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Understanding the impact of knowledge transfer in projects

A qualitative study of knowledge transfer practices in projects.

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ABSTRACT:

Knowledge is increasingly recognised as a strategic resource for sustaining organisational competitiveness. While theoretical models describe knowledge transfer (KT) as a continuous and structured process, project-based work often presents a more fragmented and contingent reality. Projects are characterised by temporality, shifting team compositions, and resource constraints, making the transfer of knowledge both essential and fragile. This thesis has been motivated by the gap between established theoretical models of KT and the ways in which experienced project managers in knowledge-intensive industries understand and enact these processes.

The objective of this study is to investigate how KT is defined, implemented, and evaluated within projects, and to identify the challenges and enabling factors that influence its effectiveness. The study is guided by four research questions: how experts define and implement KT in their projects, what main challenges they encounter, what strategies and tools they use to support the process, and whether a gap exists between theory and practice.

The conceptual foundation of the study combines perspectives from the Resource-Based View and Knowledge-Based View with process-oriented models of knowledge creation, ontological shifts, and knowledge management cycles. These frameworks provide a layered view of the contextual conditions, epistemological and ontological processes, enabling mechanisms, and expected outcomes of KT in projects.

A qualitative research design has been applied to capture nuanced, practice-based insights. Data have been collected through nine semi-structured interviews with experienced project managers working in knowledge-intensive industries. The interviews have been analysed thematically, allowing for the identification of recurring patterns, divergences from theoretical expectations, and the role of both formal structures and informal practices.

The findings show that KT is not experienced as a continuous spiral but as a pragmatic and selective activity. Formal mechanisms such as repositories, governance structures, and onboarding packages provide continuity, while informal mechanisms such as mentoring, peer reviews, and communities of practice are vital for transmitting experiential and tacit knowledge. Several barriers have been observed, including time pressure, knowledge silos, outdated repositories, and uneven motivation among team members. These constraints demonstrate that systems and tools alone are insufficient; KT requires supportive leadership, validation routines, and opportunities for reflection and informal exchange.

The study concludes that the gap between theory and practice is significant. While models present KT as structured and measurable, practitioners experience it as contingent and fragile. The research highlights the importance of individual motivation, absorptive capacity, and

informal infrastructures as decisive enablers that are often underemphasised in theoretical frameworks. The results suggest that organisations need to balance formal systems with trust-based social practices to ensure that KT strengthens not only internal efficiency but also client satisfaction and long-term competitiveness.

KEYWORDS: knowledge transfer, knowledge management, project management, knowledge strategy

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Abbreviations

RBV = Resource-Based view
KBV = Knowledge based view
KA = Knowledge Asset
KC = Knowledge Creation
KM = Knowledge Management
PKM = Project Knowledge Management
KT = Knowledge transfer
CoP = Community of Practice
KMS = Knowledge Management Systems
OS = Ontological Shift
OS SECI = Ontological Shift SECI Model

1 Introduction

Knowledge has been seen as a key resource for maintaining organisational competitiveness and success for a long time (Barney, 1991; Grant, 1996). From a Resource-Based View (RBV) and the Knowledge-Based View (KBV), knowledge is considered a strategic asset that is valuable, rare, and difficult to imitate, positioning it as an important factor for long-term advantage (Barney, 1991; Grant, 1996). In practice, however, knowledge is not a fixed asset but continuously created, adapted, and shared among individuals, groups, and organisations. This interaction is strategically important in project environments, which are characterised by temporality, changing team constellations, and tight resource constraints (Ren et al., 2018; Gasik, 2011).

Knowledge tranfer (KT) is important for projects, and at the same time, it is fragile. When knowledge is shared and then utilised through the project roles and phases, performance, innovation, and client satisfaction are affected (Ajmal & Koskinen, 2008; Liebowitz, 2005). Project implementation typically involves discontinuity, fractured ownership, and limited time for reflections and lessons learned, which makes systematic KT difficult (Szulanski, 2003; Versiani et al., 2024). There are theoretical models, including the knowledge creation process (Nonaka, 1994; Nonaka et al., 2000), the Ontological Shift SECI Model (Wu et al., 2010), and the knowledge management cycle (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000), and although they are theoretically well established, project settings lack the transferability to the real world. Previous studies identified recurring barriers such as knowledge silos, poor codification of knowledge, and weak cross-project knowledge flows (Fong, 2005; Versiani et al., 2024; Szulanski, 2003). Although numerous studies have examined knowledge management and transfer in organisational and project context (Ren et al., 2018; Gasik, 2011; Fong, 2005, Liebowitz, 2005; Versiani et al., 2024), less attention has been put on how experienced project managers in knowledge intensive industries interpret and apply these concepts in their daily work, and how their implemented practices align or differ from the established theoretical frameworks.

This gap highlights the need for further research on KT in project contexts. While literature suggests that KT is an ongoing, systematic process (Nonaka, 1994; Nonaka et al., 2000; Wu et al., 2010), the nature of project-based work suggests a more situational and fragmented process. Moreover, new technologies and changing work context raise new questions about how KT is supported and sustained in the future.

The purpose of this study is to investigate how experienced project managers in IT or Consulting understand, implement, and evaluate KT within and across their projects. The study uses a qualitative approach to capture refined, experience-based perspectives and to identify the enabling and challenging factors that shape KT in practice.

Four research questions guide the research:

- Q1: How do experts define and implement KT in their projects?
- Q2: What are the main challenges to effective KT?
- Q3: What strategies or tools do experts use to enhance KT and project efficiency?
- Q4: Is there a gap between the theoretical state and today's practice on KT in projects?

To answer these questions, the thesis combines a literature-based conceptual framework with empirical insights from nine expert interviews. It integrates multiple perspectives on the contextual conditions (context layer), epistemological and ontological processes (Process & OS SECI layer), enabling mechanisms (enabling layer), and outcomes (outcome layer), providing a multi-layered view of how KT is adopted. The qualitative design enables the identification of both formal structures and informal practices, as well as the subjective meanings that project managers assign to knowledge-related processes.

This study contributes to both theory and practice. Theoretically, it highlights where existing models of knowledge creation and transfer align with or diverge from practice and extends understanding by surfacing factors such as motivation, absorptive capacity, and informal infrastructures (Szulanski, 2003; Von Krogh et al., 2012). Practically, it offers insights for organisations seeking to strengthen project outcomes through more effective KT, understanding the challenges disrupting KT, and pointing to the importance of enablers and balancing formal structures with informal social mechanisms (Al-Zoubi et al., 2022; Wenger, 1998; Roux et al., 2006; Čulo & Skendrović, 2010; Galvis-Ardila et al., 2023).

2 Literature Review

An effective transfer of knowledge is acknowledged as a critical factor in a project's success, particularly in knowledge-intensive sectors (Ren et al., 2018). To examine the interrelationship between KT and a project's success in depth, it is essential to ground the analysis in established theoretical perspectives. This chapter begins by outlining the Resource-Based View (RBV) and the Knowledge-Based View (KBV), the two foundational frameworks that emphasise the strategic role of knowledge in creating and sustaining competitive advantage. Building on these perspectives, this review defines key concepts relevant to KT, including the different forms of knowledge, the process through which it is created and shared, and the organisational mechanisms that support its management. A suitable definition of knowledge, as it is understood and applied within this study, is also introduced to provide conceptual clarity. The chapter concludes by summarising empirical insights from previous research, with a focus on how knowledge is transferred in project environments. These findings help to identify common challenges, effective practices, and contextual factors that influence the success of KT initiatives.

2.1 Defining Knowledge and Related Concepts

The Resource-Based View (RBV) provides a foundation to understand the strategic importance of the capabilities of an organisation to achieve competitive advantage. According to Barney (1991), resources within a firm’s control can be important to competitive advantage as the strategies it pursues. For knowledge to be a source of sustained competitive advantage, organisations need to develop resources that are heterogeneous and difficult to imitate or transfer. Four important characteristics make resources strategically valuable: value, rarity, inimitability, and non-substitutability. When knowledge has these characteristics, it can contribute to long-term competitive advantage.

In addition to valuable resources, managing dynamic capabilities can further strengthen a company's competitive advantage. Dynamic capabilities are an organisation's ability to reconfigure, adapt, and integrate internal and external resources, skills and competencies in response to a rapidly changing environment. This adaptability enables companies to maintain their competitive advantage over time. Core competencies (strategic competencies) should not remain static, even when they seem to work, they need to evolve proactively to maintain strategic relevance. Properly managed dynamic capabilities have been shown to positively influence project outcomes, especially regarding client satisfaction and their repurchase intent. (Leonard-Barton, 1992; Teece et al., 1997; Ashill et al., 2020)

The Knowledge-Based View (KBV) leverages and builds on the foundations of RBV. Organisational capabilities are fundamentally developed as individuals, and groups interact and create a collective knowledge base. Companies should understand and further develop the processes necessary to integrate diverse knowledge bases into various organisational capabilities. This integration occurs through coordinated exchanges between cross-functional teams, employees and management, but also externally with suppliers and clients. While employees often have specialised tacit knowledge, it is the responsibility of the management to implement mechanisms that facilitate the effective distribution and sharing of this knowledge across the organisation. (Kogut & Zander, 1992; Grant, 1996)

Three key dimensions characterise successful knowledge integration:

- The efficiency of integration – how effectively relevant information is shared,
- The scope of integration – to whom the information is distributed,
- And the flexibility of integration - the organisation's ability to access and reconfigure different types of knowledge. (Grant, 1996)

Knowledge itself is a dynamic capability as it uses resources, skills and competencies to reconfigure and (re-)create knowledge within a company in response to the changing environments. The ability to effectively acquire, integrate and apply knowledge determines how well a firm can evolve and sustain its competitive advantage over time. This understanding aligns with the concept of dynamic capabilities described by Leonard-Barton (1992) and Teece et al. (1997). In contrast, some theoretical perspectives emphasise that knowledge supports the development of dynamic capabilities rather than forming one directly. Nonetheless, the strategic value of managing knowledge and knowledge assets remains clear, as it importantly contributes to building and sustaining competitive advantages and client satisfaction in projects. (Bindra et al., 2023; Ashill et al., 2020)

Emphasising the strategic importance of knowledge, it is often considered a fundamental organisational asset. It possesses attributes of a core capability: valuable, rare, difficult to imitate, and non-imitable, particularly because it is developed by an organisation itself and deeply embedded within its routines. Furthermore, knowledge is inherently dynamic, functioning as both an input and an output in a continuous cycle of learning and renewal. This ongoing evolution allows companies to remain agile and responsive in rapidly changing environments. (Nonaka et al. 2000, Barney, 1991)

For this thesis, knowledge is understood as a dynamic, human-centred process shaped by individual beliefs, experience, and contextual interpretation. Knowledge is not merely information but a product of internal sense-making, shared understanding, and application of information. Although technology facilitates the information exchange, it is important to note that effective knowledge management (KM) depends primarily on people. The way individuals exchange information is strongly influenced by the organisational culture, which shapes how people interact with one another. (Nonaka, 1994; Choo, 1997)

Choo (1997) describes the information flow process as a cyclical process involving the identification of needs, acquisition, organisation, distribution, and use. To be effective, this information must align with organisational learning and knowledge-sharing strategies. Building on this, Davenport and Prusak (1997) stress that information is context-dependent, interpreted by individuals or groups to support the effective decisions that influence a business's success (Davenport & Prusak, 1997). Its quality can be assessed through dimensions such as accuracy, completeness, relevance, and timeliness (Wang & Strong, 1996). While overly complex models reduce the practical value, information remains a dynamic flow through which knowledge is created and shaped by human perceptions and commitments giving knowledge a subjective and human-centred dimension (Davenport & Prusak, 1997; Nonaka, 1994).[1]

Davenport and Prusak (2000) expand on this by emphasising the importance of quality in the information transfer process. They propose that a successful transfer needs both a sender and a receiver, where the receiver must interpret the transmitted information in a way that informs their understanding and potentially influences their decision or action. It is important to note that only the receiver can assess whether the information is valuable and beneficial. If the sender fails to transfer information in a way that becomes meaningful or actionable for the receiver, the information transfer is ineffective, and no knowledge can be created. Therefore, assessing and ensuring the quality of information will impact the further development of knowledge. Using the criteria to judge the quality of information can be transferred to the judgement of qualitative knowledge, which makes it a vital component of knowledge management. (Davenport and Prusak, 2000)

Building on this human-centred understanding of knowledge, it becomes crucial to distinguish between two fundamental types of knowledge: explicit and tacit. Explicit knowledge is easier to articulate, document, and transmit.

[1] A broader explanation of this topic can be found in the attachment (8.1).

It is formal in nature, can be expressed systematically through language, and is often stored in digital formats, making it readily transferable across individuals and platforms. In contrast, tacit knowledge is informal and inherently difficult to communicate. It is embedded in the individual's experiences, shaped by analogical thinking, and formed through internal cognitive processes. Tacit knowledge encompasses mental models, beliefs, paradigms, and perspectives that individuals apply when interpreting specific contexts and anticipating future scenarios. Its contextual nature arises from the simultaneous processing of information and application of these internal mental models. Moreover, tacit knowledge includes practical skills and routines developed through personal or collective experience, interpretation of events, and continuous learning. (Nonaka, 1994; Schoenherr et al., 2014; Cavusgil et al., 2003)

For organisations to effectively leverage knowledge as a source of competitive advantage, it is essential to maintain a balance between tacit and explicit knowledge. Both types play a critical role: explicit knowledge supports the dissemination and scalability of information, while tacit knowledge contributes to innovation, institution, and decision-making tailored to more specific context. Achieving this balance enables organisations to manage knowledge more strategically, enhancing overall performance and sustaining a long-term competitive advantage. (Cavusgil et al., 2003; Nonaka, 1994)

2.2 The Creation and Adaptation of Knowledge

The Knowledge Creation Process[2] is based on the research from Nonaka (1994) and describes how organisations continuously transform tacit and explicit knowledge to generate new insights and capabilities. This transformation is guided by four interrelated dynamic modes of knowledge conversion – Socialisation, Externalisation, Combination, and Internalisation (SECI Process). Through socialisation, tacit knowledge is shared and developed through the shared experiences and interactions of information between people.

[2] A broader explanation of this topic can be found in the attachment (8.2).

Further, externalisation makes tacit knowledge explicit, often through dialogue, reflection, or collaboration. Combination integrates and systemises different forms of explicit knowledge into new explicit knowledge, while during the internalisation mode, individuals can embody explicit knowledge through practice and learning and add it to their routines and behaviours. This cyclical interaction enables continuous organisational learning and innovation. The SECI process is directly linked to the development of knowledge assets. As each mode is supported by and contributes to the specific types of assets. (Nonaka, 1994)

Knowledge assets represent the resources and content created and shared during the knowledge conversion. Nonaka et al. (2000) distinguish between tacit and explicit knowledge. Tacit knowledge is captured in experiential knowledge assets, such as the skills, emotions, and shared experiences of individuals, and in routine knowledge assets, which include organisational routines and operational know-how embedded in daily practices. Explicit knowledge, on the other hand, is found in conceptual knowledge assets, such as product concepts, design, and brand equity, and in systemic knowledge assets, which encompass formalised resources like documents, databases and patents. (Nonaka et al., 2000)

Through a clearly defined knowledge vision, companies can guide the development of specific knowledge assets and reshape existing ones to address new challenges and opportunities. This continuous redefinition and contextualisation of knowledge assets ensures that knowledge remains actionable and aligned with organisational goals and situational needs. (Nonaka et al., 2000)

“Ba” is defined as a shared context or space in which knowledge is created, shared and utilised, playing an essential role in dynamic knowledge creation within organisations. It includes not only physical places but also virtual, mental and social environments where individuals engage and interact. Ba supports the SECI Process by providing the environment for the interactions between tacit and explicit knowledge. There are four

types of Ba: originating, dialoguing, systemising, and exercising. Each type supports the different stages of knowledge conversion. As a dynamic and evolving concept, Ba changes with the participants and their activities, enabling continuous knowledge development. It fosters commitment, trust, and shared understanding, helping organisations to generate new knowledge and maintain a competitive advantage. (Nonaka et al., 2000)

In conclusion, knowledge is dynamically converted during the SECI Process, in which Knowledge Assets are the content that is created and shared during the four modes. The process takes place within Ba, a shared physical, virtual, or mental context which enables individuals to interact, share and co-create knowledge, serving as the essential environment for dynamic knowledge creation. (Nonaka et al., 2000)

While the SECI Process and its related concepts of KA and Ba have provided a foundational framework for understanding KC (Nonaka et al., 2000), scholars have pointed out several limitations that constrain their practical application. One central critique is that the SECI model emphasises the epistemological dimension, which means how tacit and explicit knowledge is converted. It is missing on the ontological dimension, which should explain who creates knowledge, where it is created, and how the responsibilities are shared for knowledge advances throughout an organisation. (Glisby & Holden, 2003; Gourlay, 2006)

This gap can result in uncertainty for practitioners trying to discover factors related to knowledge-related successes and failures. For this purpose, Wu et al. (2010) proposed the Ontological Shift SECI Model (OS SECI), which extends Nonaka's framework to include the explicit focus on the dynamics of knowledge ownership, movement, and accountability across multiple organisational levels.

The OS SECI overlays four ontological layers onto Nonaka's (1994) four knowledge conversion modes:

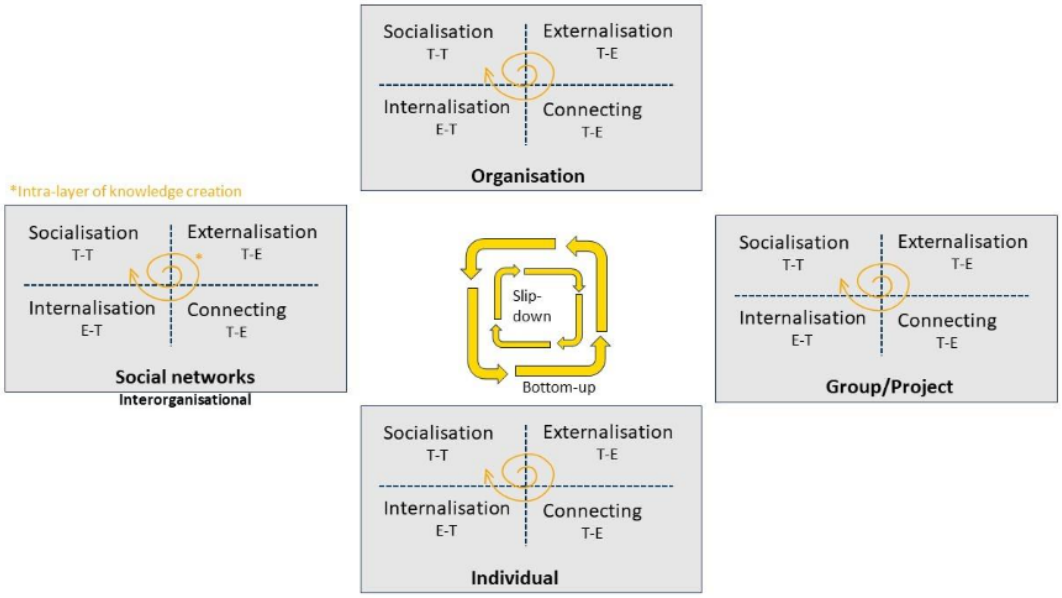

Figure 1. The Ontological Model of Knowledge Creation. (Wu et al., 2010)

Unlike the original SECI spiral-like design, which assumes a natural upward progression, Wu et al.'s (2010) model maps specifically how knowledge shifts between these layers. The movement can take on two forms:

1. Bottom-up: is an upward transition where knowledge created at a lower layer is accepted, legitimised, and further developed at a higher layer. This could be when an individual's idea evolves into an organisational project.
2. Slip-down: is a downward movement which is triggered by rejection, lack of feasibility, or failure to justify knowledge at a higher level, requiring re-work or further development at a lower layer. (Wu et al., 2010)

The dual mechanism gives a more dynamic and realistic view of how knowledge evolves, especially in complex, knowledge-intensive projects. For the operationalisability, activity maps can visually represent all SECI activities and ontological shifts (OS) over time.

It should contain the specific actors or entities responsible for each knowledge activity and how its transition occurs between the layers (bottom-up and slip-down). Additionally, it should call out enablers and barriers emerging in the process.
This will help to diagnose where the KC progresses successfully and where it stalls. (Wu et al., 2010)

With the inclusion of the KA concept, it can be clarified how knowledge is mobilised and transformed as it moves across the ontological layers. Furthermore, it enriches the idea of BA by showing how shared contexts interact with the organisational structure and responsibility. While Ba provides the space for KC, OS defines who must act to advance knowledge within and between the spaces. Combining the transparency that is given now, OS SECI can be used practically as a diagnostic tool for project teams and management. It allows the identification of bottlenecks through repeated slip downs or highlights enablers through effective leadership or cross-functional collaboration, which facilitates boom-up transitions. With this information, a company can adapt and align the knowledge processes within the management of an organisations dynamic capabilities and make adjustments accordingly to sustain their competitive advantages (Teece et al., 1997). (Wu et al.,2010; Nonaka, 1994)

While the SECI and OS SECI explain how knowledge is created, legitimised and adapted across organisational levels, they do not fully capture how this knowledge is systematically managed and sustained over time. This will be explained in a later chapter (2.3.2), which connects the dynamics of knowledge creation with the practical process of acquisition, codification, sharing, and evaluation, thereby linking theory with ongoing management and transfer in project environments.

The Knowledge Creation Process, including knowledge assets, the SECI Process, and Ba, provides a robust theoretical foundation for understanding the knowledge creation process. These constructs could also be operationalised in practice.

