowledge sharing. We also find this assumption playing out in scenarios where the one that holds the knowledge may see the value in sharing, yet out of respect for the "receiver's" time, they refrain from unsolicited sharing: "*One of the challenges we encounter is to share the information we have. Everyone has a hectic workday, so you are afraid of bothering them*". In the opposite scenario, myopia is also found to hinder those who need help, as the cost of reaching out to colleagues is raised, as indicated by an interviewee:

> *I think the knowledge exists* [someplace in Backe], *but unfortunately, we all have our own projects and things that need to be done, so the lack of time makes it so that it is easier to look up the information on your own, instead of asking for help.*

We, therefore, find that Backe's learning culture assumes a myopic view of the value of activities and thus disregards the potential future value, which hinders knowledge sharing by deflating its perceived value.

The learning culture's myopic orientation toward time also affects knowledge sharing by influencing the perceived value of proactivity. Our findings indicate that there is a generally held belief in Backe that challenges are best handled as they emerge, "*you seek out the information you need, when you need it*" rather than taking time to proactively seek out ways to dominate or reduce the chances of facing those challenging external realities. The majority of the interviewees report solving challenges "*as they pop up*", instead of proactively preparing. Several interviewees mentioned the lack of proactivity: "*It is not usually the case that I know what is coming up in a month or two regarding BREEAM, other than what I happen to know, or what the AP tells me"* and similarly *"it becomes a matter of, I am here now, I need to solve this, I then go and find a solution, solve the problem and is then done with it".* Time is mentioned by several employees as the main barrier to proactivity "*because there is so much else you need to do".* The strong orientation toward "here and now" avoids proactive planning and preparation to save time in the present moment. In doing so, the project members limit their ability to engage in knowledge-sharing activities throughout the project. The lack of time, that otherwise could have been afforded

by proactive preparations, leaves little wiggle room for collective problem-solving. An interviewee pointed out how the lack of time reduces the number of people engaged in problem-solving, which resultingly limits knowledge sharing:

> *That is an important point, you usually have an AP* [in BREEAM projects], *either internal or external, that follows the project ...* [Lack of time] *can hinder knowledge sharing because we end up discussing mainly with the AP, and then it stays in my head afterward and is forgotten before I have the time to relay it to someone else.*

These findings indicate that the short-sighted orientation toward time hinders proactive preparations, which reduces the time that project members have available during projects to engage in collective problem-solving.

As the complexity and rate of change in the industry increases, as evident by the increasing use of BREEAM-certifications, this myopic orientation toward project management may make learning and knowledge sharing even more difficult, going forward. BREEAM-certified projects require preparation and thought in earlier phases than traditional construction projects:

> *What we have conveyed internally in our subsidiary is that we must spend more time in the BREEAM early phase, set up a plan, go through all the points we plan on taking, establish the documentation needs, so that we can bring those details into the sub-contractors' contracts.*

This shift in the phases of construction is currently yielding stressful consequences for the project members that are in charge of BREEAM, as the learning culture's myopia hinders proactivity and willingness to ask for, and provide, assistance:

> *There are some minimum requirements for production that you need to follow, so I was a little stressed out in the beginning with making sure I had control ... I spent a lot of time searching for people in Backe that could explain the process to me, but I felt like the responses I got were too general ... I felt like no one took the time or effort to help me.*

It is apparent from our findings that proactivity will be required to handle more complex construction projects such as BREEAM projects, in the future. Although the current myopic learning culture disfavors proactivity, we have identified some signs of an ongoing transition toward increased proactivity. Firstly,

there is an increasing number of employees that are getting AP-certified, and several report encouragements from their subsidiary managers: "*We have been encouraged by our subsidiary to take the AP certification. All Project Planning Managers and some Project Engineers were asked if they wanted to take it".* However, employees are questioning whether this encouragement may stem from a strategic decision to win more tenders, and not from a shift in the corporation's myopic learning culture: "*... it is strategically wise of Backe that I have the certification, to win tenders*". Secondly, a few interviewees mention that their subsidiaries are undergoing changes to become better at knowledge sharing, but that there are barriers to getting there:

> *I feel like we are working on establishing knowledge sharing, but it is difficult. "Who has had a BREEAM project, how do I know who they are, who should I contact to get in touch with someone" right? So it becomes a question of how much you should bother.*

Moreover, the older interviewees point out the generational shift that is currently taking place, indicating that the younger generation, in their opinion, seems more eager to share: "*I am very lucky to be working with several people in their twenties, that are in full speed up the ranks. They have a different mindset, which bodes well for the industry*". The interviewees generally report an increasing willingness to adopt more proactive knowledge-sharing techniques, such as contributing toward centralized databases and sharing BREEAM-documentation and templates. However, the willingness is suppressed by the notion of being forced to go through with BREEAM certifications: "*Choosing BREEAM is not something we do, kind of. We are forced to build BREEAM projects*". In sum, the myopia of Backe's learning culture is found to affect knowledge sharing by disregarding the future value of activities and decreasing employees' perceived value of proactive project management. Although we do find emerging signs of increased proactivity in certain parts of Backe, the general belief held by the corporation is that challenges are best handled as they emerge, which in turn decreases the perceived value of proactive preparation.

Learning is an Individual Responsibility. The second theme we have identified for the learning culture is that learning is seen as an individual and personal responsibility. This is based on the indications that Backe lacks both

sufficient routines and norms for feedback and evaluation. Additionally, the data indicates that there is a consensus that experienced employees should not be made to "waste their time" on learning and development. In the following, we discuss how these factors are found to affect knowledge sharing in Backe.

We found, in talking to the interviewees, that the feedback culture "*is simply not there*". In practice, this hinders knowledge sharing by limiting the occurrence of feedback opportunities for development and learning. One interviewee reported that they did not give feedback to colleagues regularly, stating "*we are cowards when it comes to giving each other feedback*". Further, the participants generally agreed that there are no formalized routines that require them to provide feedback, except for external sub-contractors. This lack of established routines and norms to facilitate feedback informs our understanding that learning is regarded as the responsibility of individuals.

We also discovered that despite the TQS requiring project evaluations, interviewees reported that evaluation meetings are rarely conducted during the construction process:

> *We have a meeting before the project gets started, where we set goals. Then I think we are supposed to have midway evaluations or something, but they are not always completed.*

The lack of midway evaluations indicates that the learning culture assumes personal responsibility for learning, as there is no shared responsibility for knowledge retention throughout the project. According to the TQS, the Project Manager is in charge of performing the project evaluation. Several interviewees highlight the early departure of the Project Manager as a barrier to conducting the project evaluation.

> [The time spent on evaluation] *differs between projects ... Usually the Project Manager heads off to a new project before the old is finished, and then prioritizing time to perform a proper evaluation is demanding, especially when we do not necessarily see the value of doing it.*

By allowing the Project Manager to exit the project before a proper evaluation has been completed, the corporation communicates a devaluation of collective learning and re-use of knowledge. The lack of formalized routines beyond the end-of-project evaluation limits the occurrence of feedback and constructive knowledge sharing in

the projects. The routines, time frames, and tools for evaluation that are in use in the projects do not emphasize collective learning and sharing of knowledge, thus the culture seems to prioritize production time over knowledge sharing.

We found that the employees generally agreed that individuals with "enough" experience and knowledge do not need to continue learning and developing. Our findings indicate that more senior employees that have a large set of experiences from past projects, may not want or need to take part in knowledge sharing, because they "*do not find it very interesting*". The employees make a clear distinction between the experienced and inexperienced, "*there is a reason why we say that older Project Managers are experienced, and not the young ones*", indicating that there is a difference in the need for learning and development:

> […] *it also depends on the knowledge of those who are at the receiving end of the knowledge transfer. For my part, I am fairly new to this industry, all information is useful. But for someone that is on the 30th or 40th project, it is silly to spend time and resources on knowledge sharing.*

Despite the interviewees' admission that knowledge sharing between more inexperienced colleagues is useful and valuable, there is an underlying assumption that those who are more experienced may not benefit from taking part in such activities. The negative relationship between experience and perceived value of knowledge sharing is a barrier to knowledge sharing on all three organizational levels: Project, subsidiary, and corporate. Moreover, since knowledge sharing is not found to be a collective responsibility, more inexperienced employees have to evaluate the experience and knowledge of the receiving end before sharing insights and knowledge, which raises the costs of sharing.

Positive Relationship Between Familiarity and Perceived Value of Knowledge. The third theme we identified for Backe's learning culture, is that there is a positive relationship between the value of knowledge and the closeness and familiarity of the source. From analyzing the interviews, we found that knowledge is perceived to hold more value when it is shared by colleagues within the same project or subsidiary than that which is shared by colleagues from other parts of the corporation.

> *When we have people from our own subsidiary, that we know, that have tried out something new and can talk about their experiences, that is*

> *something I find useful. It is because you know them so well that it feels very close to heart, and you realize that these are things that also affect your own daily work. That is a form of knowledge sharing that I really like and think works well.*

The interviewees indicate that the information that is shared by close colleagues is more useful, since the closeness and familiarity is seen as an indicator of "*how their experiences apply to"* them. This underlying assumption of the learning culture is also reflected on both an artifact and espoused belief level of Backe. On an artifact level, the existence of general meetings in all subsidiaries, coupled with the lack of comparable forums on a higher, corporate level, adds to our understanding of the assumption that knowledge is found to hold more value when the giver and receiver have an existing, close relationship. Moreover, on the level of espoused beliefs in Backe, a headquarter employee indicates that there is a tradition of devaluing information, regulations, and proposals that stem from the headquarter:

> *The subsidiaries have been extremely set on the notion that everything that comes from within the headquarter is "ooh and aah, those guys at the headquarter", and that is something you need to deconstruct. There is a sense of them and us, because they cultivate their local identity.*

The subsidiaries' tendency to devalue external contributions adds to our understanding of the underlying assumption. The knowledge that is shared within the "family" is generally perceived to hold higher relevance and value than external contributions. This underlying assumption of Backe's learning culture facilitates knowledge sharing within projects and subsidiaries by increasing the perceived value of knowledge sharing relative to the loss of active production time. However, contrarily, it hinders knowledge sharing across subsidiaries by reducing the value of time spent sharing knowledge relative to the time in production.