For example, a collaborative research project with Swedish manufacturing SMEs has demonstrated how these concepts can be applied in practice. In this initiative, the project was structured around a series of four-month iterative cycles, each consisting of planning, experimentation, reflection, and knowledge sharing. The process was incorporating reflective workshops, structured dialogues, and feedback sessions. A steering group of the companies' representatives and researchers were setting the focus and objectives for each cycle, which often included specific tasks such as documenting daily practices, conducting self-assessments, or gathering examples of unplanned work. (Engström et al., 2022)

The workshops played a central role in the KT process. They typically followed a structured agenda that combined presentations, mixed-company group discussions, joint meals, and theoretical inputs from researchers or guest speakers. These activities created a shared context like Ba, where tacit knowledge was socialised and progressively externalised into explicit frameworks and organisational practices. The participants engaged in repeated cycles of sharing their personal experience, reflecting collectively on common challenges, and testing new work methods within their own organisations. (Engström et al., 2022)

The project illustrated how structured collaborative pacing can build trust and psychological safety, reducing defensive routines that constrain KT. Eventually, the process not only strengthened the participants' conceptual understanding of innovation and ambidexterity but also contributed to a shift in organisational self-awareness and confidence. Participants utilised both individual reflection and collective sensemaking, supporting both bottom-up learning and top-down feedback. (Engström et al., 2022)

Cumulatively, these dynamics illustrate how knowledge can move across different organisational levels. The iterative reflection cycle fostered the development of theoretical understanding, practical know-how, and practical wisdom.

As a result, the project expanded the participating organisations' knowledge assets and strengthened their dynamic capabilities. This example emphasises on how the SECI process and Ba can be translated into concrete activities that support sustained learning and promote KT. (Engström et al., 2022)

In addition to this contrast, other studies have demonstrated that structured collaborative environments and supportive leadership practices are essential to effectively operationalise the SECI model and foster sustained knowledge creation. This will be further examined in the following chapter.

These frameworks and examples illustrate how knowledge creation can be effectively supported through structured processes, cultural enablers, and leadership practices. Often, this involves designated groups such as project steering teams that coordinate activities and set the priorities. Yet these arrangements also come with important limitations (Engström et al., 2022). In particular, the traditional SECI model focuses primarily on the conversion between tacit and explicit knowledge but provides less detail on how knowledge moves across organisational levels and how responsibilities for legitimising, rejecting, or adapting new knowledge are defined in more complex settings (Nonaka, 1994; Nonaka et al., 2000; Glisby & Holden, 2003; Gourlay, 2006). To address this gap, the Ontological Shift SECI Model (OS SECI) introduces an additional perspective that clarifies how knowledge evolves and is managed throughout different layers of an organisation.

2.3 The Management of KT

2.3.1 The Role of Leadership in Knowledge Creation and Transfer

Leadership plays a critical but often indirect role in enabling and supporting knowledge creation and transfer within the organisation. Rather than managing knowledge directly, leaders influence the behaviours and provide structures and practices to support or retain the knowledge processes. This is a continuum of centralised approaches, which to one end, could be associated with senior management, at the other end, distributed approaches where leadership is shared among team members. The effectiveness of these practices is influenced by contextual factors such as trust, cohesion, and motivation. Studies show if project teams build an open and safe environment, individuals are more willing to articulate tacit knowledge and share unspoken assumptions, and reflect without the risk of criticism or loss of status (Ajmal & Koskinen, 2008; Von Krogh et al., 2012; Davidova & Kokina, 2018)

A centralised leadership approach is important for establishing formal structures and conditions that support the knowledge creation and its transfer. At the structural level, centralised leaders provide strategic direction, set knowledge-related goals, allocate resources, design incentive systems, and create formal procedures that support knowledge activities. At the conditional level, they also provide the shared context for collaboration, what Nonaka et al. (2000) refer to as Ba, by providing infrastructure, documentation, training, and codified resources. Centralised leaders also balance the need to generate new knowledge with the effective use of existing knowledge. However, if interventions become too frequent or controlling, they could undermine the trust and discourage initiative within teams. (Von Krogh et al., 2012)

Furthermore, the distributed leadership refers to leadership functions that are shared among individuals or groups, rather than concentrated in a single role. This approach is relevant in contexts which are characterised by high interdependence, complexity, and a need for creative problem-solving, such as project-based work in technology or knowledge-intensive fields. At the last, on the core activity level, distributed leadership helps to translate a shared context into active knowledge creation by encouraging collective engagement and different ways of contributing to the task. Authority is generally based on expertise and with general recognition among peers rather than formal hierarchical structures. This can enhance the sense of ownership of team members and motivation to contribute to the shared goals. (Imam & Zaheer, 2021; Von Krogh et al., 2012)

Von Krogh et al. (2012) outlined the interrelatedness of leadership within a three-layer framework: a structured layer that defines strategy and direction, a conditional layer that provides resources and context, and a core layer where local knowledge creation can occur. Within this framework, centralised leadership provides vision and formal structures, and distributed leadership enables emergent collaboration and shared responsibility. Effective knowledge creation requires both forms of leadership, working in complementation rather than in isolation. This point of view aligns with the research approaches proposed by Engström et al. (2022), for example, showing that companies benefit from structured leadership activities which are combined with participative practices that can be embedded into learning for everyday work.

The interplay between centralised and distributed leadership practices is an important factor influencing the quality and effectiveness of KT. Shared leadership has been shown to support project success by fostering knowledge sharing and strengthening cohesion among team members. These factors are essential in integrating expertise, coordinating tasks, and addressing complex challenges. Additionally, trust between team members plays a significant role in reducing uncertainty and encouraging open communication. (Davidova & Kokina, 2018; Imam & Zaheer, 2021)

However, some researchers suggest that trust at high levels can create dependence or reduce the critical assessment of ideas. This shows that trust must be balanced carefully with critical reflection. Beyond relational aspects, knowledge management also requires technical and structural aspects, such as the way of accessing knowledge and how it is negotiated and how contributions are valued. Leadership activities can address structural and procedural aspects, alongside motivational and mutual commitment factors. Developing distributed leadership capabilities, such as collaborative facilitation skills and shared responsibility, can help create environments where knowledge can be actively exchanged and used. (Davidova & Kokina, 2018; Imam & Zaheer, 2021)

In conclusion, the influence of leadership on the effectiveness of KT can not only be seen as a top-down approach but a dynamic combination of strategic guidance and operational collaboration. Effective KT depends on leaders who can balance control and autonomy, support trust and cohesion, and recognise the diverse expertise within various teams across the organisation. By integrating structural direction with cultural enablers, organisations can embed learning into daily practice, enhance knowledge creation, and sustain long-term project and business success (Ajmal & Koskinen, 2008; Von Krogh et al., 2012; Davidova & Kokina, 2018; Imam & Zaheer, 2021)

2.3.2 The Knowledge Management Cycle

Building on previous concepts of how knowledge is created and transformed (Chapter 2.2), and how leadership approaches enable and constrain this process (Chapter 2.3.1). It is important to consider how knowledge is systematically managed over time. While models such as SECI and OS SECI describe how knowledge is created and moves across the organisational levels, the knowledge management cycle emphasises how knowledge is acquired, structured, shared, and reused in practice. The KM Cycle connects knowledge generation with its practical transfer, showing how organisations sustain learning and embed knowledge into routines and systems.

The main objective is to generate value from knowledge to meet both strategic and operational objectives, thereby strengthening the company to become more competitive. (Nonaka, 1994; Davenport & Prusak, 2000; Choo 1997; Kogut & Zander, 1992; North & Kumta, 2014)

Knowledge management was traditionally understood as a linear process, beginning with knowledge creation and ending with its application. However, a more realistic visualisation is a continuous cycle. Under these considerations, the application of knowledge leads to new insights and improvements, which are then captured and stored, completing the cycle and enabling the ongoing refinements and reuse. This cyclical model reflects a more dynamic and sustainable approach to manage knowledge. (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000)

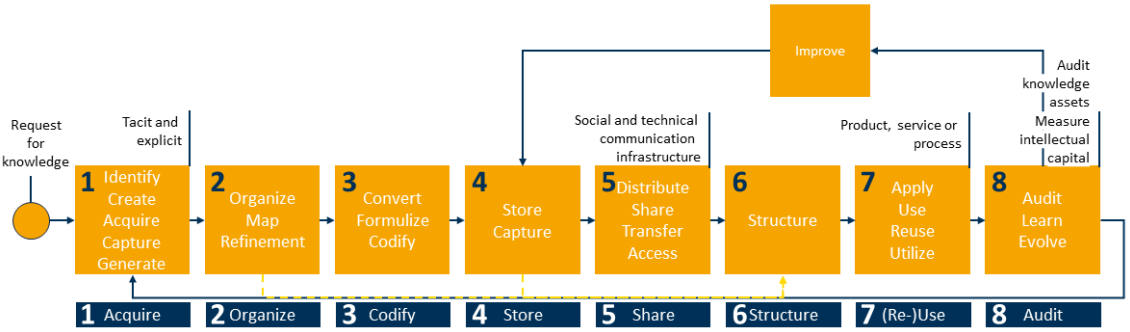

Figure 2. Knowledge Management Cycle (adapted from Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000)[3]

The cycle, as visualised in Figure 2, begins with the acquisition of knowledge, either internally or from external sources, followed by organisation and codification to structure it for future use. Knowledge is then shared across individuals, teams, or systems, and subsequently applied to solve a problem. For this purpose, the information will be adapted (6. Structure) to the situational context and used to solve problems or improve the situation.

[3] A broader explanation of this topic can be found in the attachment (8.3).

Afterwards, an evaluation step determines its effectiveness, relevance, and potential for reuse, closing the loop and ensuring that learning contributes to both immediate outcomes and long-term organisational capability. (Liebowitz, 2005; Davenport & Prusak, 1997)

The KM cycle also connects directly with the enablers discussed in the previous section on the impact of leadership on KT. Centralised leadership is often required to provide resources and formal structures for codification and storage, while distributed leadership is essential to foster sharing and the application of knowledge in practice. The evaluation phase requires the attention of the leadership to ensure that lessons learned are reviewed, disseminated, and embedded into future projects. This way, the leaderships' interventions can strengthen each stage of the cycle, but if poorly designed, they can also create bottlenecks or reduce motivation. (Von Krogh et al., 2012; Imam and Zaheer, 2021)

The KM cycle links closely with the SECI process (Nonaka, 1994) and the OS SECI model (Wu et al., 2010). The acquisition and organisation stages parallel externalisation and combination, while sharing and application reflect internalisation and socialisation in practice. The evaluation and reuse of phases extend these models by highlighting how knowledge is legitimised, revised or discarded across organisational levels. While Chapter 2.2 focused on the epistemological and ontological dynamics of knowledge creation, the KM Cycle emphasises how these dynamics are operationalised in the continuous management practice. (Glisby, M., & Holden, N., 2003; Gourlay, 2006)

For project environments, the KM Cycle provides a practical view to assess how knowledge is captured, shared, and where gaps emerge, for example, through poor codification, limited reuse of existing knowledge, or insufficient evaluation as described by Von Krogh et al. (2012) and Versiani et al. (2024).

In this sense, the cycle also offers a structured way to trace where challenges are most likely to occur and where specific enablers, such as leadership, culture, or technology, are most effective to support the transfer of knowledge. (Von Krogh et al., 2012; Davidova & Kokina (2018).

Measuring knowledge remains a significant challenge for many companies, particularly when it comes to assessing KT and determining whether it truly creates value. Even if reusable knowledge assets are systematically processed throughout the entire knowledge management cycle, it is often difficult to establish a direct link between these practices and measurable improvements in the project performance context. These challenges underline the need to combine the KM cycle with careful evaluation methods that account for both. Measurable outcomes and more qualitative indicators of success. (Yap & Skitmore, 2020)

2.3.3 Knowledge Management in Project Environments

While knowledge management typically applies to organisations, projects offer a more focused and dynamic context. Project teams often involve changing collaborations between departments, teams, and individuals, but unlike organisation-wide KM, project-based knowledge sharing often occurs within the team itself. The nature of a project usually inherits geographic distance, uniqueness, temporarily, and urgency. (Ren et al., 2018)

These characteristics of projects require more flexible and immediate knowledge exchange without major structural changes. Projects rely heavily on existing knowledge, and the ability to access and apply it reflects team, project, and organisational effectiveness. Team members are key to integrating knowledge into daily work, but in practice, knowledge is infrequently stored and structured, limiting its use in future projects. (Newell & Huang, 2005; Ajmal & Koskinen, 2008; Kazi & Koivuniemi, 2006)

Understanding how knowledge can be utilised within projects requires the consideration of both the micro and macro levels of knowledge use. Micro-knowledge focuses on task-specific, operational insights and is used to solve immediate problems or complete specific tasks within a project. In contrast, macro-knowledge addresses broader, strategic understanding, drawn from the collective organisational experience and expertise, which helps to guide and inform the overall direction of the project. (Gasik, 2011)

Effective knowledge management in projects operates across four key levels (Gasik, 2011):

1. Individual – based on personal experiences and skills.
2. Project - the collective knowledge generated during the execution of a specific project.
3. Organisational - institutionalised knowledge accumulated across multiple projects within the organisation.
4. Global – knowledge accessible at a broader, possibly international level and outside of the organisation.

These levels shape how knowledge flows both vertically, for example, from individuals to organisational knowledge repositories, and horizontally, across different projects or teams, enabling learning and KT at multiple layers within and beyond the organisation as can be seen in Figure 3. (Gasik, 2011)

Figure 3. Vertical Project Knowledge Flows. (Gasik, 2011)

Fong (2005) adds to the ideas of Gasik (2011) and Liebowitz (2005) by introducing an external perspective on knowledge creation, especially in multidisciplinary projects. He explains that knowledge in projects can come from two sources: internal knowledge ("own disciplinary work") and external knowledge from "other disciplines". When project teams cross this boundary between disciplines, they can solve problems together, benefitting not just the project but the wider organisation. Individuals contribute from their own experience and, through collaborations, create new knowledge. Changes in customer needs, design, technology, and regulations often require teams to work across these boundaries, combining, modifying, and negotiating ideas with team members and stakeholders. This process leads to collective learning, both the project team and others in the organisation, and fosters innovation.

Versiani et al. (2024) explored how project knowledge management influences organisational learning and memory. They explain that learning can happen in two ways. First, through feed-forward learning, where knowledge moves from individuals and teams to the organisation, helping to change how the organisation reacts to new situations. Second, through feedback learning, the organisation provides structures and routines that shape how teams and individuals behave. Together, these show how knowledge flows both bottom-up and top-down. (Versiani et al., 2024)

They also point out that knowledge coding, the process of turning personal tacit knowledge into explicit, shareable knowledge, is one of the hardest but most important steps in project knowledge management. This step is essential for making knowledge useful beyond the project team. It connects closely to socialisation in Nonaka's SECI process (1994) and to the knowledge sharing phase in Liebowitz's (2005) knowledge management cycle. As earlier discussed, socialisation depends on routine knowledge assets (Chou & He, 2004; Nonaka, 1994), and coding is needed to turn shared experiences into usable, organised knowledge. (Versiani et al., 2024)

Four factors affect KT in a project:

1. Trust and Cohesion – Good relationships within the team help people share knowledge and work together better. Team members often take personal initiative, seeking solutions on their own, which helps both the project and the organisation to learn. However, fear of losing their reputation or inter-divisional jealousy can limit this. Furthermore, acting without collaboration and exploring organisational knowledge can lead to reinventing knowledge that already exists elsewhere. (Versiani et al., 2024; Szulanski, 2003)

2. Ambiguity of power and hierarchy – Unequal power dynamics can obstruct KT, especially when resource constraints or client demands place pressure on the project team. In such cases, knowledge coding and transfer become lower priorities, interrupting the feed-forward learning and increasing organisational memory volatility. Low resources also reduce motivation and confidence, which in turn leads to reduced use of external knowledge and solutions. (Versiani et al., 2024; Szulanski, 2003)
3. Volatility in the coding process – During pressurised times, emotional strain, or changing project scopes, the project teams often fail to properly document their work. This means that solutions are lost, and problems must be repeatedly resolved. Poor and infrequent coding and knowledge structuring lead to incomplete learning and a reliance on individual knowledge, which is harder to access and share across the organisation. (Kazi & Koivuniemi, 2006; Ajmal & Koskinen, 2008; Versiani et al., 2024)
4. Knowledge-related Barriers – Sometimes the problem is not motivation, but whether individuals are capable of understanding and valuing new knowledge. If someone thinks information is irrelevant, it is unlikely to be transformed into knowledge or embedded into an organisation's repository. In addition, old habits can be hard to change; unlearning them takes time and effort, especially if people lack the skills or support to do so. (Szulanski, 2003)

Because the project environment is dynamic, knowledge that is useful at one stage may become less relevant later (Nonaka et al., 2000). Tacit knowledge is especially difficult to capture, as it exists in personal experience and informal interactions (Davenport & Prusak, 2000; Nonaka et al., 2000). Szulanski (2003) highlighted factors such as causal ambiguity, where it is unclear why certain practices are successful, and a lack of absorptive capacity among recipients, which limits their ability to apply new knowledge. Difficult relationships and the inherent "stickiness" of knowledge further slow down the transfer and increase the complexity of measuring the KT.

Stickiness knowledge in Szulanski's (2003) context means that specific knowledge is difficult to transfer. Characteristics would be that tacit knowledge relies on personal experience and is hard to articulate. Further, it inherits a low absorptive capacity, and its ambiguity makes it difficult to identify what exactly could make it effective.

Jäväjä (2007) identified fragmented and unstructured information flows, making the measurement of challenges more difficult because knowledge is often spread across many systems and stored inconsistently. A lack of a clear strategy and the resistance of the project team to use new tools further limit the ability to track and measure success, which leads to inconsistent practices and makes the comparison between and within the project difficult, especially if the value of knowledge changes over time (Jäväjä, 2007; Nonaka et al., 2000). These challenges show that both information data and a supportive culture are needed to understand how KTs impact project performance.

In conclusion, effective KM in projects depends on trust, collaboration, and the ability to capture and share knowledge despite challenges, like limited resources and power dynamics. There are various tools and methods available to help project teams manage knowledge more efficiently. (Kazi & Koivuniemi, 2006; Ajmal & Koskinen, 2008; Szulanski, 2003; Versiani et al., 2024)

2.3.4 Evaluating and Measuring KT in Projects

Measuring project success requires going beyond the traditional metrics of time, cost and quality (Yap & Skitmore, 2020). It is emphasised that effective knowledge management contributes significantly to project outcomes, yet its impact is often overlooked in conventional evaluations (Yap & Skitmore, 2020; Gasik, 2011). KT has been recognised as a critical factor for project success. However, systematically evaluating its effectiveness remains a persistent challenge (Ajmal & Koskinen, 2008; Gasik, 2011; Nonaka & Takeuchi, 1995). Measuring knowledge outcomes is inherently complex due to their intangible, context-dependent, and subjective nature (Davenport & Prusak, 1997; Szulanski, 2003).

Different research highlighted that despite widespread adoption of knowledge management practices, organisations frequently lack the consistent methods for assessing whether these initiatives deliver measurable value (Jennex & Olfman, 2004; Yap & Skitmore, 2020).

Measuring KT in projects remains a compounded challenge for several reasons. First, the benefits of effective KT are often subjective and rely on individual perceptions rather than objective evidence (Davenport & Prusak, 1997; Szulanski, 2003; Nonaka, 1994). Second, it is hard to separate the impact of KT from other changes happening in a project at the same time (Szulanski, 2003). Factors such as project complexity, shifting stakeholder demands, and team composition frequently interact with knowledge initiatives, making cause-and-effect relationships unclear (Versiani et al., 2024; Jäväjä, 2007; Yap & Skitmore, 2020). Furthermore, many of the benefits of effecting KT, such as trust, willingness of collaboration, and enhanced problem-solving capacity, are intangible by nature and tend to emerge over time (Versiani et al., 2024; Nonaka, 1994; Schoenherr et al., 2014; Cavusgil, et al., 2003).

Measuring the impact of KT requires assessing its impact across different organisational levels. At the individual level, it enhances employee confidence, skill development, and decision-making abilities, which contribute to better task performance (Nonaka, 1994; Liebowitz, 2005; Ajmal & Koskinen, 2008). At the project level, effective knowledge sharing reduces rework, improves coordination among team members, and supports the timely delivery of outcomes (Versiani et al., 2024; Yap & Skitmore, 2020). These benefits often result from improved access to both documented and experiential knowledge from previous projects. At the organisational level, KT strengthens institutional memory by embedding critical insights into formal systems and workflows, thereby reducing reliance on individual expertise (Jennex & Olfman, 2007; Gasik, 2011).

At the global or inter-organisational level, it enables collaboration across organisational boundaries, fosters innovation, and improves adaptability in dynamic environments (Fong, 2005; Roux et al., 2006). Considering these multilayered outcomes provides a more comprehensive basis for evaluating the overall effectiveness of KT initiatives.

Judging the success of KT also includes the judgement of the received knowledge. As it had already been established in an earlier context, the judgement of knowledge can be based on the usefulness and depends on the sender's ability to present the knowledge and on the receiver to be able to identify the usefulness of the knowledge for the needed situation and context (Davenport & Prusak, 2000). Information is transformed into knowledge by the contribution of the individuals' own beliefs, commitment and context, making the dimension on which an information quality can be evaluated impactful to the evaluation of the quality of knowledge. It should be easy to transform information into knowledge to make it practically useful. (Nonaka, 1994; Davenport & Prusak, 2000)

Using technology to assess the usefulness of information and knowledge has become more common, and depending on the technology, it can enhance the quality of knowledge and improve the effectiveness of KT (Thorsell & Larsson, 2021). Not every tool is qualified to be a benefit, and one approach to assess it is the Knowledge Management System (KMS) Success Model[4] developed by Jennex and Olfman (in 2004 and extended in 2007). They identified several key factors which could influence the effectiveness of knowledge management systems and the quality of KT.

[4] A broader explanation of this topic can be found in the attachment (8.4).

The factors are a system's quality and the relevance and completeness of its contained knowledge, their availability and timeliness to retrieve the knowledge, the support provided to use the system if needed, the user satisfaction and their perceived benefit and the net benefits. By considering these dimensions, project teams can more effectively evaluate whether the tools and systems in place truly support the KT and create real value but also cover the technical aspect that impacts KT, as well as the user experience of the tools. These factors can be transferred to any tool, practice, or method used to manage the KT. (Jennex & Olfman, 2007)

Yap and Skitmore (2020) suggest using a multi-method evaluation approach that combines the opinion from the project team with measurable data to address the problems in evaluating and proving the impact of KT. In their study, they used practical metrics such as surveys on how useful and satisfying reusable knowledge assets were, records of how often lessons learned were reused in a later project, and comparisons of project time and cost performance before and after applying structured knowledge practices. These examples show how combining usage data, feedback, and outcome measures can provide a fuller picture of whether knowledge management is working. This approach fits well with the knowledge management system success model from Jennex and Olfman (2007), which highlights the importance of reviewing the system's quality and KT success on user satisfaction and the perceived benefits together when evaluating knowledge practices.

In conclusion, effective KT depends on regularly assessing its quality and impact. Evaluating system performance, user satisfaction and perceived benefits ensures that knowledge sharing remains relevant, efficient, and valuable throughout the project. Addressing these aspects reduces risks and strengthens the overall knowledge management process in a project environment (Galvis-Ardila et al., 2023; Versiani et al., 2024; Szulanski, 2003; Jennex & Olfman, 2007).

Evaluating outcomes requires attention to both quantitative and qualitative dimensions, as tools and frameworks can structure the process but only gain real value when practitioners perceive a tangible improvement in collaboration and project performance (Davenport & Prusak, 1997; Szulanski, 2003; Jennex & Olfman, 2004; Yap & Skitmore, 2020). This perspective underscores the importance of understanding how professionals themselves experience, interpret, and assess the benefit of KT in practice.

Consequently, these insights inform the research design of this thesis, which employs qualitative interviews with experienced project managers to capture their perspectives on how KT mechanisms contribute to the project's success, the challenges which persist, and the evaluation criteria which are most relevant and capturable in the real-world setting (Yap & Skitmore, 2020). Building on these evaluation perspectives, the following section turns to the concrete tools and practices that support knowledge management across projects.

2.4 Tools, Practices and Methods to Manage Knowledge in Projects

To manage knowledge effectively throughout a project, different practices, methods and tools are required at each stage of the knowledge management cycle. These tools help support the key factors that influence KT within projects. Making each step of the KM Cycle more accessible and efficient is essential for improving knowledge flow and minimising barriers.

Nissen et al. (2000) describe three levels at which knowledge can be managed: individuals, functional groups, and the organisation. Each of these levels uses different tools and methods to handle knowledge, which is why it is important to recognise these distinctions when applying KM practices. However, as this research focuses on a more general project level, the tools, methods, and practices are summarised to show their relevance at each stage of the KM cycle rather than at each organisational level.

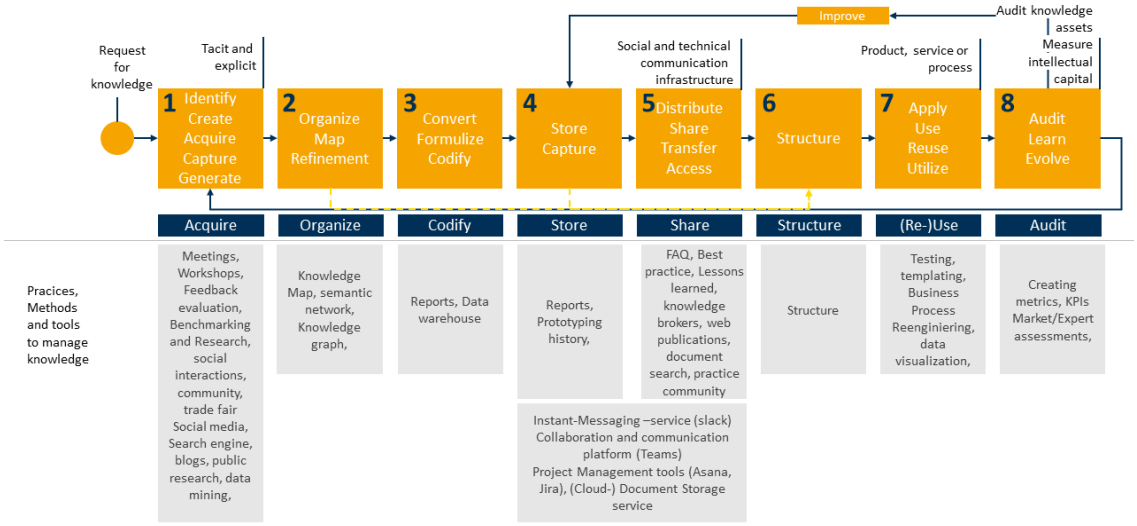

Figure 4. Tools along the KM Cycle. (Oliva & Kobe, 2018; Nissen et al., 2000)

Figure 4 illustrates how various tools align with the steps in the KM cycle (Oliva & Kotabe, 2018; Nissen et al.,2000). These tools support the KT, from individual to organisational level, and help manage both micro-knowledge and macro-knowledge within projects. Additionally, these tools are enhanced by information and communication technologies (ICT), which facilitate the organisation and exchange of knowledge, ultimately contributing to a project's competitive advantage, in line with the principles of KBV. (Oliva & Kotabe, 2018; Nissen et al.,2000)

One essential method to support KT in projects is the implementation of a structured communication plan. By defining communication channels, responsibilities, and information flow, and putting them together into a plan, a communication plan helps ensure that critical knowledge is shared efficiently among project stakeholders. A communication plan not only facilitates effective knowledge exchange but also provides a basis for measuring and managing the flow of information throughout the project.
To be effective, the communication plan should address several key questions and fulfil the listed requirements:

Table 1. Communication Plan Items (Čulo and Skendrović, 2010)

Communication plan items
Who are the stakeholders that need to be communicated with?
When and in which sequence should the communication take place?
How does the communication take place?
What should be exchanged?
How often must we communicate status?
When do we meet as a team?
When do we communicate with key stakeholders and in what fashion?
What type of media should we use and when? For what purpose?
Team communications, internal, external, and leadership teams?

Table 2. Requirements for a Communication Plan (Čulo and Skendrović, 2010)

Requirements
Organisation chart
Project organisation and stakeholder responsibility relationship
Disciplines, departments, and specialities involved in the project
People's management and location
Internal information needs
External information needs
Stakeholder information from the stakeholder register and the stakeholder management strategy.

These items, as shown in Table 1 and Table 2, represent key considerations for developing an effective communication plan. They are supported by general requirements such as understanding the project organisation, stakeholder responsibilities, internal and external information needs, and selecting appropriate tools for communication management. This structured approach ensures a clear and consistent flow of information, which in turn enhances KT and helps to keep the project teams aligned and well-informed. (Čulo and Skendrović, 2010)

While a structured communication plan supports effective KT, its success depends on how well it adapts to the changing needs of a project. Communication urgency can vary. In some situations, it demands real-time updates, where immediate communication tools are more effective than periodic reports. In such cases, existing tools may prove insufficient, requiring either new systems or reconfiguration based on stakeholder access and evolving project demands. Moreover, even when appropriate tools are available, team members might lack the skills to use them effectively. This should be assessed early, and training provided if necessary. It is also important to ensure that communication tools stay relevant throughout the project. If tools become outdated or insufficient, a revaluation should be conducted to maintain an effective knowledge flow. Finally, communication styles and tools should be tailored to the project team's structure to ensure smooth and efficient exchange of knowledge, as sometimes the teams are co-located, local, or remote. (Čulo and Skendrović, 2010)

To provide a more structured approach to communication management in projects, Galvis-Ardila et al. (2023) propose a communication model that differentiates between tactical and strategic dimensions, organised into stages. It explains how communication should be planned and carried out throughout different phases of a project's communication process. In the conception stage, the purpose and objectives of the project are defined, and a communication strategy is created, ensuring alignment with the organisation's broader strategic goals.

In the initial stage, key stakeholders are identified along with the cultural context and the types of communication most suitable for the project. During this phase, important messages, communication policies, and feedback mechanisms are also established and planned. (Galvis-Ardila et al., 2023)

The planning stage involves the development of detailed communication guidelines, including a manual for general communication, crisis handling, and conflict resolution. A comprehensive communication plan includes complete timelines and measurable performance indicators. In the execution stage, this plan is implemented using various tools such as meetings, e-mails, and other trackable communication methods, with all actions and feedback well documented. The monitoring and control stage focuses on assessing the effectiveness of communication through regular reporting, evaluations, and maintaining a record of project communication experiences. In the closing stage, the communication process is reviewed based on the predefined indicators, with final meetings and reports helping to formally conclude communication efforts. Finally, in the post-closing stage, lessons learned are shared, additional feedback is gathered, and insights are documented for use in future projects. (Galvis-Ardila, et al., 2023)

Several common challenges can limit the effectiveness of communications management in projects. One issue is the lack of attention to communication and the lack of social skills during the selection of the project staff, which can weaken a team's ability to manage communication successfully. Additionally, communication practices are often defined without clear strategic guidelines, and without measurable indicators, it becomes difficult to assess whether communication efforts are achieving their goals or not. As a result, communication plans may not deliver the expected benefits. Another key challenge is the absence of standardised messaging and conflict resolution protocols, which are essential for properly coding knowledge and transferring it to other projects or throughout the organisation. (Galvis-Ardila et al., 2023)

Traditionally, information exchange between experts, such as scientists (experts), and managers often follows two patterns: knowledge is either shared as it is created or requested when needed. However, approaches often lack mutual engagement and do not foster sustained communication. KT relies on a collaborative environment where learning occurs between experts and users. In this context, knowledge should not be viewed as a static object but rather as a “process of relating” between individuals. As previously established, trust is essential for effective KT. (Versiani et al., 2024; Roux et al., 2006)

A more dynamic method of exchange can be found in Communities of Practice (CoP). These are groups that are formed formally or informally, bringing together individuals with shared interests or challenges. Formal CoPs operate within structured frameworks, while informal CoPs are self-organised and rely on voluntary participation. Informal CoPs foster open knowledge sharing between experts and management by creating a trusted environment without strict hierarchies. Within these communities, knowledge becomes the shared currency, and members earn their place through active participation. They engage in discussions, identify quality issues, develop solutions, and create best practices. When solutions cannot be found within the group, members often know where to seek further expertise. This approach supports both internal and external KT and allows CoPs to reach their full potential by promoting open, unrestricted collaboration. (Wenger, 1998, as cited in Roux et al., 2006; Ang et al., 2017; Roux et al., 2006)

Through their activities, CoPs contribute to KT by developing practical tools such as guidelines, implementation resources, and presentations to share knowledge across and beyond the organisation. Workshops are held to explore emerging topics among experts from different sectors. The practice of CoP has been shown to improve safety standards, support standardisation, and identify valuable investment opportunities.

Additionally, working within cross-functional teams in CoPs can boost motivation to learn new skills, enhancing the creation of tacit knowledge in a low-pressure environment guided by experienced peers, and fostering innovation in organisations. As part of the broader people management efforts, CoPs offer a flexible and engaging way to build skills within an organisation. (Ang et al., 2017; Matsuo, 2015, Roux et al., 2006)

KT is acknowledged as a critical element in project success (Ren et al., 2018). Within such settings, the organisational environment functions as a key enabler or constraint in facilitating the exchange of tacit and explicit knowledge among project actors, as emphasised by Nonaka (1994); Choo (1997) and Davenport & Prusak (1997).

In project-based work, the temporary nature of teams created additional challenges for knowledge continuity (Ren et al., 2018). While knowledge management systems and explicit documentation are helpful, they often fall short in capturing tacit knowledge, which is deeply embedded in the individual experiences and their social context (Nonaka, 1994). Thus, a strategically designed work environment that fosters trust, collaboration and shared values is essential for successful KT across projects and teams (Newell & Huang, 2005; Ajmal & Koskinen, 2008; Kazi & Koivuniemi, 2006). The KT outside of an individual project plays a crucial role in building the organisational memory, which needs to be retrieved and reused across projects. When insights and skills remain siloed within a project, opportunities for innovation and process improvements are lost. By enabling cross-project learning through social structures such as mentorship, informal peer networks, and team reflections, an organisation can shorten onboarding times, reduce redundancy, and avoid repeated mistakes (Ajmal & Koskinen, 2008; Roux et al., 2006; Nonaka, 1994; Al-Zoubi et al. 2022).

Social learning mechanisms such as mentoring, job rotation, and structured on-the-job training are instrumental in enabling employees to apply tacit knowledge in the real-world context. According to Al-Zoubi et al. (2022) and Ajmal and Koskinen (2008), these practices significantly enhance an employee's ability to solve problems, adapt to a dynamic work environment, and improve customer satisfaction. Although supervisor and peer support were also positively associated with the KT, their role was not found to mediate the relationship between training and application, suggesting that the social support reinforces rather than drives the transfer process (Holton et al. 2000; Al-Zoubi et al., 2022). This supports the view that training programs build the foundational knowledge, but the surrounding work environment determines whether and how this knowledge is internalised and applied effectively (Holton et al. 2000; Al-Zoubi et al., 2022).

In projects where time pressure is high and teams are short-lived, supportive peer relationships and supervisory engagement help facilitate fast, meaningful learning. A socially cohesive team environment could enhance information communication and encourage experimentation and reduce the knowledge gap when individuals leave a project. (Szulanski, 2003; Ajmal & Koskinen, 2008; Al-Zoubi et al., 2022)

The gap in knowledge retention between generations brings challenges and opportunities for an organisation. Older employees tend to possess rich experiential knowledge but are often reluctant to share it due to a lack of formal incentives or ineffective communication channels. Conversely, younger employees tend to be more open to learning but require structured opportunities to access the knowledge of their senior colleagues. A collaborative and respectful work environment is characterised by leadership support, mentoring programs, and inclusive communication, which can bridge the generation gaps and foster more fluid knowledge exchange. (Al-Zoubi et al., 2022; Rupčić, 2017; Holton et al., 2000)

By nature, tacit knowledge is difficult to articulate, codify or share (Nonaka, 1994). Tasks that require a subjective judgement depend strongly on sensory cues and situational awareness, making them particularly resistant to standardisation. An example would be the examination of the current state of a system or by evaluating a problem. In such cases, tacit knowledge is most effectively transferred through shadowing, guided practice, and collaborative problem-solving. When the work environment lacks the support of peers or when the turnover is high, tacit knowledge is especially vulnerable to being lost. (Johnson et al., 2019)

These findings emphasise that the social and work environment plays a strategic role in shaping how knowledge is interpreted and shared. While tools and systems are vital, they must be embedded within an environment that values collaboration, supports mentoring, and aligns cultural norms with learning objectives. For organisations that rely heavily on project-based work, social mechanisms such as mentoring, cross-generational dialogue, and reflective loops are essential for knowledge continuity. These practices extend the benefits of learning beyond the life of a single project and support long-term performance across the project portfolio. Further research should examine the implications of social learning within projects and the settings that are required to extend the possibilities of KT through mentoring and informal events to enhance the collaboration between all project stakeholders. (Grant, 1996; Nonaka et al., 2000; Al-Zoubi et al., 2022)

In project settings, effective KT can directly impact success, while various tools and technologies are available to manage knowledge, their effectiveness depends on how well they align with the goals of each stage in the knowledge management process. Communication plans are often used to manage and monitor KT, but they often lose relevance over the course of a project and risk being neglected. As a result, alternative approaches such as the use of CoPs within project environments offer promising opportunities for enhancing knowledge exchange and should be explored further.

The literature review highlights the critical role of a structured communication, trust and collaborative environment to enable an effective KT within projects. While formal tools such as communication plans and knowledge management systems offer a framework for managing knowledge, practical challenges often limit their effectiveness. Informal approaches, such as CoP's provide valuable support by fostering trust-based, self-organised knowledge sharing that complements formal systems. (Roux et al., 2006; Versiani et al., 2024; Čulo and Skendrović, 2010)

These insights form the foundation for the next chapter, which outlines the research methodology and presents the expert interviews designed to validate the theoretical findings in practice.

2.5 The Multi-Layered Framework for Practical KT in Projects

Building on the literature review, this thesis developed a multi-layered framework to analyse KT (KT) in project environments. The framework incorporates established theoretical models and applies them to various real-world situations, enabling a structured comparison between theory and empirical findings derived from expert interviews. The framework considers KT as a dynamic, human-centred, multi-dimensional process that is shaped by contextual conditions, processed through the ontological and epistemological processes, supported by enabling mechanisms, and the measurability of KT-related outcomes.

The framework consists of four interrelated layers: contextual layer, process and ontological layer, enabling layer, and outcome and evaluations layer. Together, these layers provide a comprehensive view that assess both micro- and macro-level KT and highlights where the theoretical insights might align or differ from practice.

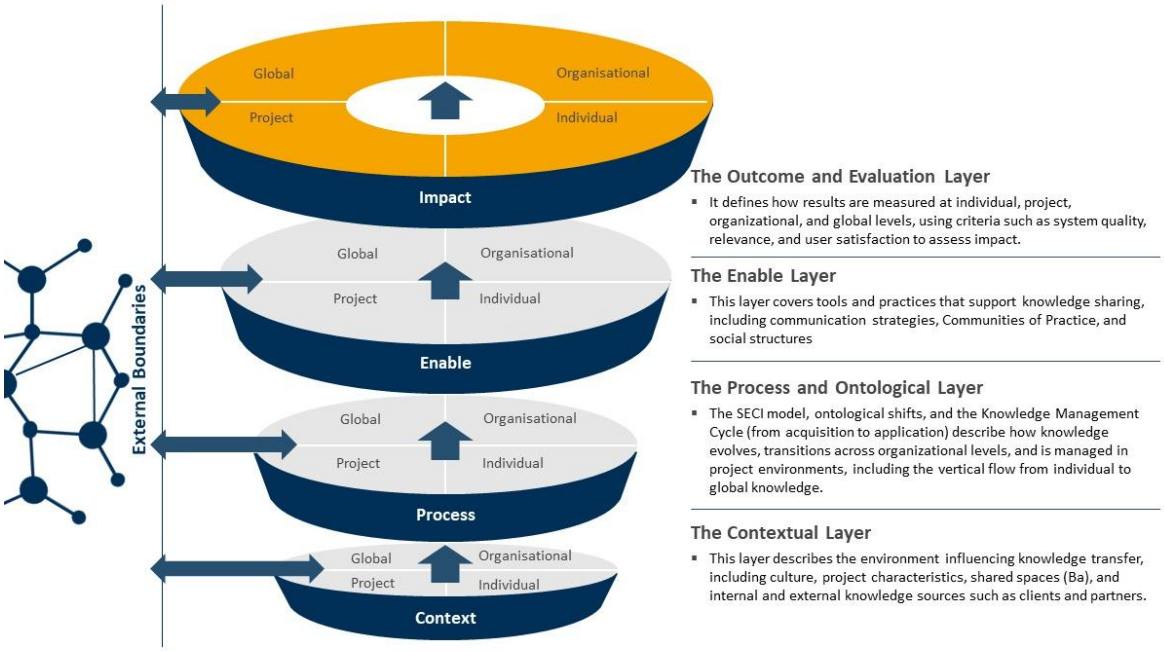

Figure 5. Multi-Layered Framework for Practical KT in Projects

1. **Contextual Layer**

   Knowledge is not transferred in isolation but it takes place within the broader organisational and project context. The contextual layer includes different aspects that influence how knowledge is generated, transferred, and applied. The first aspect is the organisational culture and climate. It influences the level of trust, openness and psychological safety, and a culture of collaboration within the organisation, which conclusively affects individuals' willingness to share both tacit and explicit knowledge. Where cultures are competitive, siloed, or risk-averse, KT is often hindered. (Ajmal & Koskinen, 2008; Szulanski, 2003)

   Furthermore, projects differ in complexity, duration, urgency, and team composition. These characteristics shape how knowledge is needed and determine the feasibility of a structured knowledge process. Interdisciplinary, temporary and changing characteristics of projects, the involved teams often

require rapid and informal knowledge exchange mechanisms. (Ren et al., 2018; Gasik, 2011; Yap & Skitmore, 2020)

Additionally, Ba refers to the shared context or physical, virtual, or mental space in which the knowledge interactions occur. These spaces can be formal, such as through structured workshops, or, for example, through informal peer conversations, and they provide the social infrastructure that enables knowledge exchange. Within these spaces, knowledge assets (experiential, conceptual, systemic, and routine) are used as the foundational elements to create or adapt knowledge. They can be continuously developed and leveraged throughout the project lifecycle, enhancing individual, project, organisational, and interorganisational learning. The last can lead to enhanced client, supplier, and partner relationships and could enrich the organisational knowledge base, illustrating that KT extends beyond company boundaries and often occurs in collaborative ecosystems. This shows that knowledge is not limited to the organisational boundaries. (Nonaka et al., 2000; Yap & Skitmore, 2020; Fong 2005)

At the same time, barriers such as stickiness, causal ambiguity, and low absorptive capacity limit the effectiveness of transferred knowledge. Resource constraints and hierarchical power dynamics can further constrain documentation and codification efforts, shifting the focus towards immediate project delivery at the expense of long-term learning (Szulanski 2003). Seen from the perspective of dynamic capabilities, the contextual layer emphasises that organisations must not only manage existing knowledge but also continuously reconfigure and renew it to sustain competitive advantage. (Bindra et al., 2023; Ashill et al., 2020) Overall, the contextual layer highlights how both organisational culture and project-specific characteristics shape the opportunities and barriers for KT.