Emphasis on Solution Over "Truth-Seeking" Processes. The fourth theme that we identified in the learning culture, is the basic assumption that optimal solutions are generally found in a single source. Our findings indicate that the project members have a tendency to make use of a limited number of knowledgeable sources and problem-solving methods when seeking out solutions, which indicates that the culture emphasizes the solution over the process. When asked about their routines for problem-solving, several interviewees highlight the

lack of routines and norms for collective problem-solving, "*we are not specifically encouraged to problem-solve together with others, but it is my impression that no one is against doing it*". The particular source or problem-solving method differs between employees, but the commonalities between them are the lack of variation and the narrow search for solutions. For instance, employees are found to favor one of the following sources: The Environment Manager, the project-specific BREEAM AP, a specific co-worker with BREEAM experience, or independent study. The source they end up selecting seems to be based on what is perceived, in the moment, as the most efficient pathway toward a solution: "*I think I speak for most of my colleagues when I say that we choose the path of least resistance. We do what is easiest, and that is asking the ones that you know may have an answer*". For instance, the AP or a team member are often chosen due to short pathways:

> […] *now that the project is underway, the most natural thing to do would be to go straight to the Project Planning Manager that is in contact with our AP. You always choose the shortest pathway to the information you need.*

While the choice to go with the path of least resistance may be explained by the learning culture's myopic temporal orientation, the available set of viable problem-solving pathways is affected by the culture's emphasis on solution over process. In the emerging field of BREEAM, collective inquiry into the various solutions could yield valuable knowledge for future projects across the corporation. Yet, this rarely occurs, partially due to the culture's emphasis on quick solutions. The learning culture's emphasis on solution over process is especially apparent in the employees that have some experience. An interviewee with previous BREEAM experience stated, "*internally I do not really reach out to anyone because I know that I know the most about BREEAM*". In other words, there seems to be an assumption that experience makes up for the need to problem solve collectively, which reflects the cultural emphasis on solutions over process. An employee from a different subsidiary also reported this sense of individual expertise:

> *When I got started, it was a demanding project. It had been on my mind since I got selected for it, so it had gotten enough time to mature in my head. When we faced challenges, I already had thought through everything on my own.*

One disadvantage of this cultural assumption, which is further exacerbated by the cultural assumption that learning is an individual responsibility, is that younger, more inexperienced employees, are often left to fend for themselves. Since the culture does not emphasize problem-solving processes as a collective responsibility, they are often expected to find the solutions on their own. One young employee mentioned that "*many people in Backe have experience and knowledge of BREEAM, but we still end up searching and reading up on things individually, rather than asking them for help*". Since the work with BREEAM is slightly more documentation-heavy, the work differs from that of the rest of the project, which adds further to the lack of collective problem-solving: "*In my first project I felt very alone in solving problems, it was something that "happened down the hall" from the rest of the project*". The learning culture's lack of focus on the process of problem-solving leads the employees to seek out solutions individually. Furthermore, the culture seems to assume that experts are keepers of indisputable solutions, which disregards the need for problem-solving to be a shared responsibility. Naturally, however, there is a practical distinction between simple and complex challenges in every BREEAM project. On the one hand, certain instances call for pragmatism in the sense that an individual search for solutions may be sufficient for the situation at hand. For instance, there are often questions related to the documentation of points in the BREEAM manual, which usually has a straightforward answer and thus should not require a collective search for a range of solutions. On the other hand, the favoring of solutions and answers over collective problem-solving hinders interaction and knowledge sharing, by not making problem-solving a shared responsibility.

Our findings indicate that there is an emerging shift in the employees' emphasis on collective problem-solving. Similar to the changing perceptions on the value of proactivity, we are seeing some early signs of change in Backe's focus on the value of collective problem-solving processes. One interviewee stated that the younger generation of employees seemingly are more aware of their flaws and inabilities, which may encourage increased use of knowledge-sharing platforms.

> *It would differ from person to person, there is a large age gap in our employees. I would think the younger ones would make use of a database, maybe we are more open to the fact that we are not complete experts.*

This is supported by a younger interviewee that highlighted the value of receiving help across projects: "*Luckily, we share some experiences internally and help each other out when we can, that saves us*". Another interviewee mentioned the Ett Backe initiative (translates to One Backe, a strategic initiative implemented in 2015 to unify the subsidiaries) and admitted that they may not be where they intended, in terms of collaboration and knowledge sharing across subsidiaries.

> *It is probably a little silly that everyone sits on their own turf and creates their own templates etc. when we are supposed to be Ett Backe, but it happens, we do things in parallel.*

The analysis indicates that the emerging shift is driven by three factors: Increasing recruitment of a younger, more collectively oriented, generation, the introduction of Ett Backe, and lastly the implementation of digital tools and platforms for knowledge sharing. These cultural artifacts seem to be slowly driving the corporate learning culture toward a more collective, process-focused orientation.

Personal Success is Driven by Gatekeeping of Knowledge. The fifth theme that we observed in the learning culture is the assumption that personal success requires individual efforts and gatekeeping of knowledge. Our interviewees generally reported masculine and conservative attitudes of control toward task-relevant communication, which could be a barrier for those who wish to engage in knowledge sharing (Schein, 2017). In order to have knowledge flow openly and freely, the corporate culture should portray positive attitudes toward the communication of task-relevant information. However, we are finding that the culture is represented in conservative attitudes that hinder both inquiry and sharing. Our findings indicate that the employees are hesitant to make use of the corporate-wide network to ask for help.

> *I am going to be honest and say that it is not something that I would do easily ... It is probably a little due to so few people using the platform. Sometimes you could feel that your question is stupid.*

This hesitancy was supported by another young employee that reported a sense of "us and them", indicating that there is a barrier to asking more experienced employees for help.

> *Many people have been here for a long time and these are things that you are supposed to know ... What is very obvious to everyone that has been*

here 10-15 years, may not have been as obvious to them when they started, but you forget what that was like.

While the younger employees are hindered in making use of the knowledge-sharing platforms in fear of sounding stupid, the older, more experienced employees report a sense of loss of pride in revealing mistakes.

It could be due to pride. I am in a certain position, why should I need to ask about something when no one else does it? If you go into Workplace, no one else is asking questions ... You never hear about mistakes in other projects, which leaves you with a sense that your project is the only one making mistakes.

The learning culture's assumption that personal success is driven by individual efforts to portray control and unwavering abilities, creates negative attitudes toward open and task-relevant communication. The attitudes are hindering knowledge sharing by limiting the employees' sense of safety in asking questions openly. Moreover, we are finding hesitancy toward sharing in all functional levels of the interviewed project members. A young interviewee that had recently completed a BREEAM project and sat on a multitude of relevant experiences hesitated to share outside of the subsidiary: "*It feels a little strange, like "here is my knowledge, look at my masterpiece", that feels a little weird to share, I probably would not have shared it myself*". Similarly, another young interviewee mentioned not wanting to share experiences that originated from mistakes, "*everyone is probably afraid to reveal the mistakes they made*". From the older, more experienced employees, we find that the hesitancy toward open task-relevant communication is explained by a sense of ownership toward the experiences they have gained over time.

You keep the cards close to your chest because the knowledge that you have worked up over many years, both good and bad, have had its costs, and you may not want to give it up just like that.

The mentioning of "giving it up" in reference to sharing knowledge with colleagues indicates a zero-sum mindset. Another interviewee touched upon how the lack of trust could play a role in explaining the lack of open task-relevant communication.

You need to work up the right amount of trust or credibility quickly, and that is always a challenge, because people are people. Getting people to open

up is demanding, people are hesitant about that sharing-thing and find that to be challenging.

On the lower functional levels, such as Construction Site Assistant and Project Engineer, we find that the conservative attitudes manifest in uncertainty and unwillingness to stand out. Moving up to the Project Manager level, the attitudes are apparent in the reported focus on a lack of personal gain from sharing knowledge. The negative attitude toward task-relevant communication stems from an inward focus on personal gain, which hinders knowledge sharing by raising the perceived cost of contributing to the collective pool of knowledge.

4.2.3 The Interplay Between Organizational Structure and Learning Culture

In the following, we present our findings and analysis of how the interplay between Backe's organizational structure and learning culture affects the use of knowledge-sharing arenas. We define a knowledge-sharing arena as any context, system or platform where sharing of knowledge takes place. Through the interviews, we identified three main groups of available knowledge sharing arenas, as outlined in Table 2: Corporate-wide platforms linking employees between subsidiaries, subsidiary-specific platforms only available to employees within the specific subsidiary, and lastly other arenas for sharing knowledge, including direct contact and experience reports.

Group		Arenas	
Corporate-wide	Technological	Workplace	Topic-related groups for knowledge sharing
		TQS	Top-down communication platform for corporate-wide routines and regulations
		Project portal	SharePoint structure available through the intranet, for project-specific document handling.
	Physical	Courses	Physical courses held at the HQ
		BackeStigen	Newly established leadership development program
		Role-specific forums	E.g. Environment Managers (one per subsidiary) meets regularly.
		Site visits	Employees are allowed to schedule project site visits across subsidiaries.
		BackeKonferansen	Annual conference for all employees.

Subsidiary-specific	Tech.	Microsoft Teams	Available corporate-wide as a communication tool, but Teams channels are mainly used within subsidiaries for document handling purposes.
	Physical	Operational meetings	Held regularly in all subsidiaries, not role-specific attendance
		Role-specific operational meetings/forums	Not seen in all subsidiaries, identified through interviews to at least take place in Backe Stor-Oslo and Østfold.
Other		Direct contact	Reaching out "across the table", phone, email, Teams chat etc.
		Experience reports	Required for projects over 50 MNOK

Table 2: Overview of the identified knowledge-sharing arenas

In the following sections, we will first examine the knowledge sharing arena of direct contact, then experience reports, and finally the corporate-wide and subsidiary-specific knowledge-sharing platforms.

Direct Contact for Knowledge Sharing. When we coded the interviews in NVIVO, we identified a handful of contexts in which direct knowledge sharing occurred. The most frequently mentioned included reaching out to other employees in person ("*I grab hold of people that have done BREEAM projects before, and just kind of talk to them across the table*"), through email, Teams, and telephone.

Although direct contact is widely used, the lack of functional awareness is a limiting factor for this type of knowledge sharing. Our findings indicate that the organizational structure hinders the employees' overview of which colleagues hold relevant BREEAM-related knowledge and experiences. Some mention the need to reach out to a more centrally located colleague for help in identifying relevant employees to reach out to: "*I have sent quite a few emails to the Environment Manager asking "do you know someone that knows something about this, do you know this, who can I ask about this? Et cetera*". This indicates that although direct contact, as an arena for knowledge sharing, works well in instances where the connection has already been established, there is a need for platforms that allow for knowledge sharing to extend beyond the established relations.