2. Process and Ontological Layer

The "Process and Ontological Layer" [5] describes how knowledge is created, transformed, and moved across levels of the organisation. It integrates the epistemological dimension of knowledge conversion and the ontological dimension of knowledge movements through the SECI and OS SECI. The SECI Process by Nonaka (1994) explains how tacit and explicit knowledge continuously convert through the four interrelated modes of socialisation, externalisation, combination, and internalisation. The Ontological Shift SECI Model addresses the lack of attention to the organisational layers through which knowledge moves according to Nonaka (1994) and adds the four ontological levels: individual, group/project, organisational, and interorganisational level. It shows how knowledge moves upwards when accepted and institutionalised (bottom up) or downward when it is rejected and revised (slip down) (Wu et al., 2019).

The OS SECI can also be operationalised through an activity map, which visualises how specific knowledge activities move across the layers over time. Such maps identify the actors responsible for each knowledge activity, show transitions between layers and highlight enablers or barriers that influence these movements. Making the flow of knowledge visible in the activity map helps to diagnose where the knowledge creation and transfer succeed and where they stall, offering a practical tool for project teams and managers to monitor and adapt KT processes in the project in real time (Wu et al., 2019). In addition, vertical and horizontal knowledge flows connect local problem-solving to broader organisational learning, which makes the KT not only a matter of conversation but also of circulation across boundaries (Gasik, 2011).

[5] note: also called "process layer" to simplify and improve readability

While the SECI and OS SECI models explain the dynamics of knowledge creation and movement, the KM Cycle complements them by detailing how knowledge is operationalised in everyday routines. The KM Cycle emphasises that knowledge is continuously acquired, organised, codified, shared, used, and evaluated (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000). These phases overlap with the SECI process but add greater detail to how knowledge moves through everyday project routines. Within the OS SECI perspectives, the KM cycle can be seen as the micro-process that occurs at each ontological level, while the activity map captures how these processes shift upwards or downward across layers. This way, the KM cycle functions as the processual backbone of the framework, linking contextual triggers, enabling mechanisms, and evaluative outcomes into one continuous flow of KT. (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000)

The level of analysis in the process layer ranges from individual, where tacit expertise and judgment are applied, to the project or team, where collaboration, documentation, and problem-solving occur. At the organisational level, insights are formalised into repositories and routines, while at the global or inter-organisational level, knowledge crosses company boundaries through clients, partners, and professional networks, supporting innovation and adaptability. In practice, iterative workshops and reflective cycles illustrate how these processes unfold, combining socialisation, codification, and institutionalisation over time. (Fong, 2005; Roux et al., 2006; Engström et al., 2022)

While the theory emphasises the continuous spirals of knowledge creation, in practice, the transfer process often deviates from this. The knowledge codification under time pressure or with resource constraints frequently leads to incomplete or volatile documentation.

As a result, valuable tacit insights may be lost, and the KT remains fragmented and incomplete. This illustrates a gap between theoretical models, which assume structured and continuous conversation and the realities of project-based work, where conditions often undermine systematic codification, which is already proven by the theory. (Nonaka et al., 2000; Szulanski, 2003; Ajmal & Koskinen, 2008; Jäväjä, 2007; Versiani et al., 2024)

3. Enabling Layer

The enabling layer identifies the formal structures and informal practices that make KT possible. It reflects the operational side of knowledge management and includes technical systems but focuses on human-centred strategies. At a formal level, a communication plan could serve as a coordinator for the knowledge exchange by clarifying what information is communicated, when and by whom. These communication strategies help to ensure the alignment across project stakeholders and support the timely and purposeful distribution of knowledge (Čulo & Skendrović, 2010; Galvis-Ardila et al., 2023). Complementing this, informal mechanisms such as communities of practice (CoP) provide organically formed spaces where individuals with shared interests engage in peer learning, problem solving, and mutual knowledge exchange without hierarchical constraints and in a trust-based collaboration. These informal networks are essential for surfacing tacit knowledge and fostering collective learning, also outside of an organisations knowledge boundary, linking practitioners across companies or industries to exchange solutions and best practices. (Wenger, 1998; Roux et al., 2006; Čulo & Skendrović, 2010; Galvis-Ardila et al., 2023)

Leadership plays a central role in enabling KT. Centralised leadership provides strategic direction, resources and formal structures, while distributed leadership empowers team members to contribute expertise and take ownership of their shared goals. The interaction between these forms of leadership directly affects the quality of knowledge exchange. High levels of trust and cohesion encourage sharing, but too much cohesion can reduce the critical evaluation of ideas, highlighting the need for balance (Von Krogh et al., 2012).

Social learning mechanisms, including mentoring, job shadowing, onboarding programs, and cross-generational exchange, embed experiential knowledge within the teams and enable rapid adaptation in time-bound projects (Al-Zoubi et al., 2022). Technology can be used as digital knowledge management tools to create and manage knowledge repositories, wikis, collaborative platforms, and lessons learned systems to support the codification, organisation, and retrieval of knowledge assets. The effectiveness of these systems depends not only on the technical robustness but also on the user accessibility, relevance of content, allocating resources and nurturing a culture that values learning (Jennex & Olfman, 2007). Hence, even though technology can support knowledge management, it still requires human-centred approaches to enable an organisational culture to exchange knowledge and nurture learning (Nonaka, 1994; Choo, 1997).

The quality of codification itself represents a critical challenge. Tacit insights are easily lost in the translation when they are externalised through sufficient context, limiting their value for future use. Knowledge is only valuable if it is meaningful to the receiver, and its quality can be assessed through dimensions such as accuracy, completeness, relevance, and timeliness. Thus, enablers must not only expand the quantity of knowledge shared but also ensure its interpretability and usefulness. (Davenport & Prusak, 2000; Wang & Strong, 1996)

Finally, this layer acknowledges that even the most well-designed practices and systems can be undermined by persistent barriers, such as unclear responsibilities, inadequate incentives, low motivation, or resistance to change. Recognising and addressing these issues is crucial to sustaining an effective knowledge-sharing environment. Collectively, these enablers provide the operational and cultural foundations that sustain robust KT in project settings. (Al-Zoubi et al., 2022; Holton et al., 2000; Davidova & Kokina, 2018)

4. Outcome and Evaluation Layer

The final layer of the framework centres on the evaluation of the impact of KT in projects, how it can be recognised and assessed holistically across individual, project, organisational, and inter-organisational levels. At the individual level, effective KT results in enhanced competencies, increased confidence, faster decision making, and personal development (Nonaka, 1994; Liebowitz, 2005; Ajmal & Koskinen, 2008). Within the project context, it supports smoother coordination among team members, minimising the rework, improves the response to complexity, and ensures better compliance to schedule, budgets, and quality standards (Versiani et al., 2024; Yap & Skitmore, 2020). At the organisational level, KT reinforces institutional memory, improves the consistency and scalability of best practices across projects, reduces knowledge silos, and lowers dependency on key personnel. At the inter-organisational level, especially in collaborative or client-facing projects, successful transfer enables greater responsiveness to external demands, supports innovation through cross-boundary knowledge exchange, and strengthens stakeholder trust and satisfaction (Fong, 2005; Roux et al., 2006). Conjointly, these outcomes illustrate how KT generates value not only for individuals and projects, but also for organisations and wider inter-organisational networks.

In conclusion, the multi-layered framework synthesised the contextual conditions that shape knowledge for its transfer, the process and ontological flows through which knowledge is created and legitimised or rejected, the enabling mechanisms that sustain its movements, and the outcomes and evaluation criteria that capture its impact. The embedding of the individual, project, organisational, and global levels into the process layer ensures that both micro- and macro-level dynamics are considered (Gasik, 2011; Fong, 2005). By highlighting that each layer includes both internal and external KT, the framework reflects the reality that KT in projects extends beyond organisational boundaries and is shaped by interactions with clients, partners and professional networks as well as between colleagues (Fong, 2005; Roux et al., 2006). The KM Cycle present a structure that links contextual conditions, process dynamics, enabling mechanisms, and evaluative outcomes into one continuous flow. In this way, the framework provides a structured view for analysing how KT is enacted in project environments, allowing a systematic comparison between theoretical expectations and empirical findings, and helping to identify points of alignment, divergence, and potential for improvement. (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000)

This framework serves as a foundation for designing the qualitative research methodology, including the development of interview topics and the coding of collected data. By structuring the study around the four layers, the research can systematically compare how KT is defined, implemented, and experienced in practice, highlighting the factors that enable or constrain effective KT in project settings, and identifying the gap between theory and practice to enhance its use in real-world settings.

3 Research Methodology

This study conducts primary research using qualitative interviews to explore how KT is understood, practised, and experienced by practitioners. A qualitative research approach was chosen to capture the subjective perspective of interviewees, making it well-suited for examining complex, content-dependent processes and capturing nuances in personal experiences and backgrounds. It offers an open and flexible structure, allowing participants to articulate their views in their own words. If needed, the interviewer can probe further or seek clarifications to deepen the understanding and minimise misinterpretation. The interviews were conducted virtually via Microsoft Teams, allowing for both accessibility and easier transcription. Participation was entirely voluntary, without contains for psychological pressure. (Hussy et al. 2010)

The study employed unstructured expert interviews. This format, guided only by an interview guide/outline, ensured the coverage and discussion of key topics while still allowing flexibility. This enabled the interviewer to adapt questions spontaneously, follow emerging threads in the conversation and delve deeper into specific issues raised by the participants. The unstructured interview offers the benefit of an encouraged open-ended discussion, enabling interviewees to speak on their own terms, and allows for clarification or probing when necessary (Williamson, 2002). This approach is especially effective in uncovering complex phenomena such as tacit knowledge exchange, informal learning, and cultural influences that structured methods that may have been overlooked (Williamson, 2002). This structure has an exploratory nature, which allows to examine and find the bridge between the theoretical models of KT with the real-world practices in the consulting and IT sector (Hussy et al., 2010).

The sampling approach in this study followed a purposive strategy, specifically combining criterion sampling, convenience sampling and snowball sampling techniques. The participants were selected from the researcher's professional network based on their direct involvement in project-based environments and their practical experience with the KT process. The participation criteria defined for the search of participants were based on:

- Awareness of the KT processes in the company
- Their work relies on project work, while projects are defined with the following attributes: Time restrictions, changing teams, changing environment, and clients are in a deciding role (Ren et al., 2018)
- Need to understand how information and knowledge are defined, shared and used in and between projects
- Ability to share practical strategies or approaches that the organisation conduct to support KT.

This criterion-based selection ensures that the participants were well-positioned to provide insights directly relevant to the research objectives. (Nyimbili & Nyimbili, 2024)

The convenience sampling was used to leverage the accessibility and willingness of the participants, which supported the study's practical feasibility. Project managers or leaders in higher positions who fulfil the criteria usually are busy, and it wasn't easy to find participants who were willing to participate. This method provided practical advantages such as reduced time and cost to find participants and increased the chance for a positive response. The ease of access to participants also enabled a more flexible interview scheduling and efficient data collection. Keeping in mind that convenience sampling usually is not the most credible technique, it fulfils the purpose of the master's thesis to investigate the gaps between theory and praxis and identify the impact of KT in projects (Nyimbili & Nyimbili, 2024).

Within the author's network, a total of only ten people could be found who fit into the participation criteria, of whom only six people were willing and had the capacity to participate in the interview. During the outreach, it became notable that the target group was not easy to convince to participate due to their many areas of responsibility. To broaden the participants' pool and compare people participating through the convenience sampling, a snowball sampling technique was utilised. The initial interviewees and people who fit into the participation criteria but could not participate were asked (off recording) if they could refer other professionals within their networks who met the same inclusion criteria. This referral-based method proved effective in accessing relevant experts and extending the study research beyond the immediate circle of contacts. In the end, the outreach for participants who met the participation criteria was extended to 12 more people. Of those people, six interviews could be scheduled, but had to be rescheduled due to the loss of the voice of the author. In the end, three people could be interviewed through the snowball sampling technique, which makes it a total of nine people that could be interviewed out of 22. This integrated purposive sampling approach ensured a focus on information-rich cases while accommodating practical constraints. Consistent with the qualitative research goals, the study did not seek statistical generalisation but rather analytical depth and conceptual insights into how KT is enacted and perceived in consulting and IT-related project environments.[6] (Nyimbili & Nyimbili, 2024)

In qualitative research, validity and reliability are not assessed through the same standards as in quantitative research. Instead, different criteria exist to ensure scientific quality in qualitative research. These are either designed as independent quality criteria or represent adapted versions of quantitative criteria. The focus is not on the standardisation of the collection and evaluation process, but on the traceability, transparency, and argumentative foundation of the interpretation. (Hussy et al., 2009)

[6] The attachment contains a Table 8 with the profiles of the interview participants.

Several steps were taken to ensure the quality throughout the research process. First, all procedures, ranging from interview preparation and data collection to transcription and analysis, were systematically documented. This documentation allows others to trace and understand the decisions made during the study, fulfilling the requirement of procedural transparency. The researchers' theoretical background, analytical choices, and reflection on the data were made explicit throughout the process. (Hussy et al., 2009)

In addition, after the first interviews were conducted, three participants (Anonymous2, 3, 4) were contacted again to clarify and extend their views on informal social infrastructures supporting KT. These follow-up exchanges served the purpose of adding more detail on how such informal mechanisms function alongside formal structures in project settings. These additional answers had been added to the end of the interview transcripts. While these additions were not part of the original interview, they strengthened the credibility of the findings by ensuring that their role of informal social infrastructure was sufficiently explored and interpreted in line with the participants perspective.

Although this research had conducted unstructured interviews to allow open and authentic expressions and enable the interviewer to respond to the questions better and in greater detail (Williamson, 2002), the data were analysed using a structured form of qualitative content analysis according to Mayring (1994). This ensures a systematic interpretation of the collected data. The coding process followed a rule-guided approach, in which the categories were derived deductively from the theoretical framework and inductively from the data itself. The codes received a coding description, adding to the coding consistency and traceability. This combination made it possible to remain open to the data while aligning the findings with the study's conceptual goals. (Hussy et al., 2009)

Furthermore, the interpretive justification is another quality criterion to consider. The development of the categories and the interpretation of their meaning were not arbitrary but were backed by clear reasoning and supported with coding descriptions based on the theoretical framework. Through quotes from the data, readers can trace how interpretations were grounded in the material and increase the transparency of the analytical decisions. The concept of reliability is treated differently in qualitative research in comparison to quantitative research. The goal is not to produce identical results under the same conditions but to ensure that findings are based on the data and not influenced by the researcher's bias. For this reason, a reflective and analytical process was employed to reduce the errors and increase consistency. The coding decisions were rescreened during the interpretation process, and recurring themes were re-evaluated during multiple rounds of interpretation. The validity in the qualitative context refers to the credibility and relevance of the interpretations. This was ensured through contextualised analysis, close connection to the participants' real-world experiences, and transparent presentation of data and findings. Internal validity, as understood in experimental design, plays a lesser role in qualitative approaches. Instead, external validity is addressed in the form of transferability by providing detailed information about the participants' contexts and roles. (Hussy et al., 2009)

It is important to acknowledge a practical limitation of this study. The interviews were constrained by time due to the participants' limited availability and to keep the interviews rather consistent. As a result, not every topic could be explored in full detail. Nevertheless, the key dimensions from the research framework were addressed across all interviews to ensure consistent thematic coverage and the possibility of answering the research questions. The choice of the unstructured interviews also presented specific challenges. As noted by Williamson (2018, citing Krueger, 2002), conducting unstructured interviews requires a high level of expertise to conduct the interviews to guide the conversation without imposing structure while still covering the relevant topics for this research.

For less experienced researchers, this can pose a challenge to manage effectively and consistently, as was the case for the interviewer for this research. In addition, unstructured interviews tend to produce highly varied and less uniform responses. This can make the organisation and interpretation of the data more complex (Williamson, 2002). These challenges were addressed through the application of Mayring's (1994) structured analytical framework, which supports the clarity and consistency of the analysis while preserving the participants' narratives.

In summary, this study complies to the essential quality criteria of a qualitative research by combining openness with systematic analysis, transparency in documentation, and careful interpretation. Despite the methodological challenges inherent in unstructured interviews, the research design enabled a rigorous and credible exploration of the subject matter. The goal of this research was not to achieve a statistical generalisation, but rather to gain an analytical depth and conceptual insights into the KT is enacted and perceived in practice. The research is grounded in a conceptual framework developed from the literature review, which defines the interrelated dimensions and concepts of KT. While this framework provides theoretical direction, the flexible methodology allows for capturing insights that may affirm, complement, or challenge the model. The data will be analysed using Philipp Mayring's Qualitative Content Analysis (QCA) (Mayring, 1994). This method provides the ability to analyse an unstructured text in a systematic and replicable manner while integrating both deductive and inductive elements. (Schreier, 2012)

Mayring's (1994) framework emphasises transparency, a rule-based coding, and category development, which supports both the theoretical alignment to the research framework and openness to new findings. Hence, the interview transcript will be coded with a hybrid coding strategy. The research is guided by the conceptual framework developed from the literature review, which outlines the four interrelated dimensions of KT. It provides a theoretical foundation for the study, while the chosen methodology ensures sufficient flexibility to capture insights that extend or challenge the initial model.

These will be captured as deductive categories in which the coding indicators are drawn from the literature-based framework. Insights which appear to complement or challenge the framework and theoretical findings can be captured through inductive subcategories. They are developed iteratively during the coding to reflect emergent themes and unanticipated insights. This could facilitate valuable insights to find the reason for the gap between the well-established theoretical base and the practical use in the real-world setting. (Schreier, 2012; Mayring, 1994)

A total of nine interviews were conducted via Microsoft Teams. Using speech-to-text AI, the interview was transcribed in minimal transcript form to remain as close as possible to the spoken language. Paraverbal and nonverbal elements were excluded from the transcription to ensure easier readability. The resulting reduction in authenticity associated with the omission of these forms of expression is acceptable for this work, as this data is not relevant to the research question. Only the analysis of attitudes, opinions and their justifications are relevant to this work. (Hussy et al., 2010)

The unstructured interviews were guided with topics but kept open to react based on the answer the interviewee gave. In case the interviewee's answer did not lead to a deeper question, a new topic was chosen from the topic guide. The interview started with a short introduction on why the interview is being held and a short statement of the purpose of the interview. Followed by that, the interviewer described the use of the recordings and transcription and confirmed the anonymity of the interviewees and gathered the declaration of consent of the participants. The interview started with key information about themself to open the conversation. After that, a base of knowledge needs to be clarified, which starts by asking them about their understanding of knowledge. (Williamson, 2018)

In this study, the interview was digitally recorded and transcribed into a minimal transcript. The content analysis, according to Mayring (1994), is based on a step-by-step approach that defines the process in advance.

With the framework built from the literature review, the category system can be derived from the theory-based framework. The transcribed interviews are reviewed several times, during which each line in the transcript will be reviewed and a code assigned if it fits. During this process, contradictions and lack of consistency of coding should be reviewed and, if needed, corrected. In the second instance, inductive categories are developed based on the collected data from the interviews to identify open themes that have not been covered by the theoretical framework and to gain new insights for the research questions. Lastly, the codes are grouped and interpreted in relation to the research questions. (Mayring, 1994)

To support the coding progress, the software MAXQDA (a qualitative data analysis software) was used to code the text, which can assign the corresponding interview segments to specified codes. The categories definition had been based on the research framework created in this thesis to evaluate how KT is done by experienced practitioners and to analyse this topic by reviewing the collected data on different layers. The coding structure is attached in a separate document. Topics which had not been covered in the theoretical base will be added in subcategories assigned to the layers of the framework.

A complete analysis of the coding units is not possible within the scope of this paper, which is why this study focuses on the most frequently mentioned topics. In this sense, the participants' key statements were developed into substantial arguments to review the focus points of practitioners and to keep in mind that, based on the limited time, not triggering codes from the framework does not mean that the theoretical argument for KT in projects is not relevant, but only hasn’t been touched during the interview.
This research additionally reviews possible gaps to create statements in which the theoretical base does not match the practical approach.

4 Findings

After conducting nine expert interviews to investigate factors that enable or constrain effective knowledge sharing in project settings and identifying the gap between theory and practice to enhance the use in the real-world settings. The data were analysed utilising the software MAXQDA and derived the deducted codes base structure from the research framework described earlier. Afterwards, inductive codes emerged from the continuous coding reviews. In total, 879 coded segments were extracted. These were grouped into the four framework layers: Contextual Layer (383 coded segments), Process and OS SECI Layer (67 coded segments), Enabling Layer (317 coded segments), and Outcome Layer (112 coded segments). The largest number of coded segments appeared in the contextual layer. This appears as this was the leading question to thematise the topic. Enabling layer referred coded segments were secondly frequently discussed, while process and OS SECI and outcome layer were described less often.

It is important to note that the interview design influenced the frequency of some themes. The interviews were conducted in an unstructured format, guided by interview topics but not always following the same order or depth across participants (Table 8). As the interviewer was relatively inexperienced, some topics received more emphasis than others depending on the flow of the conversation. For example, the high frequency of the knowledge definition segment in the contextual layer partly reflects the fact that this was the opening question asked to all participants, rather than participants themselves consistently highlighting it as a central issue in practice. For this reason, frequencies should be read as indicators of coverage and emphasis within this study, not as an absolute measurement of importance across all projects.

In the following, findings are presented thematically. For each layer, themes and subthemes are described with reference to their frequency across the interviews and supported by illustrative quotations.

The presentation of the findings continues from the contextual layer, to the process and OS SECI layer, to the enabling layer, and finally to the outcome and evaluation layer. Then the relationships between themes are examined followed by a summary of the core findings and their input to the research questions.