Currently, Backe's Environment Manager serves as the central hub for all inquiries related to BREEAM and is identified by most interviewees as the obvious first point of contact: "*For BREEAM-related questions, I would probably go to the Environment Manager first. She can steer me in the right direction because she has*

a better overview of who has had which challenges and what they have built". The centralized path of inquiry is a critical risk factor to the continuation of BREEAM-related knowledge. If the Environment Manager, as the central hub, exits the organization, the overview of corporate-wide resources and experiences leaves with her. This use of the Environment Manager as an information hub seems to come from two main reasons. Firstly, the organizational structure hinders functional awareness across subsidiaries, limiting the employees' familiarity with their available network and the collective resources that exist in the corporation. Secondly, the learning culture's orientation toward time favors the path of least resistance, and the cost of reaching out to the Environment Manager directly is perceived as less costly than making use of other arenas. By not making use of the corporate-wide arenas, the employees lose out on the collective efforts and combined knowledge of all employees with BREEAM experience. Instead, they overload the centralized asset and thus end up with more inefficient problem-solving processes:

> *I think she has a lot to do, so I do not think she has the time to get into the details. So, when we ask her, she usually replies with "ask the AP". It is what it is. I get it, but it often comes rolling back to me in the end. I think quite a lot of time has been wasted on those processes.*

However, the Environment Manager has also been found to act in ways that maintain the position as a critical centralized asset. We find several instances of selective sharing of relevant information with specific employees, instead of making the information widely available. This came up both in interviews and in our analysis of the Workplace group "BREEAM Forum".

> *I am not sure whether there openly exists a list of* [Backe's current BREEAM projects]*, but I got one sent over from the Environment Manager. It should probably be available somewhere, but I do not know where. I have not looked for it though, because I got it via email.*

Moreover, in the BREEAM Forum Workplace group, we identified a scenario where an employee asks for help on a specific topic. The Environment Manager posts a comment stating she has sent over some documents via email. This is then followed by several employees asking to be sent the same documents, in the post's comment section (see appendix A.1).

Experience Reports. The second method of knowledge sharing that was identified through our interviews, is the creation of project-specific experience reports. According to the TQS, all projects with contracts exceeding 50 million NOK must be evaluated, with the relevant findings documented in experience reports. This is to ensure that Backe's future projects learn from relevant past project experiences. The responsibility for carrying out the project evaluations with the project team, and writing up the resulting experiences in the official experience report, resides with the project manager. The report is meant to serve as a tool for knowledge sharing between projects and subsidiaries.

Given that BREEAM is an emerging knowledge area, with each subsidiary alone having limited experience in carrying out such projects, we asked those interviewed about the utilization of experience reports from BREEAM projects across subsidiaries. Among those interviewed, no one responded affirmatively to the question of whether they had previously made use of experience reports from projects in other subsidiaries. The majority followed up the question by stating that they do not know where they would find the experience reports from projects in other subsidiaries. One employee noted that this is mostly due to a lack of storage routines across subsidiaries:

> *Unless there are some very important things, I am afraid they end up in a drawer* [after being presented internally within the subsidiary] – *that is probably what has happened in the past, that they have not been used as frequently as they should* [across subsidiaries] – *it probably has a bit to do with the quality of what is produced as well.*

This finding is triangulated in discussions with headquarter employees that confirm the lack of routines for storing and distributing experience reports across subsidiaries. However, despite the lack of a systematic way of storing and sharing the reports, the employees do express awareness of their existence. Nevertheless, they do not find it natural to request access to the experience reports that reside outside their own subsidiary. This inward focus could be attributed to the organizational structure, that isolates the various subsidiaries, and hinders a natural association to the experiences made across subsidiaries. Furthermore, the low usage can also be explained by the learning culture's short-sightedness, which reduces the perceived value of proactive preparations.

When we asked those with experience in creating experience reports about the value of its current format, we found that the majority did not find it to be of much value: "*Perhaps we can become better at making them, so that they are actually worth spending time on reading*". Several interviewees point out that it is in essence a matter of the "chicken and the egg": "*We have made a report. Now we finally chose to ... how do I put this, we have not put so much effort into the report, because from experience no one will read that report*". They end up in a drawer because of the poor quality, but the quality is also poor because they know that the report will likely end up unread. The reports are therefore mostly seen as a formal requirement than anything else. In addition, some interviewees bring up the Project Manager's early exit from projects, as a barrier to creating proper experience reports, despite the management's encouragements:

> *It has been a wish from the management that we prioritize time to evaluate ... however, a project manager is often on a new project before the old one is finished, and to prioritize time to evaluate can be difficult ... you do not always see the value, and when you do not see the value, it is more difficult.*

Other interviewees add to this complexity by highlighting how the quick transition between projects, for all project members, hinders the proper evaluation of past projects:

> *You are often in a phase where you are going straight to the next project and have often already started on the next project. You are also, in a way, a bit finished with the project that was, and put it behind you.*

We find, again, that the learning culture's short-sighted orientation decreases the relative value of creating experience reports, making it difficult for the employees to argue for its priority.

The problem with the experience reports is therefore a result of both structural and cultural barriers. On the one hand, the inward focus across subsidiaries results in the experience reports not being read across subsidiaries. Furthermore, the project-based organizational structure calls for early exits and quick transfers between projects, creating a sense of project completion prior to evaluation and creation of experience reports. On the other hand, the myopic orientation to time makes it difficult for the project members to prioritize the making of valuable experience reports. Furthermore, given that they, from

experience, know that no one will read the experience reports, they lack the motivation required to go through with the process.

As a result of the current format of the evaluation and experience reports not being utilized nor perceived as valuable, we find that the majority of the subsidiaries have created their own formats and ways of transferring experience between projects within the subsidiary. One subsidiary has created what they call "learning sheets":

> *If there is anything from the project that we think is useful for other projects… these two things for example – there is always a lot of things, but we cannot take everything – we make learning sheets about it, and then we go through them at joint gatherings*.

Similarly, another subsidiary presents project evaluations in internal meetings following project completion: "*Project evaluations… are presented in operational meetings* [internally] *with everyone, and you learn from it and take it with you*". Other subsidiaries mention that these forums for knowledge sharing after project completion is done in more role-specific forums: "*I know that we have it internally… you have meetings where the project managers meet and talk about projects and experiences*". When each subsidiary finds alternative ways to do the project evaluation internally, the learning is not transferred to other subsidiaries, nor stored in a central database for future reference.

Knowledge-Sharing Platforms. A majority of the interviewees identified the same platforms when asked to explain which platforms were available to them. This shows that the interviewees have a high level of awareness of the tools, platforms, forums, and arenas that are available for knowledge sharing. However, when asked which platforms they regularly make use of, the answers varied from very few to a combination of several platform groups. We find that the younger employees generally tend to use a combination of direct contact within the project or subsidiary and individual problem-solving:

> [For BREEAM related questions] *I first ask the one who is responsible in our subsidiary, whether he has any experience. But he is often busy and there are subjects he cannot give an answer to, so I use the project portal quite a lot.*

The younger employees often end up working individually, and as a result, end up "*suffering and feeling lonely because they are given the sole responsibility for BREEAM*". We find that the more experienced employees tend to make use of a broader set of platforms, by combining direct contact, a corporate-wide platform (e.g. Workplace or role-specific Teams channels), and individual search:

> *For BREEAM related questions I would probably go to Linn and the [Workplace] forum first ... then there is a project portal we can search through ... I also make use of the TQS for documents. That will be used actively in my next BREEAM project to save time on documentation.*

Despite a high level of awareness and familiarity with the available knowledge-sharing platforms, there seems to be a low rate of actual usage. Most interviewees mention the Workplace group "BREEAM Forum" as a relevant corporate-wide platform for knowledge sharing on this specific topic, however, the group's statistics show the same low usage rate as indicated by our interviewees. The group currently holds 39 members and consists of eight posts, spread out in time since the group's founding in January 2021.

Despite Backe offering knowledge-sharing arenas that are corporate-wide, the subsidiaries are found to develop their own substitutes. As seen in Table 2, a multitude of arenas are available to the employees, and they often serve many of the same purposes, for instance, document handling. While the corporation has made Workplace, Teams, the TQS, and the project portal available for knowledge and document sharing across subsidiary boundaries, the subsidiaries tend to use Teams mostly internally for document storage. Resultingly, the knowledge, documents, and relevant templates are accumulated at the subsidiary level and are not distributed further up and out to other subsidiaries. Several interviewees, from various subsidiaries, have reported the existence of subsidiary-specific topic-related databases.

> *It has just started in* [our subsidiary], *it is a Teams channel where you put in what you have done and the documentation you have per* [BREEAM] *subject. So I add everything we have of BREEAM documentation, "this is how it should look", so that you can actually try and retrieve and use some of it later.*

Contrary to the corporate-wide platforms, these platforms that were initiated by subsidiary employees, seem to have a higher rate of usage than corporate-wide platforms, indicated by the reported willingness to contribute. Like the example above, another subsidiary has established an internal TQS that allows room for insights and key points for future reference:

> *We have started internally, we have placed* [our BREEAM experiences] *in our internal TQS, where we have added some key points to remember for the future. We have internal templates in our subsidiary that we have not shared with the others.*

When we asked why the initiatives are only for their specific subsidiaries, the interviewees acknowledged that they could have been made available corporate-wide, but that there was just a lack of encouragement to go through with it: "*It should be for everyone, but it is an initiative that was started here and just happened to stay here. There is no reason why it should not be available for everyone*". When we asked why there was a need to create these internal substitutes for the corporate-wide platforms, several interviewees indicated that the current structures and platforms for knowledge sharing are insufficient, specifically pointing at the insufficiency of Workplace for document handling, the lack of BREEAM-related information in the TQS, and lacking user-friendliness of the project portal. As a result, the subsidiaries filled the need by implementing their own substitutes such as topic-specific Teams channels for document handling.

Despite the low usage rate, a handful of knowledge-sharing arenas were perceived by the interviewees to offer certain valuable features. Backe's physical courses are perceived to offer the value of creating cross-subsidiary relations, in addition to shortening the gap between the subsidiaries and the top management. One interviewee mentioned the positive effects of the flat organizational structure, which facilitates informal relationships across the hierarchy, "*I have no trouble talking to* [the Managing Director] *when I come in for a seminar or something*". The leadership development course, BackeStigen, was mentioned by several employees as offering value in terms of bringing employees together to "*share knowledge across subsidiaries*". The participants mentioned that the program successfully creates relations across subsidiaries, aiding the process of knowledge sharing:

> [Digital platforms] *connect employees across subsidiaries if we know each other from before… When we know each other, the Teams calls work great. So I would say* [BackeStigen] *brings us closer and shortens the distance to ask for help on the digital platforms.*

These courses increase knowledge sharing across Backe by decreasing some of the structural and cultural barriers to knowledge sharing. Firstly, the decentralized structure has been found to yield low functional awareness and familiarity across subsidiaries. Meeting in person increases the employees' relations and familiarity, facilitating greater functional awareness and sense of affiliation for future problem-solving. Secondly, the learning culture favors the knowledge that stems from close colleagues or projects that are perceived as "*close to heart*". Through programs such as BackeStigen, employees are getting more acquainted, which improves the relationship between colleagues from various subsidiaries and likely increases future knowledge sharing.

The role-specific forums, such as the Environment Manager forums, are perceived to be valuable for knowledge sharing and creating closer ties between the subsidiaries. The subsidiary-level Environment Managers play critical roles in generating group-level knowledge within their subsidiary, bringing the knowledge to the forum, and distributing new knowledge back down. Similar to the physical courses, these forums are found to increase functional awareness and the perception of closeness and familiarity across subsidiary boundaries.

The Workplace platform is perceived by the interviewees to hold relatively little value in its current form. The platform offers a way for all employees to hear about projects in other parts of Backe in addition to the possibility for two-way communication for all employees. Potentially, the platform could therefore offer value by allowing direct access between all employees in addition to its use as an informal information platform. In order to yield the potential value, however, the platform requires personal interest in making use of it: "*There are nice and pretty photos on Workplace where people post when they get new projects and stuff. So, if you want to know what is happening around Backe, you can*". However, it treads a fine line between the possibility of corporate-wide communication and loss of attention due to spam.

If I go around and ask my coworkers, I am probably the only one that has Workplace on my phone. It is what it is. They say that there are so many notifications there, they do not want it on their phones, and then they cannot share information there either.

Based on our analysis of the organizational structure and learning culture, we find that they both affect the employees' use of Workplace. The decentralized structure has created strong local identities in the subsidiaries, which favors an inward focus on "*what is happening*". Moreover, the structure hinders the formation of relations and familiarity across subsidiaries. In the same vein, the learning culture seems to hinder utilization of Workplace for two reasons. Firstly, the underlying assumption that knowledge is more valuable the closer and more familiar the source is perceived to be, affects the perceived worth of the information that is posted. Secondly, the myopic orientation favors value-creating production time over time spent on the platform. This structurally induced lack of relations, coupled with the culture's underlying assumptions, seems to negatively affect the utilization of Workplace as a knowledge-sharing platform.

Despite the various knowledge sharing platforms that are made available to employees both corporate-wide and within the subsidiaries, the employees are not found to make significant use of these opportunities. Our analysis indicates that employees are generally well aware of the various arenas, however, they choose to take the "easy way out" by either directly contacting the employees they know or asking the Environment Manager for help. This yields two negative consequences. Firstly, going directly to an employee they know from before instead of making use of corporate-wide experiences and best practices may yield suboptimal assistance, relative to the potential from drawing on a larger pool of knowledge. Secondly, relying on the Environment Manager as a single knowledge hub for connecting individuals leaves the BREEAM processes quite vulnerable to resignation.

4.2.4 Summary and Concluding Thoughts on Findings and Analysis

In summary, the empirical findings depict a corporation that experiences relatively low levels of knowledge sharing, despite offering both digital and physical platforms and arenas to connect employees across projects and subsidiaries. After analyzing the interviews for trends and patterns of reported barriers to knowledge sharing, we identified eight themes in total: Three structural

and five cultural barriers. Lastly, we showed how knowledge sharing is affected by the interplay between structural and cultural barriers, by looking into how these barriers affected the utilization of available knowledge-sharing arenas and platforms.

Furthermore, the reported difficulties of successful implementation of the Ett Backe initiative showed the interconnected nature of organizational structure and culture, indicating the need to handle the two collectively. Based on the eight themes we identified, we have found three pairs of structural and cultural barriers that are self-reinforcing and may therefore require concurrent measures.

Firstly, knowledge sharing is made difficult by the combined effects of the lack of perceived affiliation and the assumption that knowledge from close colleagues is more valuable. The analysis showed that the current organizational structure has led to a fragmented corporation with subsidiary employees reporting both geographical and mental distance to other subsidiaries. This distance hinders the willingness to make use of external knowledge, as information from close colleagues is culturally assumed to be more relevant. These factors feed into each other and maintain the distance and lack of sharing that is currently found.

Secondly, the combined effects of lacking functional awareness and not sharing the responsibility for problem-solving, lead to reinforcing cycles of isolated learning environments. Due to a lack of interaction between subsidiaries, the employees are generally unfamiliar with their network of colleagues with relevant experience, in addition to being uninformed about the various projects that are completed or undergoing in Backe's total portfolio. This barrier is reinforced by the cultural assumption that individuals are single-handedly responsible for learning, developing, and problem-solving. This leaves employees with the reported sensation of being alone, and further discourages interaction across subsidiaries.

Thirdly, we find that the reluctance toward centralizing knowledge is increased by the cultural zero-sum mindset that gatekeeping knowledge is required for personal success. These barriers may reinforce the current misconception of who holds the responsibility to initiate corporate-wide knowledge sharing. The headquarter points to their contribution of establishing knowledge sharing platforms, while the subsidiaries, on the other hand, report the need for more top-down facilitation, as no one wants to initiate sharing in fear of oversharing, for the sole enjoyment of non-sharing subsidiaries.

Chapter 5: Discussion

Based on our analysis of the empirical finding, we have revised the initial conceptual framework to include the concepts that were identified in the data structure. The revised conceptual framework (Figure 6) will guide our discussion toward answering our research question.

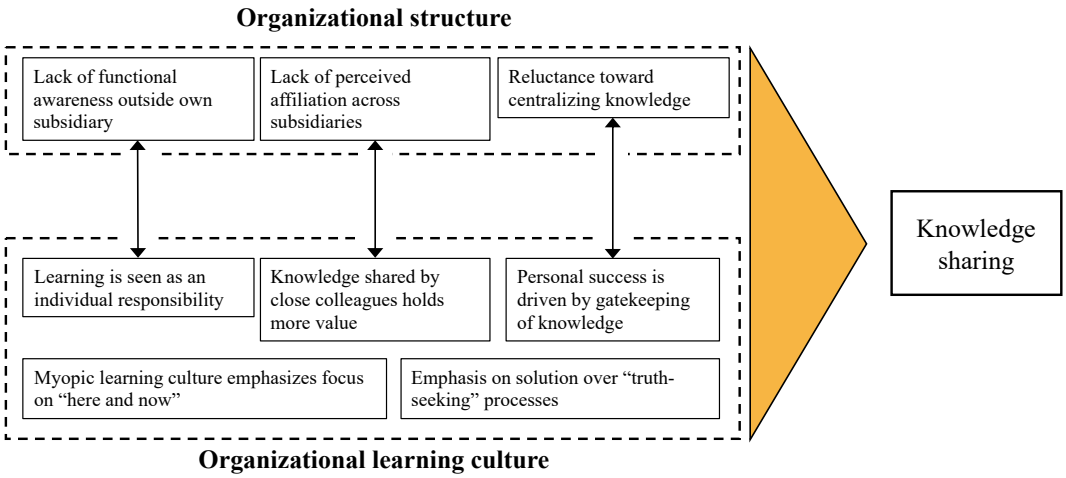

Figure 6: Revised conceptual framework showcasing the interrelationships of the 2nd-order themes

The revised framework depicts the eight second-order themes that were identified through our analysis of the empirical findings to affect knowledge sharing. Additionally, the vertical arrows indicate the three interrelationships that were found between themes in the two aggregate dimensions, organizational structure and learning culture. This chapter aims to relate our findings from the previous chapter to existing literature on cultural and structural barriers to knowledge sharing. We start by discussing the two cultural barriers that we did not find empirical evidence for affecting knowledge sharing in an interplay with structural barriers, before moving on to the three identified interrelationships.

5.1 Myopic Learning Culture

The first cultural barrier to knowledge sharing that we identified is the myopic, or short-sighted, learning culture that emphasizes the focus on "here and now" and short-term value creation. We found through our analysis of the empirical findings that organizational myopia negatively affects knowledge sharing by decreasing the perceived future value of engaging in knowledge sharing, in favor of current, value-creating production time. Additionally, the myopia negatively

affects proactive behavior, which participants reported leads to hectic time management and lack of knowledge sharing. As discussed in our literature review, Schein (2017) points out optimal orientation toward the future as one of the critical basic assumptions for high-functioning learning cultures. According to him, an optimal temporal focus is of medium length, which provides the organization with the ability to assess the consequences of selecting various solutions or courses of action, while also enabling the team to adapt in due time, should the selected solution or action yield a dissatisfactory outcome. The negative effects of myopia are also supported by Levinthal and March (1993) in their seminal article "The myopia of learning". The article discusses myopia as a consequence of the two learning mechanisms simplification (simplified interpretations of complex experiences) and specialization (narrow attention and competence focus). Although they do not explicitly discuss learning culture, we argue that the negative effects of myopia that Levinthal and March (1993) identified are relevant for our discussion as well. Similar to Schein (2017), they pose that a medium-length orientation toward time would yield a better balance between exploration (future-focused, proactive behavior) and exploitation (here-and-now, value-creation).

Contrary to our finding that the myopic learning culture leads to less proactive behaviors, Schein (2017) argues that proactivity is a separate basic assumption that is also critical for successful learning cultures. He states that organizations must not fall into passive acceptance toward their environment, but instead engage in proactively generating solutions. It could be that the two assumptions are so closely intertwined that our finding is influenced by Backe's strong myopia. In theory, we agree that although the organization's learning culture broadens its temporal orientation, proactivity can still be assumed to not hold sufficient value, however, in the case of Backe, the myopic orientation hinders the existence of proactivity.