4.1 Contextual Layer – Shaping the Conditions for KT.

The contextual layer addresses the conditions under which KT occurs. It supports answering RQ2 (main challenges), since the participants repeatedly described time pressure, fragmented systems, and cultural obstructions as a challenge. It also provides insights into RQ1 (definition and use in practice), as the participants gave different understandings of what counts as “knowledge”.

This layer produced the highest number of coded segments (n=383), with ‘Challenges’ (114 coded segments) standing out as the single most frequent theme. Participants described the volatile nature of knowledge and the difficulties of keeping it current, as well as the absence of clear strategies and the persistence of knowledge silos. Other frequent topics include the project characteristics (80 coded segments) and organisational culture and climate (66 coded segments), showing that project-specific factors such as time pressure, scope changes, and communication norms shape how knowledge is transferred. Knowledge definition (65 coded segments) also arose frequently as a result of the structure of the interview guides rather than participants' emphasis. These results suggest that KT is often fragile, shaped by organisational and cultural constraints that make its formalisation difficult and leave teams reliant on tacit exchange.

The contextual layer as a whole responds directly to RQ by identifying the main challenges that undermine KT, such as time pressure, turnover, fragmentation, and cultural constraints. It contributes to RQ1 (definition and use in practice) by showing that even the basic definition of knowledge is contested and situational, which shapes how KT is enacted across projects.

4.1.1 Challenges (n=137)

The interviews revealed several recurring difficulties that hindered the smooth documentation and transfer of knowledge in projects. Participants described knowledge as fragmented, inconsistently documented, and often dependent on informal or ad-hoc practices. This lack of structure not only made knowledge difficult to locate and reuse but also created a tendency for teams to “reinvent the wheel” of duplicated work which had been done elsewhere. Time pressure and limited resources further added to these problems, as project teams frequently prioritise actions supporting immediate delivery rather than the documentation of knowledge. Human and cultural factors also emerged as barriers. While some individuals willingly shared their expertise, others were less inclined, and the differences in terminology made it difficult to create a mutual understanding between members. Even where knowledge systems existed, they were often poorly maintained and quickly outdated, which reduced the trust in their value. Several participants also explained that instead of standardised and formalised KT processes, their organisations relied on meeting structures or regular routines as the main way to exchange knowledge across the projects.

These meetings are, for example, project-related meetings, stand-ups, retrospectives, or monthly knowledge sessions. While these routines created opportunities for tacit sharing, they also meant that much of the knowledge remained undocumented and inaccessible to others outside of the immediate group. These conclusions give evidence for RQ2 (main challenges), as this part concludes the obstacles that undermine effective KT.

"…sustainability comms project and the project structures are quite fragmented, so we rely on project meetings for alignment." - Anonymous3

"KT happens mostly in stand-ups and retrospectives. We talk about problems and solutions there, but very little of it is actually documented afterwards." - Anonymous6

"Rather than a formal knowledge base, we have regular monthly knowledge sessions where people present their work. That's where most of the transfer happens." - Anonymous4

Challenges were the most common contextual theme. The most frequent subthemes were the nature of knowledge itself (31 coded segments), lack of clear strategy (15 coded segments), resource and time constraints (11 coded segments), and knowledge silos (10 coded segments).

Table 3. Contextual Challenges

Subtheme	Segments (n)	Interview (n)	Example quote
Nature and of Characteristics K.	31	7	*"The more challenging part of all this is to maintain it, to check and somehow maybe reframe, reshuffle, reorganise and reprioritise."* - Anonymous 8
Lack of clear strategy	15	6	*"And we don't have so many structures and ways of working… It's actually something that is kind of like the person's responsibility who is transferring the knowledge. And if the person is not good at it… then the KT is not in a good level."* - Anonymous3
Lack of resource/priority	11	6	*"So there used to be someone kind of gathering people together. But once that role was not in place anymore and we were also lacking the project managers, then it was quite hard to try to stay on track on what's going on in all the all the different projects."* - Anonymous4
Knowledge silos	10	7	*"But I also have some colleagues who barely exchange any knowledge about their projects"* - Anonymous1

The participants often described knowledge as volatile and difficult to capture. The dynamic nature of knowledge quickly makes it outdated; new skills need to be acquired with the changing environment, such as the quick advances in technology developments.

> *"…everything was related with upskilling, telling them what to learn. OK, you know, Angular. Now you learn React because a project on React is coming. And I learned Angular for last five years. And now you're asking me to learn React in two weeks."* - Anonymous 9

” … half a year later and then consumes knowledge, which is completely old and outdated” - Anonymous 5

”The more challenging part of all this is to maintain it, to check and somehow maybe reframe, reshuffle, reorganise and reprioritize. Because like if you only open it up and say everyone throw their knowledge in there and it doesn't stop at one point,” - Anonymous 8

These findings show that KT is fragile when left to informal practices. Knowledge itself is dynamic and quickly becomes outdated, making the capture of it difficult without resources and ownership (Nonaka, 1994). In the absence of clear strategies, responsibilities for KT fell back on the individuals or on recurring meetings, producing silos, duplication and outside of the immediate group. While meeting structures created spaces for tacit exchange, they were no substitute for a standardised process as they rarely led to durable, retrievable knowledge. Time pressure compounded the issue, with documentation consistently deprioritised in favour of the project delivery. Together, this demonstrates the need for stronger structural and cultural support if knowledge is to be preserved and reused effectively and answers RQ2 (main challenges). Anonymous5 suggested an integrated database solution from which users could create a query in a conversational way and receive immediate feedback based on project documentation, automated meeting records and other knowledge created throughout the project and organisational knowledge. The participant stressed that this would require an accurate distribution of access rights and role-based permissions to manage who can view or contribute specific pieces of knowledge, but considered these issues solvable in practice. Overall, more than one interviewee sees generative AI capabilities as a promising step forward in making stored knowledge more accessible and actionable.

4.1.2 Project Characteristics (n=87)

Project characteristics shaped how KT can be realised across different contexts. Many projects were fast-paced and had a short duration, which required rapid adaptability and decision-making, and this made it difficult to retain or document knowledge systematically. Shorter projects relied more on informal and ad-hoc exchanges. In contrast, longer projects in which many stakeholders require a standardised method of KT, allowing more structured documentation and knowledge capture due to external regulations, standards, and reporting obligations. This shows that the size and complexity of projects play a decisive role because large-scale projects with multiple stakeholders demanded more standardised approaches to knowledge sharing, while smaller, two- or three-person teams managed with flexible, ad hoc practices. The team composition can add further complexity with cross-functional and frequently changing constellations. This often spanned over geographic and time zones, making the communication and transfer of knowledge more challenging. In such cases, it becomes necessary for project managers or client directors to carry the burden of continuity of the knowledge by sharing and presenting the team with the benefits and drawbacks of the relevant knowledge base, with its historical documentation and client context. Furthermore, a barrier arose from the dependence on highly experienced individuals, who were often overloaded and their “niche knowledge” are usually uncoded as it is more time-consuming to transfer the knowledge rather than performing the tasks by themselves.

> *“usually, the client directors which is me many times or the project managers responsibility to also share the old materials or the relevant information from the client side”* - Anonymous3

This theme contributes to both RQ1 (definition and use in practice) and RQ2 (main challenges), since the participants describe how project size, duration, and complexity influenced whether KT was informal and conversational or structured and documented, and how these characteristics often create barriers.

The most mentioned subthemes that evolve from the data are team composition (23 coded segments), shared context (18 coded segments), project-specific conditions (12 coded segments), and complexity (9 coded segments).

Table 4. Project Characteristics Influencing KT

Subtheme	**Segments (n)**	**Interview (n)**	**Example quote**
Team composition	23	8	*"The larger the setup, the more complicated it gets, the more partner you add to that equation, the more complicated the KT, right?"* – Anonymous5
Shared context	18	5	*"If you say in German, data sharing, and you translate it with "Daten teilen", it is something that provokes different ideas and emotions even than if you would stick with data sharing."* - Anonymous8
Project related context	12	8	*"specific projects in the IT field where a certain feature needs to be developed or discovered for a client. Let's say that's a certain project goal that the client wants to achieve, then we kind of identify what is needed in order to get there"* - Anonymous5
Complexity	9	5	*"Even if we allocate all the assets to an action plan and then we come into the project implementation, it's quite stressful, chaotic, and you don't take the time sometimes"* – Anonymous2

These findings underline that KT is inseparably tied to the pace, scope, and complexity of projects. Short-term projects and fast-moving engagements created pressure to prioritise the project delivery, pushing KT into informal, tacit exchanges that often remain localised and undocumented.

In contrast, long-term projects and those with compliance or reporting obligations have greater opportunities for systematic documentation. The complexity of the project was equally decisive, because large projects with many stakeholders required a structured process to ensure team alignment, while small projects could be managed with flexible person-to-person interactions. The team composition and shared context additionally shape outcomes. When teams are dispersed or frequently changing, they require extra effort to build a common understanding. The dependency on highly experienced individuals highlighted the fragility of KT when the processes for it are not formalised. In general, the project characteristics acted both as enablers and constraints. In a regulated and complex context, they can support structured practices, but more often teams need to be more adaptive, relying on informal routines, which puts knowledge at risk ad is likely to result in its loss.

4.1.3 Organisational Culture and Climate (n = 80)

The cultural and organisational conditions influenced whether knowledge flowed or was blocked. The most frequently coded subtheme was individual motivation and capability (31 coded segments), which revealed how workload, incentives, and personal attitudes determined whether knowledge was shared or withheld. Another recurring theme was the organisational priority on KT (23 coded segments). When KT was not visibly supported or resourced by the management, participants explained that it was quickly deprioritised in favour of immediate project delivery. Finally, the last subtheme, organisational culture (12 coded segments) emerges from the codes trust (2 coded segments), openness (2 coded segments), flexibility (3 coded segments), and country culture (4 coded segments). It includes aspects such as trust between colleagues, openness in communication and the freedom to try out new approaches without the fear of negative consequences. Additionally, the flexibility in adapting practices to project needs and differences in national working styles and interpretations. These aspects together illustrate how KT is embedded in the broader social climate and knowledge flows more easily where people feel trusted, supported, and able to be creative.

Table 5. Organisational Culture and Climate

Subtheme	Segments (n)	Interview (n)	Example quote
Individual motivation and capability	31	8	*"Some colleagues who barely exchange any knowledge about their projects."* – Anonymous1
Organisational priority on KT	23	14	*"We haven't invested so much in any kind of like administrative people who would actually be the ones who would think about this."* – Anonymous3
Organisational culture	12	9	*"So, there is a human barrier of maybe trust or just, you know, feeling often know each other, right?"* – Anonymous5

These findings show that the organisational culture acted as a powerful moderator of KT. The individual motivation determined whether people saw the value in documenting or sharing knowledge, while the organisational priority made the difference in the embodiment of KT or if it was a sidelined task, hence answers to RQ2 (main challenges). The broader theme of organisational culture revealed that trust, openness, adaptability, and even national working styles shape the ease of the knowledge flows. It changed the willingness to share or withhold knowledge, even if it is not necessarily on purpose. Individuals sometimes decide to share their knowledge only if they can perceive benefits for themselves. If it is quicker to solve tasks by themself or they might see the KT as a burden, they might deprioritise them, as stated by Anonymous2:

"So why should I share the knowledge? For me, there's no benefit." - Anonymous2

In conclusion, these findings answer RQ2 (main challenges) and RQ3 (enablers), highlighting that the organisation's culture and social climate were central to making KT efforts successful or a reason to fail, functioning as a social condition that enabled or constrained knowledge practices.

4.2 Process & OS SECI Layer – How Knowledge Evolves.

The process & OS SECI layer relates to how knowledge is exchanged, transformed, and validated in projects, which provides a direct answer to RQ1 (definition and use in practice). It also contributes to RQ4 (gap between theory and practice) because the findings show selective and fragmented applications of SECI mechanisms, rather than a continuous cycle as described in theory.

The process & OS SECI layer contained 67 coded segments across all nine interviews, making it the smallest of the four framework layers. Although fewer in number compared to the other layers, this layer provides crucial insights into the practical dynamics of KT. As noted earlier, frequencies cannot be equated with importance, since the unstructured interview format and the order of questions influenced how much each theme was discussed. Even so, these data shed light on how roles and responsibilities shape ownership, how knowledge is externalised and internalised, and how it is validated or rejected. Hence, this informs RQ1, by showing KT as a role-bound, partial, and context-driven.

Four themes were identified in this layer. Together, they show that KT is not a smooth universal cycle but a pragmatic process of ownership, collaboration, and validation, which is occasionally supported by forward-looking technological suggestions on supporting this process. This refers to RQ4 (gap between theory and practice) , by highlighting the gap between the idealised SECI process in theory and the fragmented realization observed in practice.

4.2.1 Activity Map (n=33)

The activity map theme describes the roles, responsibilities and processes through which knowledge was managed. The participants emphasised the importance of clear ownership.

The subthemes also revealed practices of externalisation (7 coded segments), such as writing down the perspectives and creating glossaries for enhancing mutual understandings, and internalisation (6 coded segments), where knowledge was absorbed into ongoing project work. Combination (5 coded segments) referred to the consolidation of knowledge in reusable formats, which are often validated by a central team, while socialisation (3 coded segments) highlighted informal interactions and personal preferences in KT. This theme contributes to RQ1 (definition and use in practice), by illustrating how KT is enacted through defined roles, responsibilities, and fragmented SECI processes.

Table 6. Activity Map

Subtheme	Segments (n)	Interview (n)	Example quote
Actors & responsible people	9	3	"*it would have an owner, there would be specific channels where one can access the knowledge and it's frequently updated. And I feel like here the clear ownership and having key people involved,"* – Anonymous4
Externalisation	7	3	*"Basically, we started ideally with a lot of discussions… And next step was… to create a glossary… where we said… when we use this term, we mean that. So basically that we have this agreed upon and then stored in some sort of archive."* – Anonymous8
Internalisation	6	4	*"they gave me the knowledge I needed to continue with that and then I combined the team with the knowledge I had and then we created an offer or like a plan for them to structure it and move forward with their goals and how to reach their goals."* – Anonymous3
Combination	5	2	*"This team is checking, first of all, if you have the proper description, if it's understandable, if it's neutral, so that you don't have any customer specifics in. That is really a neutral reusable which you can use."* – Anonymous2
Socialisation	3	2	*"a lot of discussions and a lot of knowledge also then exchanged through this physical presence, through hearing, seeing the people, talking to them directly"* – Anonymous6

The activity map shows that KT was heavily dependent on the role clarity and validation. The ownership ensured knowledge had a place and remained updated, while the externalisation and combination practices allowed the knowledge to be codified for reuse. Internalisation sustained continuity during project transitions. Socialisations pointed to interpersonal dynamics but also raised scepticism in one participant about the value when they are not directly involved in it.

> *"It's not my thing to listen to dudes talking with each other for two hours and I'm not part of the discussion. I feel, I don't know, a little bit kept outside of this thing."*
> - Anonymous8

Overall, KT here was fragmented and pragmatic, with effectiveness tied to ownership and selective validation rather than a complete SECI cycle.

4.2.2 Vertical Knowledge Flow (n=16)

The vertical flow captured how knowledge moves across the individual, project, organisational, and interorganisational levels and therefore provides valid information to answer RQ1 (definition and use in practice). At the project level (7), the interviewees described structured sessions and monthly meetings as important channels.

> *"we have in our monthly meetings, always if we do some strategic plans, or we are guiding them, for example, with their public affairs team structuring, we keep sharing all the material, like every time we have that meeting, and then the other teams can use that open, like in their work with the other parts of the company"* - Anonymous3

Flows at the organisational level (4) referred to guidelines and frameworks, through participants stressed they were often outdated. Interorganisational flow (3) occurred mainly through conferences and informal settings, while individual level flow (2) reflects the need for enabling knowledge before the project work began.

Table 7. Vertical Knowledge Flow

Subtheme	Segments (n)	Interview (n)	Example quote
Group/project level	7	5	"*we have in our monthly meetings, always if we do some strategic plans, or we are guiding them, for example, with their public affairs team structuring, we keep sharing all the material, like every time we have that meeting, and then the other teams can use that open, like in their work with the other parts of the company,"* – Anonymous3
Organisational level	4	4	*"the knowledge that the organisation can harvest from such a project, from such a work. In order to learn as an organisation, in order to learn as an organisation, in order to learn as an organisation, and to have the next project being better and faster."* – Anonymous7
Interorganisational level	3	4	*"going to events, to conferences, to situations where experts come together and then somebody like, I mean, you know these types of events. You have then also speakers, you have roundtables, you have discussions and things going on."* – Anonymous3
Individual level	3	3	*"This team is checking, first of all, if you have the proper description, if it's understandable, if it's neutral, so that you don't have any customer specifics in. That is really a neutral reusable which you can use."* – Anonymous8

These results illustrate that the vertical KT was uneven and selective, functioning well in local settings but often failing to scale up or outwards.

A proper flow has not been described by the interviewees on how the knowledge is strategically transferred across these levels. These are important insights to answer RQ4 (gap between theory and practice). The enablers are in place to support the transfer from one level to the other. These will be reflected in the enabling layer (Chapter 4.34.3).

4.2.3 Legitimised (6) and Revised/Rejected (6)

Segments coded as legitimised highlighted moments where knowledge was validated and approved for use. This gives additional ideas contributing to answers for RQ1 (definition and use in practice). This includes peer or managerial approval and integration of reusable assets into portals.

> *"so they gave me an indication of whether my way was okay and I should proceed with the way I suggested or whether I should refrain from that and readjust the process."* - Anonymous1

Segments coded as revised or rejected described how ideas were assessed but not taken forward. Sometimes central team rejected knowledge that was too specific to be transferred into a different context, or experts judged subjectively whether the knowledge was useful for a wider audience.

> *"you basically have an expert or team of experts who's then judging if this idea is useful for this customer or not. Most of the time, it's our architect and the consultants doing that. But at the end, this is subjective because it's expert judgment."*
> - Anonymous2

The legitimisation captured moments when project-level or individual knowledge was reinforced and integrated into the wider use. In line with its deductive definition in this study, the code reflects how knowledge is accepted and carried forward, representing a bottom-up movement from local contribution to organisational recognition. At the same time, the evidence shows that this process was selective, as only some ideas or practices received approval and were legitimised, while others were revised or rejected. The rejection reflects the slip down, as defined deductively for this study, a downward movement where knowledge is rejected, found unfeasible, or with the requirement of rework at a lower level. The coded material shows that many ideas did not progress to wider use without revision, and that filtering often relied on subjective expert decisions. At the same time, detailed accounts of how rejected knowledge was reworked were less visible in the data.

The process layer demonstrated that the KT was pragmatic, selective, and role-dependent. Activity maps revealed the importance of ownership and validation, while the vertical knowledge flow showed an uneven distribution across levels. While legitimised and rejected segments illustrated that knowledge was actively curated, the SECI process, such as externalisation and internalisation, was visible and appeared as fragments rather than as a full cycle. Generally, the evidence shows KT as a practical process of ownership, collaboration, validation, and occasionally added to with forward-looking technological suggestions for improvements in the process, but primarily dependent on the clarity of roles and selective knowledge filtering.

4.3 Enabling Layer – Condition Supporting KT

The enabling layer contained 317 coded segments across all nine interviews. This layer captured factors that could directly support KT from the participants' view. While the frequency is high, this reflects the ease with which interviewees could describe enabling practices rather than their absolute importance. The participants pointed to formal governance structures, digital tools, and leadership direction on one side, and informal social practices on the other. Across both, the quality of knowledge and its transfer

emerged as a central theme. These findings respond directly to RQ3 (enablers) by identifying governance structures, repositories, training, incentives, and mentoring as critical enablers. They also contribute to RQ4 (gap between theory and practice), since the participants described tensions between the formal systems envisioned in theory and the informal practices that often carried tacit knowledge in practice.

4.3.1 Formal Structured Environment Through Centralised Leadership (n=201)

Participants consistently described that KT required ownership, structure, and leadership. Knowledge needed a designated "home", clear owners, and active upkeep of its content. Digital repositories like Confluence were widely used, but their value depended on the integration into the everyday work of the employees rather than being treated as extra tasks.

> *"we use Confluence a lot. I don't know if you are familiar with that software… And this is super helpful"* - Anonymous8

Beyond repositories, formalised processes and events also played a role. The participants described structured reporting routines, governance meetings, and regular presentations where teams shared project progress or pitched new ideas as enablers. These sessions would serve as semi-formalised venues for exchanging lessons learned.

> *"do like a lunchtime lessons learned or something like that. So we're just each week when a project is finished, one member of the team just presents the project they've been conducting, the troubles they faced, the takeaways they have, the lessons learned from conducting the process, and everybody else can just eat and listen. So this way you have a subtle way of sharing knowledge within the company without feeling like you have to listen to hours and hours of KT. So it's like try to make it part of the living experience or of the daily work lives of the participants or of your employees."* - Anonymous1

Communication structures, such as defined meeting cadences, escalation paths, and internal channels, supported the process, although in some cases the interviewees described them as fragmented or overwhelming.

> *“if anything can't be solved in the appropriate time, we of course have team meetings… So whenever somebody is missing an appropriate response or whatever, then those issues are escalated into the core team meeting and then solved in there.”* - Anonymous6

Leadership provided strategic direction, linking knowledge activities to the organisational goals and KPIs. To ensure quality and reusability, contributions were validated through templates and centralised checks, which neutralised customer-specific content and created standardised formats. Formal training programs supported onboarding and upskilling, while incentive systems encouraged participation.