Although we found little empirical evidence to identify an interplay between the second-order cultural theme of temporal myopia and organizational structure, some academic literature discusses how the temporary characteristic of project-based organizations imposes time constraints, hecticness, and short-term orientation on behavior (Boge et al., 2021; Grabher, 2002). Grabher (2002, 2004), argues that a defining feature of projects is the constant, overarching, presence of short-term deadlines, which inhibits knowledge management processes and causes

organizational amnesia. Moreover, a Norwegian study on project management in building projects found that such projects must balance the short-term value creation that favors the construction company, against long-term value creation for other project stakeholders (e.g. client and user). They argue that, in practice, project members are often measured based on the "iron triangle" (Boge et al., 2021, p. 2), in other words, time, cost, and quality. Evidently, we find that time constraints make up a defining characteristic of the project-based organizational structure. According to Schein's (2017) three levels of organizational culture (Figure 2), cultural artifacts include "structural elements such as charters, formal descriptions of how the organization works, and organization charts" (p. 17). Consequently, one may argue that Backe's project-based structure, with its associated time squeeze (we had several participants referring to the constant "tidsklemme" in projects), can be understood as a surface-level artifact of the organizational learning culture's myopia. On the one hand, the organizational structure seems to have played a part in establishing a learning culture that emphasizes short-term value creation, instead of broadening the focus toward a medium-length orientation that balances the two polar fronts of "here-and-now" value creation and future value. On the other hand, Backe's myopic learning culture seems to keep the current structure and project management processes at a standstill, by not allowing time to explore new solutions. To put it concisely, based on our discussion of the literature above, coupled with our empirical findings, we find that the interplay between the project-based structure and the myopic learning culture causes a self-reinforcing effect on the perception of time that hinders knowledge sharing.

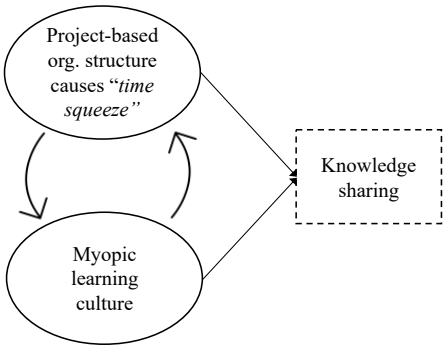

Figure 7: Model depicts interplay between myopia and project-based organizational structure

5.2 Focus on Solution Over Process

Another second-order theme that we identified was the learning culture's focus on solutions over "truth-seeking" learning processes. Through the analysis of our empirical findings, we found that this cultural barrier affects knowledge sharing by emphasizing the "path of least resistance" in problem solving, coupled with an assumption that experience makes up for the need to problem solve collectively. This cultural barrier is best explained by being the opposite assumption to Schein's (2017) fifth basic assumption for successful learning cultures: "Commitment to truth through inquiry and dialogue" (p. 346). He argues that every learning organization must hold the assumption that the learning process to collectively search for truth is a shared responsibility and the optimal process for problem solving. By emphasizing truth instead of solutions, Schein (2017) highlights the difference between what he considers to be any solution to a problem versus the most widely accepted solution ("the truth"). In Backe's case, we find that the culture assumes that any solution, regardless of how it was retrieved, that functions and gets the job done, is "true". However, this assumption is not found to be optimal for learning organizations. According to Schein (2017), learning organizations must avoid "the automatic assumption that wisdom and truth reside in any one source or method" (p. 346), which we found to be the case in Backe, that employees tended to make use of few sources and methods in their endeavors to seek truth.

As we briefly touched upon in the previous chapter, there is a difference in the level of complexity of problems, which requires different levels of collective problem solving. The basic assumption we have discussed above does not necessitate collective brainstorming sessions for all problems encountered in a project, but rather the acknowledgement that not all problems can, or should, be solved in the same individualistic manner. In his study on team-based complex problem solving, Hung (2013) differentiates between "simple, linear, well-structured problems that have one single straightforward solution" (p. 366) and complex problems that often require "more sophisticated cognitive processing … [and that are often] so complex that they exceed the cognitive capacity of any individual" (p. 366). According to him, complex problems are best handled in teams that make use of complementary strengths. The strength of team-based problem solving is often attributed to "team cognition", which is defined as a group interaction activity, and is generally observed in the context of complex problem

solving (Cooke et al., 2013). One particular strength that team cognition has over individual problem solving is that researchers find that "team cognition is not equal to the sum of its parts" (Cooke et al., 2013, p. 270), but rather greater than the sum of the individual group members. This, in turn, enables groups to tackle more complex challenges. These findings align with Schein's (2017) basic assumption that members of a learning organization should be open to utilizing various methods and sources to solve problems, and therefore not assume that optimal solutions are found through individualistic means.

In analyzing our empirical findings, we found no interplay between this cultural barrier and any of the structural barriers, we therefore look to literature to see if such a relationship may exist. A prominent feature of the project-based structure is interdependency between the project members to solve problems and complete their predetermined task (Cooke et al., 2013; Goodman & Goodman, 1976; Grabher, 2002; Hung, 2013). According to Goodman and Goodman (1976), this characteristic is an enabler for knowledge sharing in projects since the complexity of the task requires project members to "keep interrelating with one another in trying to arrive at viable solutions" (p. 495). The reason for this interdependence, with the accompanying need to interrelate, stems from two characteristics of projects. First, project teams are by definition made up of members that hold specific knowledge that is the reason for their participation in a project, in other words, the members are specialized in one or more project domains (Cooke et al., 2013; Hung, 2013). Resultingly, they must come together to solve tasks throughout the project to meet deadlines and milestones (Grabher, 2002). Second, another identifying characteristic of a project is its *raison d'être,* namely that it exists temporarily to solve a particular task. The project members are therefore dependent on all participants to perform their tasks according to a predetermined time and quality, in order to accomplish their task and successfully complete the project (Grabher, 2002). In talking to employees that have experience from overseeing BREEAM in construction projects, we found that there was a general notion that this task was "on the side" of the actual construction project. Several participants mentioned being alone in their responsibility and that their task was dealt with "down the hall". Although the certification itself is of utmost importance in successfully completing the project, this task was not seen as interdependent to any of the other project tasks. Resultingly, what we find is that

this feature of the project-based structure should, in theory, be an enabler for knowledge sharing, due to the interdependency between the project members. However, in our context with BREEAM-related knowledge, this enabling feature of projects may become an inhibitor to knowledge sharing, since all project members, except the one in charge of BREEAM, are interdependent in solving their tasks. While this finding does not enable us to hypothesize about any potential interplay between the structural and cultural barrier, we find that the interdependency may have opposing effects on knowledge sharing, depending on the task in question. In short, based on the literature we have discussed above and the analysis of our empirical findings, we conclude that Backe's solution-focused learning culture is suboptimal for knowledge sharing in general, while the project-based structure has both positive and negative effects on knowledge sharing depending on the task.

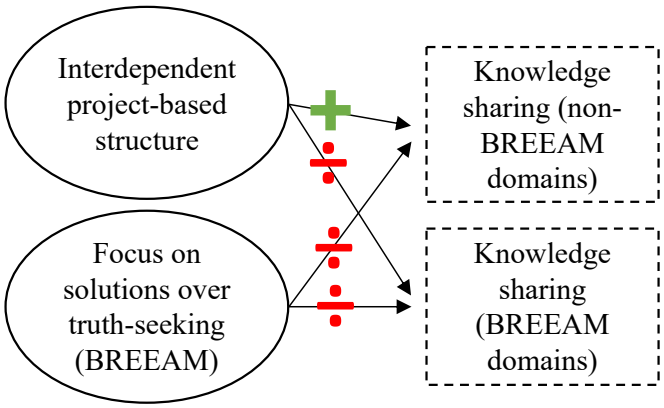

Figure 8: Identified relationship between project interdependency and cultural solution focus

5.3 Lack of Functional Awareness and Learning as Individual Responsibility

One of the cultural and structural interplays we found to affect knowledge sharing is the lack of functional awareness across subsidiaries and the learning culture's basic assumption that learning is an individual responsibility. In our analysis, we found that the corporate structure hinders knowledge sharing by yielding low functional awareness across subsidiaries, in other words, the subsidiary employees are generally unfamiliar with employees and projects that belong to other subsidiaries than their own. This was evident by their reported lack of relations across subsidiaries, and the frequent mentioning of learning silos and small learning environments. Resultingly, we found that this hindered them from

seeking knowledge outside their own subsidiary, since they had little awareness of who possessed relevant knowledge that they could tap into. This relationship between structure and knowledge sharing is supported by Hansen, Mors, and Løvås' (2005) finding that reaching out across subsidiaries to seek knowledge is positively related to the size of the inter-subsidiary network (i.e. the number of relations to contact points in other subsidiaries). In other words, the probability of seeking knowledge outside one's own subsidiary increases with the number of relations one possesses. Moreover, the project-based organizational structure is thought to hinder functional familiarity on all levels, project, subsidiary, and corporate, due to insufficient time to engage in such clarifying activities (Grabher, 2002). This lack of functional awareness, which is caused by the organizational structure, may explain the low prevalence of reaching out to employees from other subsidiaries with relevant BREEAM-related knowledge.

From the perspective of the organizational learning culture, our analysis of the empirical findings indicated that there exists a basic assumption that learning is not a shared responsibility, but rather a responsibility belonging to the individual. This is based on the identified lack of routines and norms for feedback and evaluation, coupled with reports that indicate that when employees reach a certain level of experience, knowledge-sharing activities is perceived as "a waste of time". Schein (2017) mentions learning as a shared responsibility in relation to the assumption of commitment to truth-seeking process over solutions. He poses that a learning organization that sees the task of learning as a shared responsibility has the optimal foundation for engaging in truth-seeking processes. In Backe's case, the individual responsibility of the learning culture hinders knowledge sharing by raising the mental cost of reaching out to seek knowledge, but also, on the sender's side, the cost of sharing knowledge.