> *”there's a specific role that owns kind of knowledge management or is partially embedded in the role, and this person in the role would also have this sort of agent who also worked with knowledge management across the company, and they would together be in charge of making sure that the owners of the knowledge have the knowledge kind of up-to-date, it's in a specific established format, it's kind of serving what it's supposed to, it's like proper length and all that, like very detailed stuff.”*
> - Anonymous4

> *”We have a dedicated team, a centralised team, who's responsible of trying to quantify the knowledge and also to qualify the knowledge. So not every idea which I think is reusable finds its way into the portal.”* - Anonymous2

Formal structures also supported onboarding and skill development, with new employees provided with standardised packages and documented processes to reduce dependency on overburdened experts.

> *“detailed knowledge, training programs and so on are tracked and stored, so that whenever somebody new comes into play, there is of course some history, a generic one, so like general trainings”* - Anonymous6

The evidence shows that formal structures provide stability and accountability for KT. Repositories, mandatory contribution mechanisms, and validation teams ensured content was neutral, reusable, and structured. Strategic guidelines prevented inconsistency, while communication routines kept issues visible and solvable. Training and incentives institutionalised participation. However, participants noted that excessive channels made access difficult, and resource pressure often constrained the extent of documentation or training. Formal structures, therefore, act as necessary enablers, but their effectiveness depends on careful design and sustained attention.

4.3.2 Informal Through Social Infrastructure (n =26)

Beyond formal structures, participants described a wide range of informal and semi-structured mechanisms that supported KT in practice by embedding exchange into everyday routines, creating communities, and fostering a trustful peer-to-peer dialogue. One important element was mentorship. Participants described how senior consultants with decades of experience guided juniors in a project context, offering evaluations of their approaches and passing on tacit insights that were otherwise hard to document. Some organisations also had structured mentoring platforms, which matched mentors and mentees formally, while informal arrangements can take place on demand.

> *“we had a new project coming up with a process no one really knew about or on how to do it because it has never been done before in the company. But just from the experiences these people had gathered through their career, we had two meetings every day, one meeting in the morning and one meeting in the evening, both meetings for like half an hour. And within these meetings, based on their profound knowledge, they evaluated my suggestions on how to handle the project and how to proceed with the next steps”* - Anonymous1

Another set of practices was job rotations and exchanges, which created new networks and broadened perspectives. These could involve international assignments or internal job rotations, which participants saw as enriching both their personal experience and their professional networks. One person claimed that these initiatives are being cut due to cost pressures.

> *“I was in the US for two years. And the contacts I made over there, the experiences that I made over there, I still have so many advantages of that. I have still such a good network. So that's really a thing where I have so much advantage from. So I can only recommend to everybody to do that. But also those positions are unfortunately cut due to the cost pressure.”* - Anonymous6

Team reflections are also playing a role, with some organisations building lessons-learned practices into weekly routines. These were often informal presentations of recent projects, challenges, and takeaways. One interviewee suggested holding these informal reviews during lunch breaks, allowing others to learn in a low-pressure setting.

> *“each week when a project is finished, one member of the team just presents the project they've been conducting, the troubles they faced, the takeaways they have, the lessons learned from conducting the process, and everybody else can just eat and listen. So this way you have a subtle way of sharing knowledge within the company without feeling like you have to listen to hours and hours of KT.”* - Anonymous1

Beyond these, participants described a wide variety of other social learning mechanisms. In one case, career week events were held to foster horizontal and vertical exchange across roles, and open invitations for events for clients to share trends and lessons outside of the project setting. Others are offering morning coffee sessions and open sessions provide opportunities for employees to meet around specific topics, led by internal experts or industry guests, to foster free exchange around a specific topic.

> *“we have these morning coffee sessions for everyone who is interested about the relevant topics like all the industry topics that we invite and usually the people who are working with the industry joins these and they are leading the discussion but then there's everyone from our company welcome to join that if they want to talk about the pharmacy industry or forest industry and listen what happens there. Then we have these open sessions where we talk about the industry changes.”*
> - Anonymous3

Alongside central repositories, the interviewees described the use of collaboration platforms such as Slack, OneDrive, and Microsoft Teams. These tools were not only used to share documents and updates but could also function as an informal Q&A channel in which employees could post questions, and colleagues responded with documents, advice, or contact persons. These ways of communication allow knowledge to circulate quickly without the need for formal structures.

While this created a quick and flexible way of exchanging knowledge, participants also noted that information often became fragmented or difficult to retrieve later.

> *”but usually if you have a topic in mind, you can just ask around in, in the intranet or internal channel, like do we have a community or does someone know about this topic? And most likely someone is always able to help”* - Anonymous4

Finally, one person reflects on the remote work and COVID-19. He noted that informal exchange was disrupted, and spontaneous conversations disappeared, making it more challenging to establish new relationships or maintain communication flow.

> *“especially during COVID, it was quite difficult if you didn't see each other in presence, just remote then that was really difficult to get there, to get at the bonding and get the team together and make sure that communication is flowing.”* - Anonymous6

These findings show that informal infrastructure created rich ecosystems of KT beyond what formal systems alone could achieve. Mentorship transferred highly tacit knowledge in ways that repositories would not be able to and enhanced the individual skills. Job rotations and international assignments build durable personal networks. Team reflections and lunch sessions embedded learning into daily routines. Semi-structured events such as career weeks, client forums, and morning coffee sessions provided recurring opportunities for exchange. Communities of practice and intranet Q&A channels enable employees to self-organise around their interests and problems. At the same time, the disruption of these informal flows during COVID-19 revealed their importance for sustaining informal KT even in remote environments. Altogether, the evidence demonstrates that informal mechanisms are not incidental but essential complements to formal structures, enabling tacit, contextual, and relational knowledge to circulate across projects and teams.

4.3.3 Quality (n=28)

Quality refers to both the content requirement and the process condition of knowledge. Participants emphasised that the usability of knowledge depended on the clarity, neutrality, and structure of documentation. Centralised review processes were tasked with filtering contributions and maintaining the version control. At the same time, interviewees noted that the transfer would fail if the content did not reflect what recipients needed or if the terminology diverged. Hence, the quality described not just the accuracy but also the readiness for reuse and mutual understanding.

> *“So there's a consistent structure, the way how you have to upload it. Always a description, a structure. So it's easy for somebody who is not from our business to understand what this asset is about and how it can help you… When you upload an idea, it's not automatically uploaded to the portal. This team is checking, first of all, if you have the proper description, if it's understandable, if it's neutral, so that you don't have any customer specifics in. That is really a neutral reusable which you can use.* - Anonymous2

> “*Then it is, of course, the quality of your documentation that you are using in order to provide the knowledge. So, it's not just gathering the information, for example, from a technology vendor and just placing it on a slide and demonstrating that. It takes also a lot of time in gathering or, let's say, digesting the information first before it's transferred to the customer. It's learning the system, learning the business process, understanding the customer, building the bridge before we try to educate the customer. So, it's refining the knowledge before we talk to the customer.”* - Anonymous7

The interviewees interpreted quality as a condition for trust and the use of knowledge. Without a structure review, version control, and clarity, repositories quickly lost relevance. Quality was a subjective judgement, tied to what other people considered useful. The emphasis on checklists and structured templates reflects attempts to standardise the evaluation. Ultimately, participants highlighted that knowledge quality can't be seen as something static; it requires continuous updating, agreement on the definition to create a mutual understanding, and attention to the audience's needs to keep KT viable.

The enabling layer demonstrates that KT is enabled through a blend of formal structures, informal practices, and quality assurance mechanisms. Formal systems provided stability, ownership, and legitimacy, but were vulnerable to overload and resource pressure. Inform infrastructure created an accessible space for experiential learning and trust-based exchange, completing what repositories could not capture. Quality emerged as the linchpin, connecting formal and informal practices by ensuring content and processes remained usable and relevant. Together, these findings show that enabling conditions are not passive; they are actively maintained through structures, routines and social practices that give KT both a "home" and a "life" and conclusively answer RQ3 (enablers).

4.4 Outcome Layer – What KT Can Achieve

The outcome layer contained 112 coded segments across nine interviews. Participants reflected on what KT achieved at different levels. The results reflect on the individual, project, organisations and interorganisational level and how the outcome of effective KT can be assessed or measured. They were not only expressed as tangible results, such as efficiency gains and project success, but also as intangible effects such as confidence, trust, and satisfaction. These findings contribute to RQ1 (definition and use in practice) by demonstrating what KT produces at different levels and to RQ4 (gap between theory and practice) by showing both tangible and intangible benefits and showing some clarity about the difficulties of measuring KT impact.

4.4.1 Project-level Related KT Outcomes (n=31)

Outcomes on the project level were the most frequently coded in this domain. The interviewees associated effective KT with managing expectations, reducing confusion, preventing rework, and improving project quality. They stressed that poor KT could leave stakeholders unprepared, disappointed, or confused, whereas effective KT supported a smoother transition and better alignment by ensuring expectations management and structured knowledge handovers in projects.

> *"I think we also had here and there sort of a last minute way of working and not thinking about the whole KT kind of well in advance because we were missing the right resources kind of to think about these things. So in one project, for example, I feel like the people who were impacted by the change, were..., or at least some of the groups were quite confused after the go live."* - Anonymous4

> *"And when you're thrown into a new project where you have no experience of and the customer has no experience of, expectations can be off very far and what you end up with is quite disappointing for both sides in the end even, not only customer side but also on the company side. And that's for me, that's a worst case scenario, if you complete a project and both sides are not satisfied, that's like the worst case scenario."* - Anonymous1

> *"The classic project triangle, right? If you have a bad KT, the quality suffers immediately. The project will take longer. The costs, I mean, it always has a cost, but it's not, let's say, immediately connected to the cost component. But the most impact will be seen in the quality. As the customer might not be able to apply the knowledge he gathered through the project, he might not be able to use the technology to an extent that he could. So, he loses out on quality of the technology, loses out on business value in the end."* - Anonymous7

This theme informs RQ1 (definition and use in practice), by showing how KT shaped project delivery and RQ2 (main challenges), since poor KT created confusion and unmet expectations. In the end, it had direct consequences for the project success or failure. When knowledge was fragmented or absent, projects suffered delays, poor quality, and stakeholder confusion, draw. Conversely, drawing on past experiences allowed participants to manage their expectations, avoid costly rework, and deliver smoother results, with the client's ability to perceive the benefits of the technology and can use it.

4.4.2 Individual-level Related KT Outcomes (n=17)

The participants linked KT-related outcomes to personal development, perceived confidence, and ability in capability-building. Upskilling and onboarding were particularly emphasised, with internal policies encouraging employees to grow into their roles rather than constantly hiring externally. However, this often happened under time pressure, which could cause stress and frustration.

> *"A lot of time had to be allocated for their learning, because if I take a guy who is who has got one and a half years or two years experience and I for project, I need four, four and a half year experience guys. Usually it's not very usual to hire instantly for a project and then fire them. Our policy is always to upskill our guys and let them work. Right. Yeah. So when we ask them to upskill and work, most of the time they did under pressure, of course."* - Anonymous9

> *"That's obviously usually not advised to do to onboard so many people such a short time frame because it can create a lot of frustration, not only on an individual level, but it can get very confusing, right? Because if you're adding like, let's say 50, 60 people within a month, then I've seen in other projects that can really lead to a dysfunctional organisation because nobody really knows maybe what to do, but it also like what direction to work, what's the knowledge, where does it lie, who am I talking to, et cetera, PP."* - Anonymous5

> *"And then we have communities… So, how does this help a project success knowledge sharing in general? Clearly it helps to onboard especially new or junior consultants really quick. It also helps, lessons learned and and getting benefits from the history for any new project."* - Anonymous2

KT outcomes at the individual level were described in terms of growth and strain. Upskilling policies created development opportunities but also placed pressure on the people. Communities and shared platforms eased the onboarding, allowing juniors to learn quickly. In conclusion, KT can shape the confidence and competence of individuals, enhancing their ability to contribute to projects if KT is successful. By showing how KT produces confidence, competence, and onboarding it addresses RQ1 (definition and use in practice) and RQ3 (enablers) by informing about the supportive structures that enable individual development.

4.4.3 Interorganisational-level Related KT Outcomes (n=11)

Several interviewees described how the outcome of KT can extend beyond the organisational boundaries. They included stakeholder trust and satisfaction, responsiveness to external demands, and innovation. Knowledge sharing across organisations was critical for the clients' relationship and business development.

> *"I mean that's the nice thing about knowledge, it is basically there to prevent or to help others in the future of not having to go through the same learning experiences or whatever or curves or whatever there is than you did when creating this knowledge. So it is there to give the future society or whoever it is for whom it is relevant an advantage, somehow like a competitive advantage to the older generation, let's say."* - Anonymous8

“And then there's also a big question of feedback, of course, from the customer, whether he's fine with the current mode of KT, getting a lot of feedback during the project is important to verify your approach of how you're interacting with the customer. Is the customer even able to digest whatever you are placing or whatever you are putting on him? Is he able to absorb all the knowledge? Or does the methodology, the process, or whatever needs to be changed so that the customer can absorb it better?” - Anonymous7

“…not that badly or easily that we can recover from those, but that was such a fail that the client just said that they don't need to operate with us anymore.” - Anonymous3

Interorganisational outcomes were described as trust-building and value-creating. Effective KT enabled an enhanced client collaboration, adaptiveness to external pressures, and even direct business wins. Ineffective KT, in contrast, presented a chance for misunderstandings and loss of credibility. These outcomes address RQ1 (definition and use in practice) and RQ2 (main challenges) by showing KT as a driver of productivity but also a risk when it's neglected.

4.4.4 Measurement of KT Outcomes (n=7)

The final theme related to the ability to measure the impact of KT. Some organisations tied the contribution of KT to the performance metrics and KPIs, while others stressed the challenge of quantifying the outcomes. On the one hand, several organisations attempted to show the visibility of KT by linking it to the performance metrics and KPIs. On the other hand, it had been pointed out that quantifying knowledge loss or transfer quality is inherently difficult, especially where failures manifest indirectly through delays, confusion, or re-working. It was noted that in technical domains such as software development, proxy indicators such as velocity could reflect the consequences of KT's efficiency even if the attribution remains partial.

Organisations remain divided on whether the effects of KT are measurable, whether there is a need for accountability, and how to address the reality of KT's tacit and subjective nature.

> "*And that's also one of the KPIs that we use, you know, for their performance metrics. So that way we kind of try to motivate them individually, right? Okay, you did this project for three months now. How many articles have you written? None? Come on. Don't talk to me in your next performance"* - Anonymous9

> *"I think there is no numeric number you can put together in order to measure what is lost due to bad transfer. So, what is a bad transfer anyway? For example, if you discuss certain topics twice, three times, right, a certain indication of a bad KT might also be just a complex knowledge to be transferred. It's not easy to measure. At least, I don't have an answer to how to measure bad KT except that you will see impacts that you might say, okay, that's because of bad KT. That's because the person did not do the KT before. The person did not learn or is just unexperienced. And that's very often the case."* - Anonymous7

> *"It's usually, so for very complex projects, this can actually go, if you have a very unstructured KT, this can go to four to six weeks. That's not unusual. I've seen this because you can see it very easily and you can measure it also very easily in software development because you're basically tracking velocity."* - Anonymous5

These findings illustrate that measurement of KT is contrasted and partial. Some organisations enforce measurability by counting the contribution to repositories or linking outputs directly to the performance evaluations. While this created accountability, it risks the reduction of KT to a quantitative exercise divorced from its quality of impact.

Others argue that the intangible and tacit aspects of KT are unmeasurable. When it leads to issues with communication, knowledge loss, or impacts the quality of project goals, it cannot be quantified into simple KPIs indicating its standalone impact. Nevertheless, it's known to cause delays, rework, or poor expectations management even though there is no direct evidence of its cause. However, proxy measures such as velocity in software projects offer some insights, but attributing cause-and-effect to KT remains difficult to quantify. In addition, the data set addresses and provides evidence for RQ4 (gap between theory and practice). Although frameworks exist to measure the effects of KT, they often capture the occurrence of KT rather than its effectiveness, leaving the true value difficult to quantify.

4.5 Cross-Layer Synthesis

The preceding sections have shown that KT in projects emerges from the interplay of several layers of contextual conditions, process mechanisms, enabling factors, and outcomes. While each layer highlights different aspects, they are not independent areas; moreover, combined, they create the lived experience of KT in projects. When taken together, the data show KT to be fragile but essential despite being obstructed by systemic barriers.

Contextual conditions (4.1) set the baseline for KT. Challenges such as time pressure, fragmented teams, and a lack of standardisation created fragile environments in which knowledge was often lost or overlooked (Anonymous3, 5, 6, 7, 9). Project characteristics such as size, duration and complexity, determine whether KT took the form of informal, conversational exchanges or more structured and documented practices (Anonymous5, 6, 8). At the same time, organisational culture, particularly the presence of trust, openness, and long tenure, shaped people’s willingness to share knowledge (Anonymosu4, 6, 7). Altogether, these findings support RQ2 (main challenges) and show that barriers arise not only from missing systems but also from deeper structural and cultural conditions within projects and organisations.

The way the participants defined and used the concept of KT in practice is shown by the findings of the Process Layer (4.2). Here, knowledge is getting exchanged, refined and legitimised. Participants described selective applications of the SECI process, such as externalisation (Anonymous2, 8), internalisation (Anonymous3, 6), combination (Anonymous2), and socialisation (Anonymous6, 7), but not as a continuous cycle. Vertical flows mainly occur at the project level (Anonymous3, 6), while organisational and interorganisational flows were less consistent (Anonymous4, 7, 8). These practices were filtered by ownership and validation roles, which determined what knowledge was retained, revised or rejected. Legitimisation and rejection processes further demonstrated that not all knowledge moved “bottom up” with expert judgment sometimes validating and sometimes discarding new contributions (Anonymous1, 2). The empirical findings show that many ideas “slip down” or remain localised. These insights contribute to RQ1 (definition and use in practice) by showing KT as a pragmatic, selective process shaped by context rather than a smooth theoretical cycle.

Enabling conditions (4.3) acted as the strongest counterbalance to contextual fragility. Formal governance structures, which also include repositories (Anonymous2, 4, 8, 9), communication routines (Anonymous4, 6, 7), training (Anonymous2, 9), and incentives (Anonymous2, 9), provided stability and continuity. Informal mechanisms such as mentoring (Anonymous1, 4, 9), coffee sessions and communities (Anonymous3, 4, 8, 9), and job rotations (Anonymous4, 6) supported the transfer of tacit knowledge that could not be codified. Across both formal and informal systems, participants stressed the importance of quality, both in content and in process and were dependent on the individual motivation and incentives (Anonymous2, 6, 7, 8, 9). These results address RQ3 (enablers) by demonstrating that successful KT relies on the combination of formal and informal infrastructures, continuously maintained through validation, incentives, and social trust. Attempts to align KT with KPIs created accountability, but in practice, this often reduced it to compliance activities and disconnected it from the underlying, relational benefit that practitioners would value.

Outcomes (4.4) demonstrated why KT matters. At the project level, strong KT prevented delays, managed expectations, and supported delivery (Anonymous1, 3, 4, 7). At the individual level, KT enabled upskilling, onboarding, and confidence building, although often under pressure (Anonymous2, 5, 6, 9). Interorganisational KT was tied to trust, client satisfaction, and even direct business benefits (Anonymous3,7,8). At the organisational level, effective KT was described as preventing reinvention and increasing productivity, while poor KT was considered a "productivity killer" (Anonymous5). Attempts to measure KT outcomes highlighted the tension between formal KPIs (Anonymous2,9), proxy indicators such as velocity (Anonymous5), and recognition of KT's tacit, unmeasurable aspects (Anonymous7). These findings relate to RQ1 (definition and use in practice) and RQ4 (gap between theory and practice), by showing both the measurable and intangible impacts of KT.

In conclusion, the four layers show KT in projects as a fragile but essential practice. Contextual constraints and fragmented KT processes often undermined it, but the enabling structures and social practices kept it alive. Furthermore, outcomes confirmed the critical role that KT plays in achieving the project goals, individual development, and organisational performance. However, the finding also highlights a gap between theoretical views of KT and KT in practice. While the KT models are presented as structured, continuous, and measurable, the reality described by the interviewees was fragmented, contingent and unevenly measured across projects.

5 Discussion and Limitations

This study aimed to explore how KT is defined, enacted, challenged, and enabled in project environments, and how these characterisations align with or diverge from theoretical expectations and practice. The interviews revealed that KT was most often described as a fragmented and pragmatic process rather than a systematic or continuous cycle. The interviewees emphasised that while formal repositories, templates and onboarding packages existed as a knowledge base, most of the transfer occurred informally through stand-up retrospectives and mentoring practices. As one participant explained, *"KT happens mostly in stand-up and retrospectives... but very little of it is actually documented afterwards."* (Anonymous6). This reliance on informal tacit exchanges reflects Nonaka's (1994) distinction between tacit and explicit knowledge, yet also illustrates that the theoretical balance between the two types was rarely achieved in practice.

RQ1: How do experts define and implement KT in their projects?

In relation to the first research question, the data highlighted the central role of legitimisation in scaling up knowledge. Participants described situations where their individual contributions were validated by peers or managers and subsequently integrated into broader organisational repositories. This mirrors the bottom-up knowledge creation and the OS SECI model's emphasis on the upward transition described by the OS SECI model (Wu et al., 2010), which extends Nonaka's (1994) SECI process by emphasising how knowledge moves across the organisational layers. For example, one participant recalled that *"they gave me an indication of whether my way was okay, and I should proceed."* (Anonymous1). However, such upward transitions were not automatic.

Ideas were rejected or revised, reflecting as well what Wu et al. (2010) call the “slip down” process, where contributions are not deemed reusable or sufficiently general. Another participant explained, *“you basically have an expert or team of experts who then judging if this idea is useful for this customer or not... But at the end, this is subjective because its expert judgement”* (Anonymous2). These findings confirm the selectivity of legitimisation and show that only a fraction of local KT is carried forward into organisational practice.

Beyond the formal structures of legitimisation, the results also pointed to individual absorptive capacity as a critical but often neglected factor. Although not discussed at length in the interviews, several participants implied that the ability of people to take in and apply knowledge was constrained by stress and workload. One described the effect of rapid onboarding, *“if you're adding like, let's say 50, 60 people within a month, then I've seen in other projects that can really lead to a dysfunctional organisation because nobody really knows maybe what to do”* (Anonymous5). This suggests that effective KT requires not only structures but also sufficient time and mental space for the individuals to absorb knowledge. This confirms the theoretical discussions about the absorptive capacity of people (Cohen & Levinthal, 1990), even if not explicitly addressed by most interviewees.

RQ2: What are the main challenges to effective knowledge sharing?

Regarding the second research question, the participants mentioned time pressure, lack of clear strategy, fragmented systems, and reliance on individuals as recurring obstacles. One person explained:

> *“we didn't really have any kind of forum, for example, for transferring the knowledge between projects, and we would just have ongoing projects with different kind of resources, different people working on them, and for example, creating internal communications at the same time, and having, for example, the employees and people who the change was touching quite confused. So a lot of information from different channels and a lot of demands that you need to do this and that and this and that program or tool is changing and now you need to do this*” – Anonymous4

Another emphasised the difficulty of maintaining the relevance: *“half a year later and then consumes knowledge, which is completely old and outdated”* (Anonymous5). These accounts confirm Szulanski’s (2003) argument that knowledge is often “sticky” and difficult to transfer, particularly when projects prioritise immediate delivery over systematic codification.

The findings on challenges confirm what the literature describes in the contextual layer. Ajmal and Koskinen (2008) already emphasised that the project environment forms a fragile place for KT because time pressure and organisational silos often undermine systematic exchange. Ren et al. (2018) and Gasik (2011) mentioned that project environments suffer from fragmented responsibilities and weak stressed cross-project flows, making knowledge prone to loss (Anonymous3, 4). The interviews illustrated this vividly. Even when repositories existed, they were often left unused or outdated (anonymous7). These accounts demonstrate that the contextual fragility described in theory is directly reflected in practice. Projects rely on ad hoc solutions, inconsistent structured, and individual initiative, all of which worsen the barriers to effective KT.

A particularly striking insight from the data was the emphasis on motivation as a decisive factor. Even where repositories or systems were in place, participants noted that some colleagues simply did not engage in the KT.

One remarked, *"some colleagues who barely exchange any knowledge about their projects."* (Anonymous1), while another replicated common phrases in practice, *"So why should I share the knowledge? For me, there's no benefit. And that's how they continue from project to project."* (Anonymous2).

This shows that motivation precedes all other enablers, because without the willingness to share the knowledge, even the best-designed systems and processes remain unused. Interestingly, despite theoretical discussions about the role of motivation and organisational support in enabling KT (Ajmal & Koskinen, 2008; Von Krogh et al., 2012), the empirical findings did not indicate that incentives were effective solutions. Moreover, participants described the motivation as driven by immediate project needs or personal attitudes rather than by formal reward systems. Then again, unstructured interviews conducted by an unskilled person, in addition to limited interview times, lead to results that not every topic can be covered, and the motivational factors in practice need to be reviewed in separate research.

RQ3: What strategies or tools do experts use to enhance KT and project efficiency?

Turning to the third research question, the findings showed that both formal and informal mechanisms play a critical role. On the formal side, repositories such as Confluence or OneDrive were used to store and share documentation: *"this document is basically stored in a general knowledge management system we use* "(Anonymous8, 3), and centralised validation ensured that reusable content met the quality standards (Anonymous2). Structured onboarding materials were also used to reduce the reliance on overloaded experts (Anonymous6). On the informal side, mentoring, peer reviews, and coffee sessions created spaces where tacit knowledge could be shared more naturally. One participant described how senior consultants guided juniors through daily evaluation meetings *"based on their profound knowledge, they evaluated my suggestions on how to handle the project and how to proceed with the next steps"* (Anonymous1).

These informal mechanisms included both everyday social structures, such as mentoring, peer review, and coffee sessions, and the formation of a community of practice. While all of these are informal mechanisms, they differ in scope and continuity.

The supportive social structures created immediate trust-based opportunities for exchange within and beyond projects, whereas communities of practice represented more sustained, interest-driven areas where knowledge was shared beyond single projects, but gave the members of such communities knowledge for their work in projects (Wenger, 1998). Together, these informal mechanisms played a central role in transmitting tacit and experiential knowledge that could not be codified into repositories.

An innovative aspect of the finding was the suggestion of AI-enabled knowledge retrieval. One participant proposed an integrated AI solution that could pull knowledge from project documentation, meeting records, and repositories and make it accessible through conversational queries (Anonymous5). While this was raised as a promising future enabler, it also introduced new challenges, including concerns over data privacy, security, and the ethical use of AI in organisations' knowledge management. These aspects extend beyond the scope of existing KM frameworks but highlight a potential area for future research and development (Arya et al., 2025; Al-Kfairy et al., 2024).

RQ4: Is there a gap between the theoretical state and today's practice on KT?

With respect to the fourth research question, the findings reveal several clear divergences between theoretical models of KT and the practices described by the interviewees. The literature portrays KT as a structured and continuous process. Nonaka's SECI Model (1994) conceptualises it as a spiral of tacit and explicit conversions, while the OS SECI model extends this view by adding ontological levels and emphasising upward movements when knowledge is legitimised and slips down when it is rejected (Wu et al., 2010).

In contrast, the empirical evidence shows that KT in projects are fragmented, role-dependent, and pragmatic. Participants described that the effectiveness of KT depended on ownership and selective validation rather than on a smooth spiral process.

For example, they mentioned that clear ownership was necessary to keep repositories relevant (Anonymous4), that central validation teams would filter the contributions to ensure neutrality and reusability (Anonymous2), and that ideas were frequently revised or rejected if judged too specific (Anonymous2). These insights highlight that, unlike the theoretical spiral that assumes continuity, in practice, knowledge moves in an irregular and selective pattern.

Another variance concerns the evaluation of KT outcomes. Chapter 4.4 pointed out that measuring KT is inherently complex because KT-related outcomes are intangible, context-dependent, and difficult to isolate (Ajmal & Koskinen, 2008; Gasik, 2011; Yap & Skitmore, 2020). The literature suggests mixed approaches, such as tracking the reuse of lessons learned or combining measurable outcomes with subjective assessments of usefulness. Then again, there is no single, standardised framework that exists so far to properly measure the impact of KT on project outcomes. The interviews confirmed these theoretical concerns. One participant explained, *"I think there is no numeric number you can put together to measure what is lost due to bad transfer"* (Anonymous7), while another suggested relying on indirect indicators such as software development velocity (Anonymous5). This shows that while theory conceptualises the difficulty of evaluating KT, practice illustrates the operational consequences of this problem. Organisations fall back on subjective judgements and proxy indicators instead of direct metrics that can only be linked to KT.

Another gap lies in the role of individual motivation. The literature review emphasised the influence of organisational culture, trust and openness as enabling conditions for KT (Ajmal & Koskinen, 2008; Von Krogh et al., 2012).

However, the empirical findings point out that individual motivation is not merely a favourable factor but a decisive bottleneck. The participants described colleagues who did not exchange knowledge because they saw no benefit in doing so (Anonymous1, 2). This reveals that structures and repositories, even if they exist, will not be used unless those who own the knowledge have the desire to share it with others and to contribute to the organisation's knowledge base. Which is why, even though the theory focuses on cultural enablers, practice shows that personal motivation must precede any structural or technological approaches.

Related to the motivation, the question of absorptive capacity and time. The literature recognises that causal ambiguity and limited absorptive capacity can make knowledge “sticky” and difficult to transfer (Szulanski, 2003; Gasik, 2011). The empirical material confirmed this but highlights the extent to which stress and a high workload increase the challenges of KT. One participant noted that KT barriers are greater if many people were onboarded simultaneously within a short time, leading to confusion and dysfunction (Anonymous5). In addition, another participant described that if upskilling is required in a very limited time in demand for a project, this could cause frustration as well (Anonymous9). All these observations indicate that the theoretical recognition of absorptive capacity as a limiting factor becomes even more pressing under project conditions where high urgency and constant change are present.

Finally, the interview pointed to a gap between theory and emerging practice concerning technology. The literature review did not cover artificial intelligence in KT, focusing instead on the established tools and knowledge management systems. However, one participant suggested using AI to enable a repository that could retrieve knowledge across projects and meetings through conversational queries (Anonymous5, 9). This suggestion highlights a gap where practitioners begin to consider technological innovations which are not yet integrated into the theoretical frameworks. Conclusively, the evidence shows that while theory describes KT as continuous, structured, and evaluable, in practice, project environments are fragmented, selective and dependent

on the individual motivation and contextual constraints. Additionally, the measurement of KT-related outcomes is just as elusive as in theory; both perspectives acknowledge the difficulty of capturing outcomes directly. The interviews, however, added a different meaning to the findings by showing the impact of stress and workload on the absorptive capacity of people and by surfacing AI-enabled knowledge retrieval as an emerging, but still untheorized, direction.

This study contributes to the literature on KT in several ways. First, it confirms the importance of trust, leadership, and cultural enablers that have been highlighted in prior research (Ajmal & Koskinen, 2008; Von Krogh et al., 2012). Participants repeatedly described how openness and trust supported their willingness to share, and how leadership validations were necessary to scale up contributions (Anonymous 1, 2). These findings reinforce the argument that social and organisational conditions remain critical for KT.

Second, the study extends existing frameworks by showing that informal mechanisms are not peripheral but central to KT in projects. While the literature acknowledges the role of communities of practice and peer learning (Roux et al., 2006), the empirical data demonstrate that ad hoc social structures such as mentoring, peer reviews, and coffee sessions were the dominant modes through which tacit and experiential knowledge was transferred (Anonymous1, 3, 6). This extends the theory by emphasising the primary importance of informal mechanisms in dynamic project environments.

Third, the findings contradict the assumption of continuity embedded in the SECI and OS SECI models (Nonaka, 1994; Wu et al., 2010). Whereas theory envisions a spiral of conversions and upward knowledge movements, the interviews revealed fragmented and selective processes in which the contributions were either legitimised, revised, or rejected. This demonstrates that KT in projects does not proceed as a seamless cycle, but rather is a pragmatic and contingent process characterised by personal responsibility and validation (Anonymous2, 4).

Finally, the study illustrates how motivation and the people's absorptive capacity are decisive factors for KT. While the literature on contextual and enabling layers recognises cultural and organisational influence (Ajmal & Koskinen, 2008), it does not place individual motivation and capacity at the centre. The data show that without the willingness to engage, even well-designed systems remain unused (Anonymosu1, 2) and that stress and overload of work undermine the ability to absorb new knowledge (Anonymous5, 9). This positions motivation and capacity as fundamental conditions for effective KT in projects. In addition, the study introduces AI-enabled repositories as an emerging practice mentioned by participants (Anonymous5,9), an area not yet reflected in existing frameworks, but which represents a promising direction for future theory development.

The findings from this research generate several practical implementations for project management and organisations. First, managers need to recognise that KT is not automatically happening once repositories or processes are in place. Assigning clear ownership and validation responsibilities is essential to ensure that the knowledge remains accurate, relevant and shared. (Anonymous2, 4)

Secondly, organisations should possess a balance of formal and informal mechanisms to support KT. While repositories and onboarding material provide stability, informal practices such as mentoring, peer reviews, and reflective sessions are essential for transferring tacit knowledge (Anonymous1, 3, 6). Fostering both types of mechanisms is necessary for a comprehensive KT.

Third, leadership should not only provide resources but also plan with enough time and space for individuals to absorb knowledge. As several of the participants indicated, heavy workloads and rapid onboarding reduce the capacity to process and apply knowledge effectively (Anonymous5, 9). Allowing room for reflection and absorption is, therefore, a critical leadership responsibility.

Fourth, the findings suggested that intrinsic motivation, trust and perceived usefulness of KT are decisive for successful KT. Hence, managers should focus on creating a supportive culture that values sharing and recognises contributions rather than relying on formal rewards only.

Finally, new technologies hold potential but should be approached cautiously. While AI-enabled repositories were described as promising solutions for making knowledge more accessible (Anonymous5, 9), concerns about the data quality, security and ethical use remain undiscussed and require additional research. Despite the contribution of this study, several limitations must be acknowledged, which at the same time highlight opportunities for future research.

The methodological constraints shape the scope and transferability of the findings. The research relied on unstructured expert interviews, which provided rich and open-ended insights but also introduced variation in coverage and depth across the interviews. Conducting unstructured interviews requires substantial expertise; inexperienced researchers may find it challenging to ensure consistency and coverage (Williamson, 2002). This limitation is reflected in the present study, where some topics received less emphasis than intended, partly due to the researcher's limited interview skills and the time restrictions of the sessions. The size of the samples involved was limited to nine participants who were recruited mainly through convenience and snowball sampling within the professional network of the author. While purposive sampling ensured access to the target group, it also introduced selection bias and limits their representativeness (Nyimbili & Nyimbili, 2024). Future research could mitigate these issues by employing larger and more diverse samples across industries and geographies, and by using unstructured interviews or focus groups, which balance openness with comparability (Hussy et al., 2009).

Secondly, the data focuses on IT and consulting projects, which provides a coherent empirical field, but the insights may not be generalisable to other industries with different KT dynamics. The use of minimal transcription, excluding non-verbal and paraverbal cues, reduced the richness of contextual information (Hussy et al., 2009). It should be noted that only three participants (Anonymous2, 3, 4) were contacted for additional clarification on a question related to informal social infrastructures. While this improved the depth of analysis on this theme, it also means that other participants' views were not revisited in the same manner, which may limit comparability.

Furthermore, the frequency of certain codes was partly shaped by the interview design. Most of the time, the interviews opened the topic about KT in projects by asking about their definition of knowledge. This leads to a high frequency appearance of the corresponding code in the dataset rather than being emphasised by the participants themselves. This illustrates how interview structures can influence the coding frequencies. Future studies could use an interview method which is more structured or include further project documents or direct observations to capture deeper contextual insights. (Schreier, 2012)

Third, analytical limitations should be considered. The research applied Mayring's (1994) qualitative content analysis, combining deductive categories derived from the research framework with inductive subcategories emerging from the data. While deductive coding always risks constraining novel insights, the openness of inductive coding helped to balance this limitation by capturing unexpected themes and grounding the analysis in participants' perspectives if needed (Schreier, 2012). Still, future research could further expand on this openness by applying fully inductive or grounded theory approaches to develop new theoretical categories that extend beyond established frameworks.

Fourth, contextual limitations affect the transferability of the results. The participants were mostly based in European project environments, and cultural or organisational factors specific to this setting may not apply elsewhere.

Moreover, the reliance on professional networks for participant recruitment may have favoured individuals who are already interested in the topic of KT in project environments. Future research could extend this to diverse cultural and sectoral contexts to highlight how differences in organisational priorities, resource availability, and cultural norms shape KT.

Fifth, theoretical limitations must be noted. The study was grounded in established frameworks such as the knowledge creation process by Nonaka (1994) and Nonaka et al. (2000), the OS SECI model (Wu et al., 2010), the knowledge management cycle (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000), and other frameworks. However, these are still relevant, even though they may not fully capture the emerging realities. The participants described AI-enabled retrieval systems as promising enablers of future KT (Anonymous5, 9). This could change the way knowledge management and its transfer are. However, this raises several unresolved questions such as why AI, although technically possible, is not yet implemented on broader scale, how organisations weigh investment priorities when AI might partly take over the role of a knowledge manager, what ethical, data privacy, and security concerns prevent adoption, or how much will the way of knowledge management change and the roles and responsibilities in managing and transferring them when generative AI solutions for knowledge management are in place. Addressing these questions would extend the current KM theory into the digital transformation area.

Ultimately, future research should focus on the social and motivational dynamics of KT. While the theories often highlight organisational culture and trust (Ajmal & Koskinen, 2008; Von Krogh et al., 2012), this study found that individual motivation was a decisive bottleneck, often outweighing formal incentives. The interviewees described the individual motivation which are driven by the immediate project needs or personal attitudes rather than by structured rewards.

Future studies should therefore investigate the interplay between intrinsic motivation, incentives, and organisational culture to identify the most effective levers to engage KT. Similarly, given the growing relevance of remote and hybrid work, future research should examine how informal social infrastructures, such as mentoring, peer exchange or spontaneous conversations, can be sustained in an increasingly virtual and globally distributed project environment (Anonymous6).

It is also important to note that this study exclusively interviewed participants who either have a managing position within projects and have to manage KT and other methods or were responsible for designing and maintaining knowledge management structures in their organisation. While their perspectives are critical to this study, they represent only one side of the KT process. Future research should therefore include project team members and other stakeholders involved in the process, such as people from the project team or clients, to capture how KT is experienced by those who receive, apply, or are in-/directly affected by it. Such a multi-perspective approach would provide a more comprehensive understanding of KT dynamics in projects and reveal potential mismatches between managerial intent and practitioners' experience.

In summary, this study offers contextually bounded insights into KT projects. Its limitations point to several promising opportunities for future research. Addressing these directions would contribute to a more comprehensive and practice-relevant understanding of KT in projects.

6 Conclusion

This thesis examined how KT is defined, enacted, challenged, and enabled in project environments. Drawing on the established frameworks such as the Resource-Based View (Barney, 1992; Grant, 1996), the Knowledge-Based View (Kogut & Zander, 1993), the knowledge creation process (Nonaka et al, 2000), OS SECI Models (Wu et al.,2010), and the Knowledge Management Cycle (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000), the study combined a literature review with nine expert interviews from knowledge-intensive industries. Four research questions guided the analysis.

The findings show that KT in projects is indispensable but fragile. In response to RQ1, practitioners described KT not as a continuous spiral but as a selective and pragmatic process. Contributions were legitimised when judged as reusable and general enough but often revised or rejected when they were considered as too specific, reflecting the “slip down” dynamic described by Wu et al. (2010). This would indicate that although theoretical models reflect the principle of KT, in practice, it is more shaped by ownership, validation, and contextual pressures.

Regarding RQ2, several recurring challenges emerge during the research. Project teams operated under constant time pressure, lacked clear strategies for the codification of knowledge, and relied heavily on individual initiative. Knowledge silos and fragmented systems further weakened systematic KT, supporting Szulanski’s (2003) argument about the “stickiness" of knowledge. Even when repositories existed, they were often outdated or unused. The individual motivation proved to be a decisive bottleneck, as without the willingness, even well-designed systems remain ineffective.

In relation to RQ3, both formal and informal mechanisms played critical roles. Formal structures such as repositories, governance routines and onboarding packages provided accountability and continuity.

Informal mechanisms such as mentoring, peer reviews, and communities of practice (Wenger, 1998; Roux et al., 2006) were equally vital in transmitting tacit and experiential knowledge that could not be codified. These findings highlight that effective KT requires a balance between formal systems and informal social infrastructures, supported by the leadership, trust, and a culture of openness (Ajmal & Koskinen, 2008; Von Krogh et al., 2012).

Regarding RQ4, the study confirmed a gap between theory and practice. While the models presented KT as structured, continuous, and measurable (Nonaka et al., 2000; Wu et al., 2010; Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000), the empirical findings show that it is fragmented, contingent, and challenging to evaluate. Outcomes were often judged through proxy indicators such as repository contributions or project velocity rather than directly through the performance metrics (Yap & Skitmore, 2020). Absorptive capacity (Cohen & Levinthal, 1990) was further constrained by stress and workload, limiting the ability of individuals to internalise knowledge.

The study makes several contributions. Theoretically, it demonstrates that individual motivation, absorptive capacity, and informal infrastructure deserve greater emphasis in KT frameworks than they have typically received. Practically, it shows that organisations cannot assume KT will occur automatically once the systems are in place. Clear ownership, validation routines, and leadership support must be complemented with opportunities for reflection, mentoring, and informal exchange. Importantly, the study also reinforces that KT directly affects not only project delivery but also client satisfaction, as effective transfer reduces rework, ensures smoother collaboration, and enables clients to capture the intended value from project outcomes (Ajmal & Koskinen, 2008; Al-Zoubi et al., 2022; Ren et al., 2018).

The empirical insights of this study are based on a small sample of nine experts, primarily from Europe, working in IT and consulting. The reliance on unstructured interviews provided depth but uneven coverage across the topics, which reflects the researchers' limited experience. The findings are therefore exploratory rather than generalisable. Future research should broaden the scope by including project team members, clients, and other stakeholders, whose perspectives would complement those of the managers. Comparative studies across industries and cultural contexts would further clarify how KT challenges and enablers differ. Finally, more systematic investigation of motivational factors and absorptive capacity is needed, as these emerged as decisive but underexplored conditions for effective KT.

In conclusion, this thesis demonstrates that while KT in projects remain a fragile process, it is also a critical driver of success. Bridging the gap between theory and practice requires recognising KT as a human-centred, selective, and contingent process. By combining IT solutions with trust-based informal practices and by ensuring that KT supports not only internal efficiencies but also client satisfaction, organisations can strengthen both project outcomes and long-term competitiveness.

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8 Attachment

8.1 From Information to Knowledge – A Process Model of Information Management (Choo, 1997)

Choo (1997) describes the information flow process as one in which individuals actively engage with and structure information, applying their perceptions to assign meaning and generate useful knowledge.