In our analysis, we found that there is an interrelationship between the aforementioned structural and cultural barrier. The structural barrier, lack of functional awareness, may reflect a belief that there is little benefit in establishing relations across subsidiaries. We see this belief reinforced in action, both from the subsidiaries and the headquarter. First, the subsidiaries are generally disinterested in making use of the available corporate network, which is reflected in the low use of corporate-wide platforms such as Workplace. Moreover, participants in our study reported low cross-subsidiary interaction in settings where several subsidiaries were

present (such as physical seminars at the headquarter). They explained this phenomenon with the tendency to "stick to the ones you know". From the headquarter's perspective, very little has been done, up until recently, to establish ties across subsidiaries, except for the subsidiary managers. According to Schein's (2017) three levels of organizational culture (Figure 2), we may understand this structural barrier (lack of functional awareness caused by, among others, siloed subsidiaries) as a first-level artifact, namely a visible representation of underlying beliefs and assumptions. In turn, the artifact reflects the second level of culture, the espoused beliefs and values, in which we find that these silos may be partially caused by the belief that there is little added value in cross-subsidiary ties. On the third level of Schein's (2017) cultural analysis are the basic underlying assumptions, which is where we identify the interrelationship between structure and culture. We assume that one of the underlying assumptions that explain the two upper cultural levels is the assumption that learning is an individual responsibility. In practice, we find that the structural barrier hinders knowledge sharing by raising the cost of seeking out relevant contact points outside one's own subsidiary. Similarly, we find that the cultural assumption hinders knowledge sharing by adding to the mental cost of reaching out across subsidiaries, which also self-reinforces the subsidiaries' siloed structure.

However, on a positive note, we noticed an increase in cross-subsidiary relations due to BackeStigen, which intentionally paired up employees from separate subsidiaries. Participants noted that this "forced interaction" lowered the mental barrier to reach out for help. This aligns with the finding that seeking knowledge outside one's subsidiary is positively related to the size of the cross-subsidiary network (Hansen et al., 2005). Thus, there are structural changes taking place that may have a positive effect on knowledge sharing, going forward.

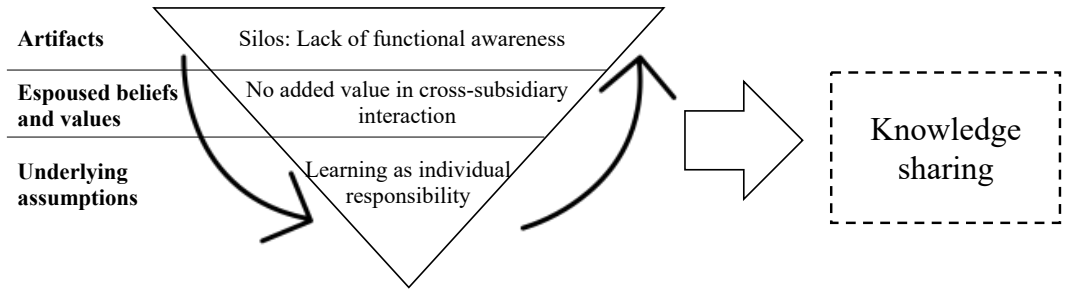

Figure 9: Model of interplay between lack of functional awareness and learning as individual responsibility, adapted from Schein (2017)

5.4 Lack of Perceived Affiliation Across Subsidiaries and Preference for Knowledge from Close Colleagues

We identified an interplay between the structurally induced lack of perceived affiliation across subsidiaries and the culturally bound preference for knowledge from close colleagues. These two second-order concepts were found to individually hinder knowledge sharing across subsidiaries, but also self-reinforcing these barriers in a collective interplay. The structural barrier, lack of perceived affiliation across subsidiaries, was established as a second-order theme based on findings that indicated that the subsidiaries were fragmented, referring to their own subsidiary as their "family", and the subsidiary landscape as "separate turfs". This identified mental distance was coupled with the inherent geographical distance. In sum, we find these factors to hinder cross-subsidiary knowledge sharing by placing an inward focus on the employees and strengthening their intra-subsidiary network. This intra-subsidiary barrier is supported by Hansen, Mors, and Løvås (2005), that find that the density of the network within a group is negatively related to seeking knowledge across subsidiaries. The density, in this study, is defined as the number of in-group relations an employee possesses, divided by the number of total relations possible. In other words, they found that the more people you know in your in-group, the less likely you are to search for assistance and knowledge outside your group. Moreover, they also find that the strength of these in-group relations (strength in this setting is defined as the "frequency and intensity of interactions (Hansen et al., 2005, p. 779)) is negatively related to knowledge search outside one's own subsidiary.

In relation to the structural barrier discussed above, we find that the learning culture assumes that knowledge holds more value (in terms of relevance and usefulness) when it is shared by those who are perceived as close colleagues. While this assumption is not explicitly supported by Schein (2017) in his ten basic assumptions for optimal learning cultures, there is research that supports this tendency to favor knowledge from sources of which one holds a closer relationship. According to the findings of Pacharapha and Ractham (2012), a receiver of knowledge is more likely to acquire knowledge from a source that they 1) trust the competence or expertise of, and 2) share a language and narrative with. Furthermore, interpersonal relationships between employees that involve a social dimension of care and concern are found to foster affect-based trust, which drives

motivation and opportunities for learning (Bartsch et al., 2013; McAllister, 1995). In Backe's case, the frequent use of the word "family" to describe their subsidiary points to close, affect-based, ties between the employees. These family-like ties can therefore give meaning to the cultural assumption that knowledge from close colleagues is of higher value than knowledge from external sources (outside the subsidiary).

Similar to the interplay discussed in the previous section, we find that the two barriers of this chapter are interrelated at separate levels of Backe's organizational learning culture. On an artifact level, we find the corporate structure that causes mental and spatial distance between subsidiaries with strong local identities. Further, this artifact is based on Backe's highly emphasized belief that locally connected, autonomous subsidiaries are the corporation's main competitive advantage. As the local affiliation is cultivated by the corporation, one of the main consequences is the lack of perceived affiliation across subsidiaries. Lastly, this belief in local autonomy seems to stem from a basic underlying assumption that knowledge shared by close colleagues holds more value than from other sources, in terms of relevance to one's own tasks. This factor of proximity in evaluating knowledge is also reflected in the belief of local autonomy, as close colleagues share local expertise and experiences that are thought to provide competitive advantage.

The interplay between the two barriers is found to affect knowledge sharing due to a self-reinforcing cycle. The structural barrier, the lack of perceived affiliation across subsidiaries, creates a significant divide between those that are perceived as close colleagues and those that are not. Resultingly, the lack of social relationships with colleagues from other subsidiaries, in addition to the lack of shared narratives, may cause distrust in cross-subsidiary sources and a resulting devaluation of their knowledge. This, in turn, reinforces the cultural assumption. In the other direction, the underlying assumption that close colleagues hold knowledge of higher value affects the willingness to seek out relevant sources across subsidiary boundaries, which further reinforces the lack of relations and the perceived lack of affiliation.

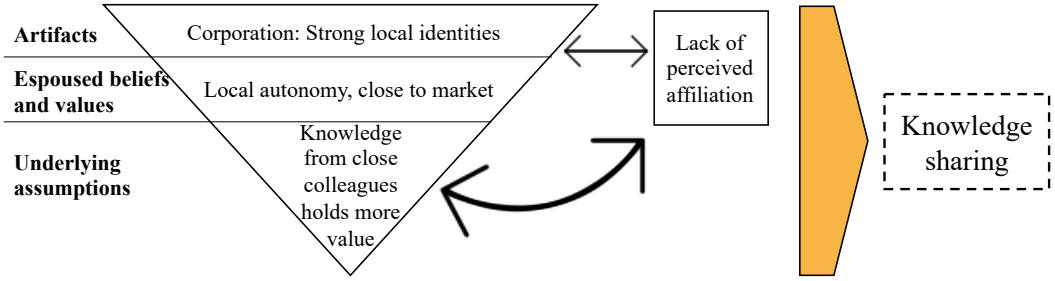

Figure 10: Model of interplay between lack of perceived affiliation and knowledge from close colleagues, adapted from Schein (2017)

5.5 Reluctance Toward Centralizing Knowledge and Personal Success Driven by Gatekeeping

The final interrelationship we identified from our second-order themes was the interplay between the structural barrier of centralizing knowledge and the learning culture's assumption that gatekeeping knowledge drives personal success. In our study, the participants reported having suboptimal platforms to facilitate sharing across subsidiaries. We found that employees on all levels of the organization were generally positive toward a centralized platform for knowledge integration, storage, and retrieval. However, while the subsidiaries called for the headquarter to implement such infrastructures, the management was hesitant and reluctant toward imposing top-down decisions on the subsidiaries. The management argued that certain structures were already in place for such use, but that they were not perceived to be well received by the subsidiaries (as experienced by the lack of engagement in the BREEAM Workplace forum). We therefore found that there was a general reluctance in the organization to take charge in implementing new infrastructure to integrate BREEAM-related knowledge in a centralized location. When discussing centralized integration of knowledge, it is useful to distinguish between tacit and explicit knowledge. Explicit knowledge is described as information in terms of declarative statements reflecting the reality of a situation (Kogut & Zander, 1993). This "*knowing about*" (p. 111) is characterized by its ease of "transfer across individuals, across space, and across time" (Grant, 1996, p. 111). Contrarily, tacit knowledge is procedural know-how that is less easily codified and transferred, and usually requires slow and costly transfer through observation and practical application (Grant, 1996; Kogut & Zander, 1993). In speaking to our participants, we found that the main need for knowledge sharing within the BREEAM domain, at this point in time, is linked to templates, checklists,

and guides. Several pointed out that they start from scratch with adding logos to generic templates, instead of borrowing a ready-made template from another project. Templates, checklists, and guides are explicit forms of knowledge, that can easily be transferred to a centralized infrastructure for corporate-wide integration and reuse. Research shows that digital knowledge-sharing platforms positively affect the combination of explicit knowledge, which is the conversion of "explicit knowledge into more systematic sets by combining key pieces" (Lee & Choi, 2003, p. 189). According to Grant's (1997) knowledge-based view of the firm, knowledge should be stored close to the relevant decision-making authority. This entails that procedural and tacit knowledge should be delegated outward to the autonomous subsidiaries. The explicit knowledge, however, such as the aforementioned templates, checklists, and guides, is more generalized across BREEAM projects, and may therefore best be stored close to the centralized BREEAM asset of the corporation, the Environment Manager, in some sort of a centralized knowledge management platform, such as a database. This is not to say that the system should be operated top-down, the responsibility to maintain, make use of, and contribute knowledge remains the responsibility of the subsidiaries. The centralization of knowledge should therefore not be confused with the centralization of the organization.

We found that the structural barrier discussed above was related to the learning culture through the assumption that personal success is driven by gatekeeping knowledge. This assumption is found to be debilitating for knowledge sharing, since it causes hesitancy toward seeking help and sharing knowledge. We found this assumption to play out through mistrust and fear of negative repercussions in situations where employees either wanted to seek help or share unsolicited pieces of advice. Trust has long been established as an important factor for facilitating knowledge-sharing processes in all types of intra- and inter-organizational contexts (Das & Teng, 1998, 2001; Mayer et al., 1995; Scott, 2000). Trust is found to play an important role as it promotes risk-taking and reciprocation between actors to openly share over time. In Backe's case, the mistrust is particularly related to being perceived as lacking control of one's own tasks, and employees are therefore afraid to engage in situations that may harm their reputation. This is explained in research as lack of benevolence-based trust, which is found to be an equally important factor in knowledge sharing, as trust in the

competence of the source (Abrams et al., 2003). One of the drivers of such inter-personal trust is the perception of mutual benefit (Scott, 2000). In the case of Backe, we find that the cultural assumption that success is driven by the perception of control and expertise, which is acquired through gatekeeping knowledge, negatively affects the perception of gaining mutual benefit from knowledge sharing. Thus, this may partially explain the lack of trust that we found to be the case in our study.

Based on our analysis of the empirical findings coupled with existing research, we identified an interplay between this structural and cultural barrier. By adapting Schein's (2017) framework to our purpose, we find that the lack of centralized structures for integration of knowledge is a cultural artifact that reflects the cultural assumption of success through gatekeeping. We find support for our finding that gatekeeping knowledge naturally hinders knowledge sharing, in Schein's (2017) seventh assumption, "commitment to full and open task-relevant communication" (p. 347). He argues that a learning organization must be built on an assumption that telling the truth and sharing openly is most optimal for the organization and the well-being of its employees. We find, therefore, that the learning culture affects knowledge sharing by yielding decentralized structures that are reluctant toward integration of knowledge in centralized structures. This effect is also moderated by trust, and in this case, in a negative and reinforcing direction due to the lack of trust. Similarly, the decentralization does not foster trust across subsidiaries, which reinforces the gatekeeping of knowledge. This aligns with Lee and Choi's (2003) finding that the combination of knowledge, conversion of "explicit knowledge into more systematic sets by combining key pieces" (p. 189), is affected by trust. In other words, regardless of the type of centralized knowledge integration structure that is chosen, inter-subsidiary trust must be established before knowledge sharing successfully can take place.

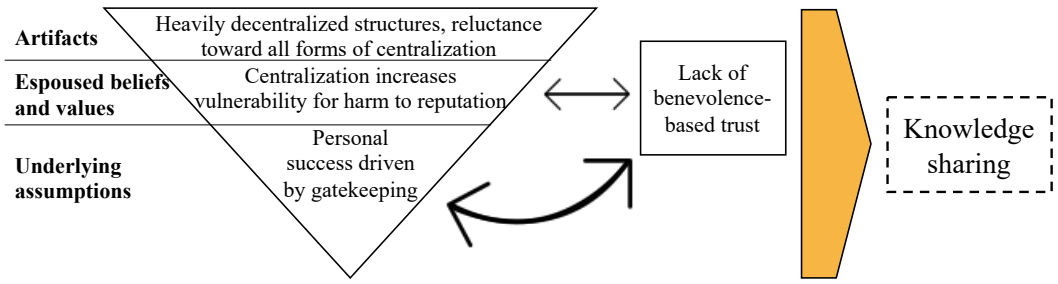

Figure 11: Model of interplay between reluctance toward centralization and gatekeeping of knowledge for personal gain, adapted from Schein (2017)

Chapter 6: Conclusion

In this chapter, we aim to present an overall conclusion of the thesis by expanding on the theoretical and practical implications of our findings. This will be followed by a discussion of the limitations of our study, together with some recommendations for future research.

6.1 Theoretical Implications

The objective of our study has been to explore the interplay and relationships between structural and cultural barriers to knowledge sharing, specifically in project-based organizations. Through a review of relevant literature, we found there to be ample evidence for the existence of both types of barriers, with some articles going to the next step of suggesting a relationship between structure and culture (e.g. Lee & Choi, 2003; Zheng et al., 2010). However, additional research was needed to understand how the barriers are interrelated, such that a holistic approach to overcoming said barriers could be implemented. The research was performed through a single-case study of the Norwegian construction firm, Backe. Data was collected using semi-structured interviews with employees on a variety of levels in the organization, all selected based on their experience with a particular knowledge domain, namely BREEAM-NOR certifications.

To the best of our knowledge, this study makes several contributions to the existing body of research on barriers to knowledge sharing. First, we provide insights into the interplay between structural and cultural factors that affect knowledge-sharing processes. Although our methodology does not allow us to infer causality or suggest any relative impacts on knowledge sharing, our findings yield useful interrelationships in which future research may be built upon. By making use of Schein's (2017) framework for cultural analysis, we were able to identify how culture and structure are inherently tied together and must therefore be assessed in combination to identify the combined effects on knowledge sharing.

Our second contribution to the existing body of research is the eight specific barriers we identified. By probing into the factors our participants reported as hindering knowledge sharing, we were able to identify the more underlying dimensions. For instance, while previous research has found the geographical distance between subsidiaries, projects, or departments to hinder knowledge sharing (Riege, 2005; Wang & Noe, 2010), we do not see this as the core problem, as

knowledge sharing can be facilitated in practice by the use of various IT tools. Instead, we find that knowledge sharing is hindered by the lack of affiliation across subsidiaries that is caused by the mental and geographical distance.

The third contribution our study makes to literature on knowledge sharing is the identification of how certain factors hinder and facilitate knowledge sharing depending on the level of the organization. In our study, we explored knowledge sharing between individuals, projects, and subsidiaries, and were, therefore, able to indicate instances where a single factor was both hindering and facilitating sharing. This was particularly the case for the cultural assumption that knowledge shared by close colleagues held more value. This was a facilitating factor for intra-subsidiary knowledge sharing, but a barrier for cross-subsidiary sharing. This aspect of our thesis answers Wang and Noe's (2010) call to action for multilevel analysis of barriers to knowledge sharing. Additionally, we make a minor contribution to another call to action made by Wang and Noe (2010), namely how in- and out-group membership affects knowledge sharing. In our study, we found that the subsidiary employees felt little to no affiliation to employees of other subsidiaries, which could be regarded as a form of in- and out-group phenomenon. This was found to be a barrier to knowledge sharing, due to lack of benevolence-based trust and an inward focus on the in-group social network.

6.2 Practical Implications

The aim of our thesis was to explore how organizational structure and learning culture affects knowledge sharing in project-based organizations. In addition to providing contributions to gaps in the existing body of research on knowledge sharing, our research also offers some implications for practice and thus may be a valuable starting point for practitioners and managers. In essence, our findings point toward the necessity of taking a holistic approach to knowledge management in order to increase knowledge sharing in an organization.

Our main contribution toward knowledge management in practice, is the identification of interplay between structural and cultural barriers. This finding indicates the need for managers to explore their distinct barriers in depth before implementing systems, policies, cultural change programs etc. in an effort to increase knowledge sharing. This is due to the bi-directional relationship between culture and structure, where a change in one factor may cause unintended effects in

the other, or conversely, a change in one factor may have no effect due to the reinforcing effect of the other (e.g. the implementation of a much-wanted knowledge management system to reduce the lack of functional awareness across subsidiaries, that ends up not used due to interrelated cultural barriers (McDermott & O'Dell, 2001)).

For the organization to overcome these barriers in an effort to increase knowledge sharing, we propose four focus areas:

- **Establish a database for knowledge sharing:** This can either be done by implementing a new system for knowledge integration, or by drawing up clear routines for the use of Backe's existing knowledge sharing platforms (e.g. Workplace, Teams or the TQS). The selected database has two main functions for knowledge sharing within the domain of BREEAM-NOR: 1) Storing of explicit information for easy retrieval (e.g. checklists, templates, and "tips and tricks"), 2) An overview of employees with relevant experience from BREEAM projects. Thus, the majority of the input should be declarative, which is explicit information that is easily shared (Grant, 1996; Kogut & Zander, 1993). By implementing such a database, the organization handles one of the critical structural barriers, the lack of functional awareness across subsidiaries.
    - While this implementation may be hindered by the reluctance toward centralizing knowledge, we argue that it does not need to be organized as a top-down initiative that takes away expertise and autonomy from the subsidiaries. We believe the process must be initiated from the management, then maintained by the subsidiaries.
- **Programs for cross-subsidiary collaboration:** We recommend that measures should be taken to increase interaction between subsidiaries. This would have positive effects on the lack of perceived affiliation, as well as positive effects on the cultural barriers, particularly the assumption that knowledge shared by close colleagues holds more value. According to Schütz and Bloch (2006) interdepartmental (or subsidiaries in our case) projects are good remedies for siloed structures, as employees are given a task with a mutual goal. The newly implemented program, BackeStigen, is a prime example as it enables cross-subsidiary interaction and collaboration.

- **Run a proper culture change process:** In order to make changes to the existing learning culture, Backe needs to acknowledge which cultural assumptions are effective and which are suboptimal for the future of the organization. We recommend following the steps of Schein's (2017) process for cultural change, which is based on three distinct steps. Step 1: Make certain the organization is motivated and ready for change. Stage 2: Go through the actual change process to establish new organizational assumptions. Stage 3: Refreezing and internalizing the new assumptions. The process should deal with one assumption at the time, to allow sufficient focus and attention for it to adapt correctly. We pose that the cultural barrier "personal success is driven by gatekeeping of knowledge" would be a good assumption to begin with.
- **Recruitment of young generation with focus on learning culture during onboarding:** According to Schütz and Bloch (2006), recruitment of young people who possess a broader mindset for knowledge sharing can stimulate the process in a positive direction. As part of their onboarding, they should be allowed to meet and collaborate with various departments, to provide a wide perspective and understanding of the organization. This allows for interdepartmental networking and may allow the younger employees to seek knowledge across boundaries more easily. From interviewing young employees in Backe, we found that they were generally eager to share and learn from others, but hesitated for reasons that we have discussed throughout this thesis, as they have become embedded into the suboptimal learning culture. Additionally, we find that the younger employees are more inclined to make use of IT software, and thus may become ambassadors for new systems and procedures.

Based on the findings of our thesis, we recommend seeking to increase knowledge sharing by focusing on a combination of structural and cultural changes. As we discovered, the structural barriers are interconnected with the learning culture as we explored through Schein's (2017) three levels of culture. According to him, the most important thing for leaders to keep in mind when fostering a learning culture, is consistency. A leader transmits cultural assumptions through a variety of ways, including, but not limited to: Action, inaction, interaction, control measures, and

design of physical space, and should aim for consistent messaging across all forms (Schein, 2017).

6.3 Limitations and Recommendations for Future Research

In order to answer our research question within the given time and scope of a master thesis, we had to make certain choices that may have impacted the transferability of our findings. The first potential limitation of our thesis is the lack of analysis for potential sub-cultures. While we acknowledge that sub-cultures may be actively affecting knowledge-sharing between subsidiaries in Backe, this was not possible to include due to constraints on time and scope. The possibility that there are distinct differences between the subsidiaries' cultures, was mentioned in both interviews with headquarter employees, and would therefore be an interesting topic for future research.

Second, our thesis took a broad perspective on knowledge sharing, and thus did not differentiate between seeking, sharing, and receiving knowledge. As our thesis focused on factors that affected knowledge sharing in general, this distinction was not found to be of particular relevance. However, we acknowledge that barriers may affect the various phases of knowledge sharing differently. It would therefore be interesting for a future study to focus the research on one phase of knowledge sharing.

The third limitation of this study is that we did not isolate our scope to only inter-project barriers, but also included cross-subsidiary barriers. This may limit the transferability of our findings to other pure PBOs without subsidiary structures. However, we chose to include these barriers, as they were found to play a significant role in hindering knowledge sharing in our empirical setting.

Lastly, based on Wang and Noe's (2010) framework of knowledge sharing research, we find that there may be other important factors that affect knowledge sharing, that were not included in our thesis.

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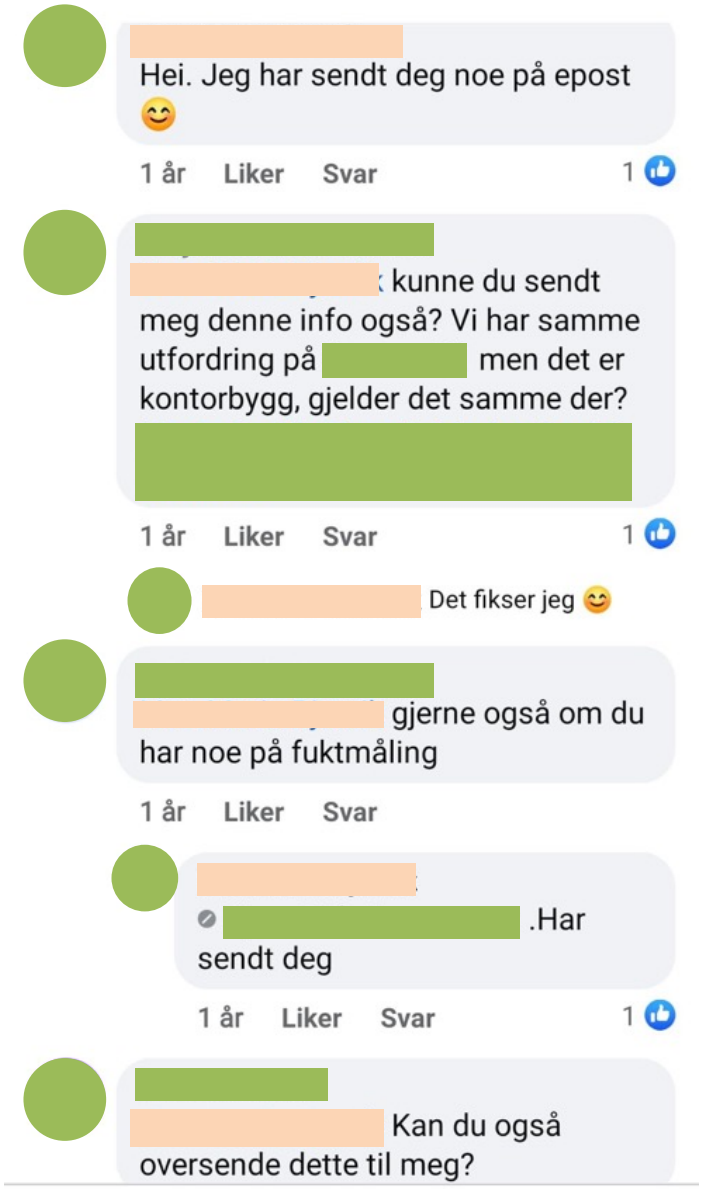
Appendix

A.1 Limited Open Knowledge Sharing in Workplace Group



A.2 Interview Protocol

1.0 Intervjuobjektets bakgrunn	
1. Kan du fortelle oss litt om deg selv, din alder, yrkesbakgrunn og din erfaring med BREEAM?	• Hva er din rolle i Backe? • Hva er din erfaring med BREEAM? ○ Prosjekter/kursing/sertifisering • Formell/uformell erfaring med BREEAM

2. Til AP: Kan du si noe om hvorfor du valgte å ta AP sertifiseringen? 3. Ikke AP: Opplever du at du blir oppfordret av lederne dine til å øke din kompetanse på BREEAM?	• Føler du at du ble oppfordret av din leder til å sertifisere deg?
2.0 Om Backe	
4. Hvis du skal forklare arbeidsplassen din til noen som ikke jobber der, hvordan ville du beskrevet Backe og menneskene som jobber der?	• Er det felles kjennetegn? Er det stort mangfold? Er det en viss type mennesker du føler ønsker å jobbe i Backe?
5. Føler du mest tilhørighet til konsernet Backe, ditt lokale entreprenørselskap eller prosjektet du jobber på?	• Når du blir spurt hvor du jobber, føler du da at det holder å si at du jobber i Backe, eller føler du et behov for å utdype hvilken del av Backe du tilhører? ○ Hvorfor tenker du at det er sånn?
3.0 Læringskultur i Backe	
6. Kan du fortelle litt om hvordan prosjektteam settes sammen ved oppstart av et nytt prosjekt? Er det forskjell på om prosjektet er BREEAM eller ei?	• Kan man ønske seg til prosjekter? Kan du søke deg til BREEAM prosjekter? • Er ulik kompetanse en faktor i sammensetningen av team? • Jobber du som regel med de samme menneskene på forskjellige prosjekter?
7. Det er mange som sitter med kunnskap om BREAAM på tvers av organisasjonen, kan du fortelle litt om hvordan og	• Er det proaktiv deling eller hentes erfaringer inn når det trengs? • Hvilke systemer kanaler deles informasjonen gjennom?

kanskje i hvilken grad denne informasjonen deles? 8. **Til AP:** Har dere som APer noe forum internt i Backe hvor dere deler informasjon mellom dere for å holde dere oppdatert og vedlikeholde kunnskapen dere sitter på knyttet til BREEAM? Føler du eventuelt at dette blir flittig brukt av alle APer?	• Deles det mest informasjon på tvers av organisasjonen eller mest internt i ditt lokale datterselskap? • Hvis de snakker om deres preferanser – tenker du at det er sånn det gjøres generelt i organisasjonen? • Rutiner/normer – før og underveis – generelt eller lokale rutiner.
9. Føler du at noe kunne vært gjort sentralt i Backe for at deling av informasjon og kunnskap om BREEAM blir mer effektivt?	
10. **TIL PL med fullført prosjekt:** I henhold til TKSen skal alle prosjekter over 50 millioner evalueres. Føler du at du i sist rapport hadde mulighet og kapasitet til å utarbeide en rapport som du anser som verdifull for læring knyttet til erfaringene rundt BREEAM i prosjektet?	• Hvorfor, hvorfor ikke? • Nok ressurser og tid?
11. I hvilken grad anser du erfaringsrapporter verdifulle i forhold til BREEAM? 12. Har du noen tanker om hva som kunne vært gjort annerledes for at prosjektvurderingen kunne gitt	• Føler du at det er høy overførbarhet mellom prosjekter eller er prosjekter generelt unike fra hverandre? • Føler du at du har like god tilgang på erfaringer fra andre prosjekter i de ulike selskapene som innad I din lokale avdeling?

mer verdi i forhold til læring rundt BREEAM?	• Hva er eventuelt forskjellen?
13. **De med erfaring fra BREEAM prosjekt:** BREEAM er jo relativt nytt for alle. Når du har jobbet på et BREEAM prosjekt, føler du at du har vært alene om å løse utfordringer knyttet til BREEAM, eller føler du at du har god tilgang på andre med erfaring som du kan støtte deg på?	• Dersom alene: Hva er det du tenker kan gjøres for å tilrettelegge for mer samarbeid og støtte knyttet til slike problemstillinger? • Hvis ikke alene: Hvem støtter de seg på? o Internt i prosjektet o Internt i datterselskapet o På tvers av konsernet o Eksternt • Føler du at andre prosjektledere i Backe løser utfordringer på samme måte?
4.0 Det sosiale nettverket rundt BREEAM	
14. Nå skal vi snakke litt rundt nettverket rundt BREEAM i Backe. Føler du selv at du har god kjennskap til andre med BREEAM erfaring på tvers av Backe?	• Hvis ja: Er det enkelt for deg å nå ut til andre med BREEAM erfaring? • Hjelper dette deg i ditt daglige arbeid med BREEAM? • Hvis ikke: Hva kunne vært gjort annerledes for å skape et sterkere nettverk rundt BREEAM?
15. Føler du at det er like lett for deg å kontakte andre med BREEAM erfaring på tvers av Backe som internt i ditt datterselskap?	• Hvilke systemer bruker du? • Har du lettere for å kontakte de innenfor ditt datterselskap? Går du først til de i ditt datterselskap før du snakker med de i andre datterselskap? Føler du kommunikasjonen og innholdet er den samme?
16. Har du noen gang besøkt et BREEAM prosjekt som du selv ikke har vært involvert?	• I hvilken sammenheng? • Hva fikk du ut av det?

	• **Hvis nei: Tenker du at det kunne vært verdifullt for deg?**
17. Til slutt ønsker vi å høre litt rundt din kjennskap til Backe sin strategi knyttet til klima og miljø. Kunne du sagt litt om ditt forhold til den? Har du god kjennskap til den, fremstår den som tydelig for deg? Støtter du deg til den i hverdagen?	• Hvordan påvirker dette deg?
18. Føler du at toppledelsen i Backe har vært konsekvent i de avgjørelsene som blir tatt knyttet til klima og miljø? Er det tydelig for deg hvilken posisjon Backe skal ta mot BREEAM i framtiden for eksempel?	• De avgjørelsene som sier noe om "slik gjør vi det i Backe" – er disse konsistente, eller føler du at de vingler eller spriker litt? Føler du at du får motstridende kommunikasjon? Ser du en tydelig retning?