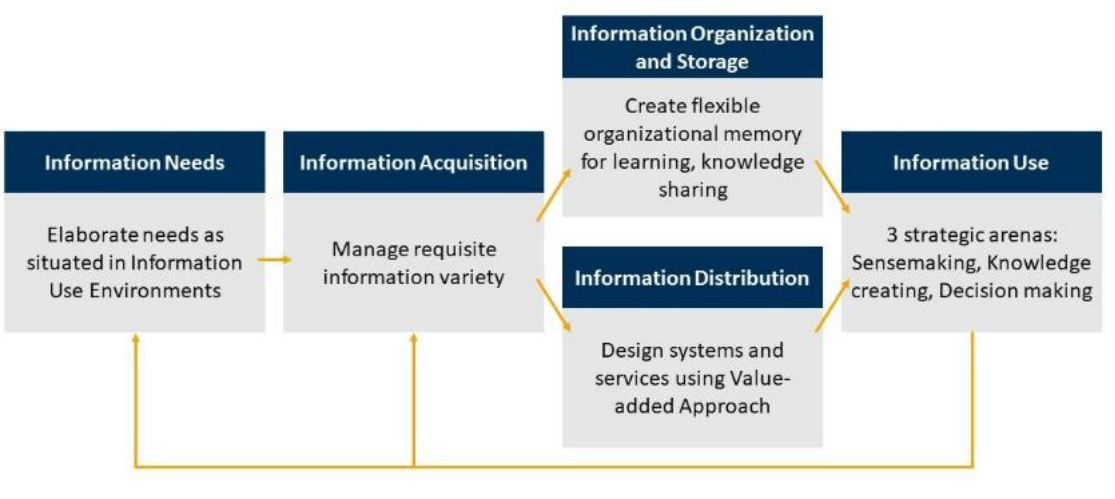

Figure 6. A Process Model of Information Management: Initial Principles (Choo, 1997)

Figure 6 illustrates Choo's (1997) process model of information management, which outlines the key stages through which information flows within an organization. The model emphasises the cyclical relationship between information needs, acquisition, organization and storage, distribution, and use. It highlights the importance of aligning information practices with organizational learning, knowledge sharing and decision-making processes.

People, whether as individuals or groups, interpret information based on the specific context in which it is used in, with their perceptions shaped by the surrounding

environment. The primary function of information is to support the effectiveness of decisions, which in turn impacts business success (Davenport & Prusak, 1997).
According to Wang and Strong (1996), information quality can be evaluated across several dimensions: Accuracy, completeness, consistency, relevance, timeliness, and understandability. Davenport and Prusak (1997) also emphasize that increasing the complexity of an information model tends to diminish the practical value of the information. Nonaka (1994) characterizes information as a flow, a dynamic process through which knowledge is created. In this process individuals contribute their beliefs and commitments, giving knowledge a subjective and human-centred dimension.

8.2 The Knowledge Creation Process

The Knowledge Creation Process is based on the research from Nonaka (1994) and describes how organizations continuously transform tacit and explicit knowledge to generate new insights and capability. This transformation is guided by four interrelated modes – Socialization, Externalization combination, and internalization. Together they are known as the SECI Process and are supported by specific types of knowledge assets and unfold within shared spaces referred to as Ba, which provide the context for meaningful knowledge exchange and development.

8.2.1 Knowledge Assets

To enable and sustain the dynamic process Nonaka et al. (2000) identified 4 categories of knowledge assets. There are various ways to categorize knowledge as an asset. For instance, Rebentisch and Ferretti (1995) proposed to categorize knowledge assets into functional groups or organizational functions such as *Human Knowledge* and *General Knowledge.* However, for the purpose of this research, the categorization by Nonaka et al. (2000) will be adopted, as it is directly linked to the knowledge creation process. Alternative categorizations of knowledge assets, such as those by Rebentisch and Ferretti (1995) will not be further examined, as they do not directly support the knowledge creations and transfer process central to this research.

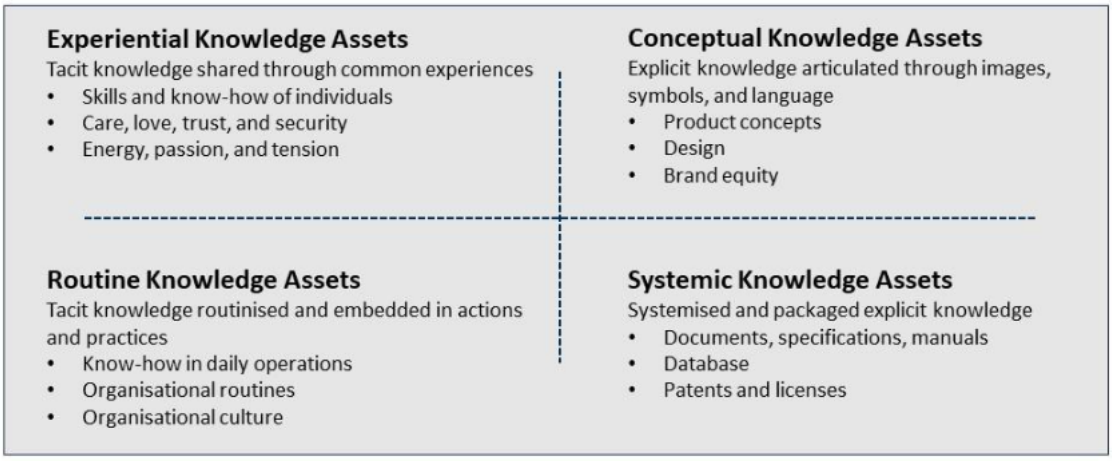

Figure 7. Four Categories of Knowledge Assets (Nonaka et al., 2000)

Figure 7 illustrates the four categories of knowledge asset as defined by Nonaka et al. (2000), distinguishing between tacit and explicit knowledge. Tacit knowledge is captured in experiential knowledge asset, such as the skills, emotions, and shared experiences of individuals, and in routine knowledge assets, which include organizational routines and operational know-how embedded in daily practices. Explicit knowledge, on the other hand, is found in conceptual knowledge asset, such as product concepts, design, and brand equity, and in systemic knowledge assets, which encompass formalized resources like documents, databases and patents. (Nonaka et al., 2000)

According to Nonaka et al. (2000), these categories of knowledge assets are essential in enabling the processes of knowledge creation, exploration, and exploitation within organizations. Through a clearly defined knowledge vision, companies can guide the development of specific knowledge assets and reshape existing ones to address new challenges and opportunities. This continuous redefinition and contextualization of knowledge assets ensure that knowledge remains actionable and aligned with organizational goals and situational needs. (Nonaka et al., 2000)

8.2.2 SECI Process

To understand how knowledge assets are developed, applied, and transformed within an organization, it is essential to examine the underlying process of knowledge creation. Nonaka et al., (2000) conceptualized this process through the SECI process, which describes four dynamic modes of knowledge conversion shown in Figure 8.

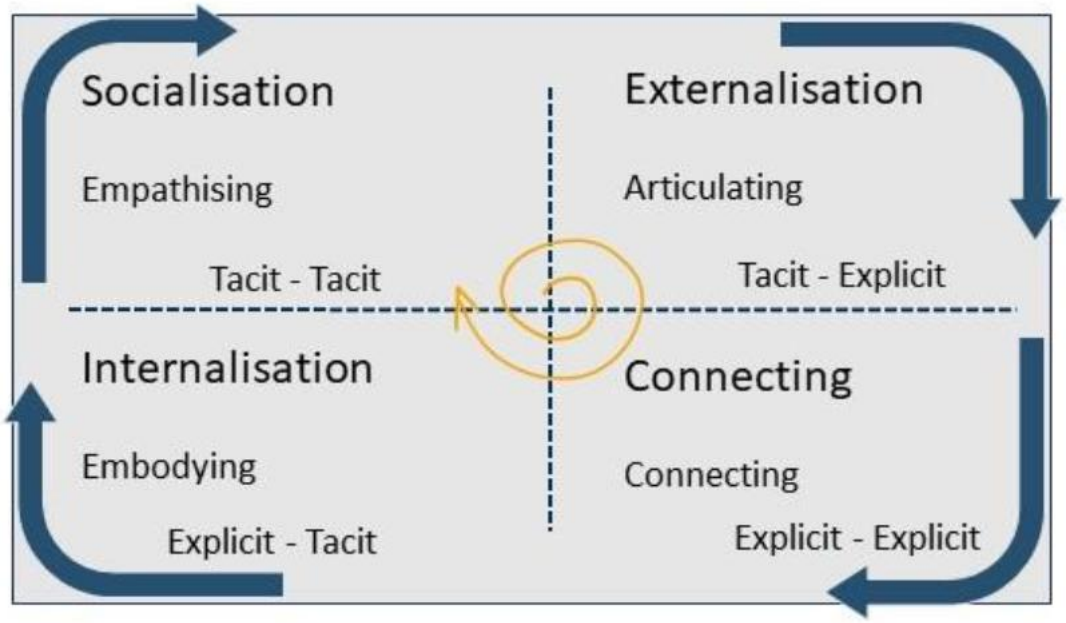

Figure 8. The SECI Process (Nonaka et al., 2000)

These modes explain how tacit and explicit knowledge interact and evolve, forming the ground for continuous organizational learning and innovation. The socialization mode refers to the conversion of tacit knowledge through shared experiences and informal interactions. This often occurs between employees or through external engagement with customers and suppliers, allowing new tacit knowledge to emerge. In the externalization mode, tacit knowledge if made explicit through dialogues, reflections, and collaborations. For example, employees may articulate insights during ideation sessions, resulting in the development of new concepts or process improvements. The combination mode involves merging and systemizing existing explicit knowledge to create new explicit knowledge to create new explicit knowledge. This can include

compiling data, reports, or formal documents that bring together various knowledge sources. The final mode, internalization mode, refers to the embodiment of explicit knowledge into tacit knowledge through learning and practice. Training, simulations, and hands-on experience help individuals internalize formalized knowledge, immersing it into routines and behaviours. This completes the spiral of knowledge creation, enabling ongoing development and capability building. (Nonaka et al., 2000)

The SECI process is directly linked to the development of knowledge assets, as each mode is supported by and contributes to specific types of assets. For example, conceptual knowledge assets, such as product designs or service models, are important during the externalization phase, helping structure and communicate tacit insights. Similarly, routine knowledge assets, which include operational know-how and established practices, are enriched through socialization process that occur in daily project activities and stakeholder interactions (Nonaka, 1994; Chou & He, 2004)

This interdependence between knowledge assets and the SECI process highlights how knowledge is not only stored and categorized but actively created and reconfigured within project environments, which makes it a crucial foundation for dynamic capabilities and sustained project success (Teece et al., 1997; Nonaka et al., 2000; Ashill et al., 2020)

8.2.3 Ba – The Shared Context of Knowledge Creation

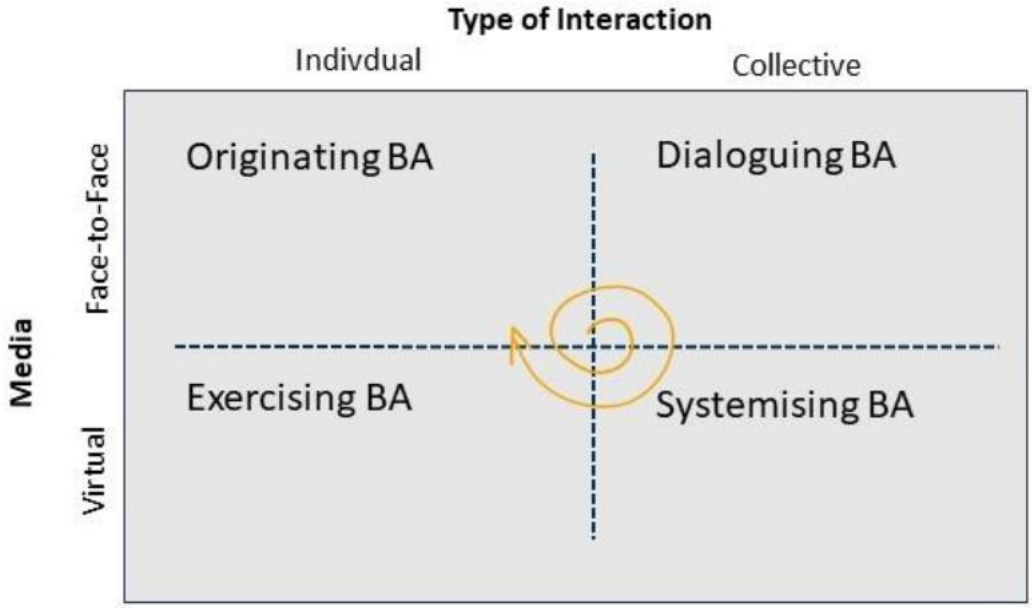

Figure 9. Four Types of Ba. (Nonaka et al., 2000)

Ba is defined as a shared context or space in which knowledge is created, shared and utilized, playing an essential role in dynamic knowledge creation within organizations. It includes not only physical places but also virtual, mental and social environments where individuals engage and interact. Ba supports the SECI Process by providing the environment for the interactions between tacit and explicit knowledge. There are four types of Ba, originating, dialoguing, systemizing, and exercising. Each types supports the different stages of knowledge conversion. As a dynamic and evolving concept, Ba changes with the participants and their activities, enabling continuous knowledge development. It fosters commitment, trust, and shared understanding, helping organizations to generate new knowledge and maintain a competitive advantage. (Nonaka et al., 2000)

To conclude the knowledge creation framework, a basic understanding of the three key elements had been established. The SECI process is more dynamic where tacit and explicit knowledge are continuously converted through four modes, socialization,

externalization, combination, and internalization enabling knowledge to expand and evolve. Knowledge assets represent the content that is created and shared during this process, categorizing them into experiential, conceptual, routine, and systemic asset, which both support and result from SECI activities. The process takes place within Ba, a shared context, physical, virtual, or mental which enables individuals to interact, share, and co-create knowledge, serving as the essential environment for dynamic knowledge creation. (Nonaka et al., 2000)

8.3 Knowledge Management Cycle

The knowledge management cycle typically begins with a need or request for knowledge, often triggered by the need to solve a specific problem (Evans et al., 2014). Figure 2 presents insights from various researchers, with the cycle's phases simplified into single word summaries (in blue) for clarity in this study. The first phase, acquire, involves initiating the cycle by searching for relevant knowledge either within the organization or from external source. This requires observation, research, and sourcing efforts to identify useful knowledge assets. Depending on the company's strategic direction and orientation the repository of knowledge should be well balanced between tacit or explicit (Nonaka, 1994; Cavusgil, et al., 2003). In the organization phase, the knowledge is structured and refined to enhance understanding. It is categorized to tagged to make future recognition and access easier. Next, knowledge is converted into a shareable form, aligning with the externalization and combination stages of the SECI process, where tacit knowledge becomes explicit, and explicit knowledge is synthesized into new explicit knowledge. Once converted, the knowledge is stored, becoming part of the organization's memory. Usually, the amount of tacit knowledge decreases at this stage, as knowledge is saved in a way that allows the retrieval of it. Beneficial should be the ease extraction of knowledge which makes it important to have a repository of well defined, detailed and categorized explicit knowledge. The sharing phase enables individuals and teams to access and distribute knowledge across the organization. This relies on both personal interactions and technical communication system. Unlike other models, Sağsan (2006) introduces and additional step, structurization, which occurs after

sharing. He argues that the infrastructure for sharing must be established first, allowing the knowledge to be properly structured for future use. While the structuration is done during the codification and storing phase it only inheritance other people views and context. The restructuration of the knowledge into the context it supposed to be used becomes a useful step to make the knowledge fit into the giving situation. Following this, knowledge is used to solve the problem or improve performance, addressing the original trigger for the cycle. After usage, an audit evaluates the effectiveness and impact of the knowledge. Based on this evaluation, a decision is made about whether the knowledge is valuable for future use. If it wasn't useful, it can be improved, or the process starts with the first step to acquire new knowledge. At this point, it also important for the organization to take a broader view and assess the value of its overall knowledge and intellectual resources. (Evans et al., 2014; Sağsan, 2006; OuYang, 2015; Nissen et al., 2000)

According to Liebowitz (2005), the knowledge management cycle begins with the identification and capture of knowledge which then initiates the socialization process, leading to knowledge sharing. For sharing to occur effectively, externalization is required, and tacit knowledge must be made explicit and applied. Following this, knowledge is combined and internalized, allowing individuals to absorb and integrate it into their personal and professional practices. This process leads to the creation of new knowledge, which must then be preserved for future use, completing the continuous cycle of knowledge management. (Liebowitz, 2005)

8.4 The Knowledge Management System (KMS) Success Model developed by Jennex and Olfman (in 2004 and extended in 2007)

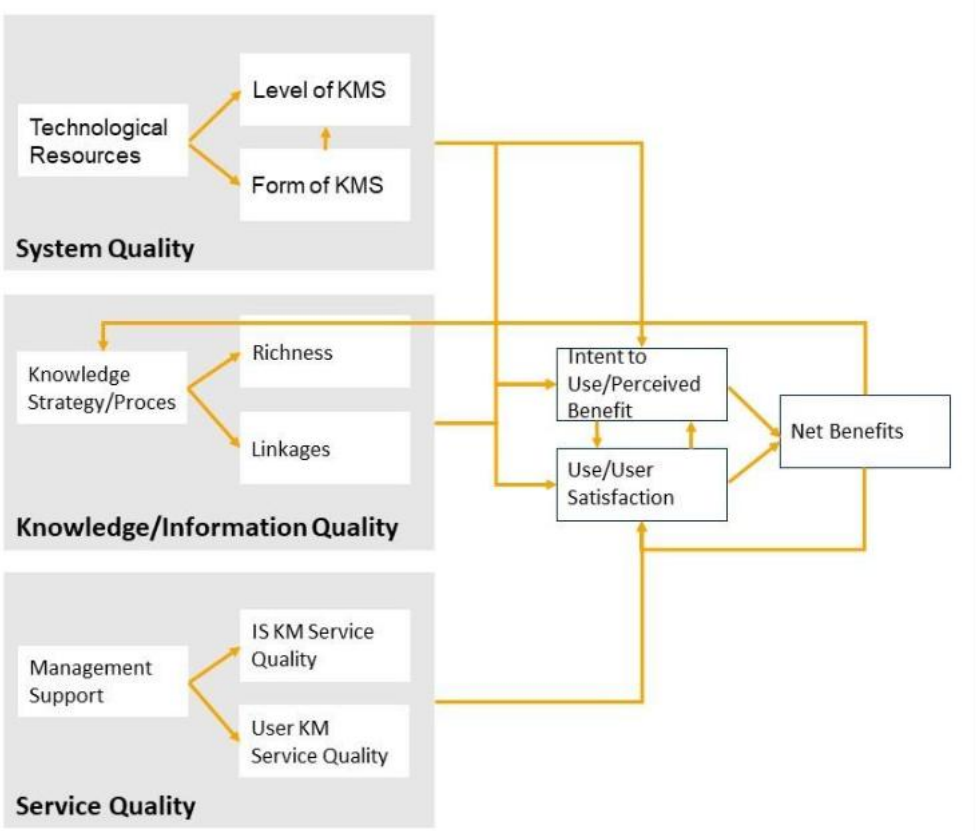

Figure 10. KMS Success Model. (Jennex & Olfman, 2007)

This model identifies several key factors that influence the effectiveness of knowledge management systems and the quality of KT.

These factors include:

- System quality, which evaluates how well the system performs in terms of including relevant and complete knowledge.
- Knowledge/information quality, which focuses on the availability of the right knowledge, delivered with sufficient context and timing for the intended users.
- Service quality, which considers the support provided by IT systems and service to end-users.
- Use/User satisfaction, reflecting how often the system is used and whether users are satisfied with the experience.
- Perceived benefit, examining how users perceive the usefulness and impact of the knowledge system.

- Net benefits, which measures the broader impact on individual skills, teams performance, and organizational outcomes. (Jennex & Olfman, 2007)

In project environments, this model can guide both the design of evaluation criteria and the interpretation of results. For example, assessing the system quality may involve gathering feedback on how accessible and intuitive a projects knowledge base is, while measuring net benefits could include tracking reductions in errors or improvements in project timelines. By considering these dimensions, project teams can more effectively evaluate whether the tools and systems in place truly support the KT and create real value. This model offers a practical framework for assessing not only the technical aspects of knowledge management but also the user experience and overall impact. (Jennex & Olfman, 2007)

8.5 Table of the Participants

Table 8. Table of the Participants

Document Name	Reference in Text	Participant Profile (short)[7]
Transcript_Anonymous1	Anonymous1	Consultant with experience in digitalization projects for the public sector; currently working on strategy consulting and project implementation at communal/state level.
Transcript_Anonymous2	Anonymous2	Project manager in consulting with over 10 years' experience in IT software implementations across various industries; leads multi-month projects using centralized knowledge repositories.
Transcript_Anonymous3	Anonymous3	Operations director and senior consultant at a large Finnish consultancy; specializes in strategy communication and public affairs

[7] The more detailed profiles follow directly after the table.

Transcript_Anonymous4	Anonymous4	Former HR professional in a large marine and energy company, focused on strategic internal HR projects and communications; contributed to designing knowledge management frameworks.
Transcript_Anonymous5	Anonymous5	CEO of an IT services company delivering variable-sized projects across industries; also acts as project or product manager.
Transcript_Anonymous6	Anonymous6	Project leader in the automotive industry managing large-scale development projects (250-300 FTEs) with complex technical requirements.
Transcript_Anonymous7	Anonymous7	Consultant and project lead in ERP and management consulting; manages client delivery, team development, and business development.
Transcript_Anonymous8	Anonymous8	Project manager and consultant in IT service provider; leads a research project in supply chain digitalization and data spaces.
Transcript_Anonymous9	Anonymous9	CTO with 27 years in IT; leads projects ranging from startups to public sector, with broad experience in software delivery and team management.

8.6 Participant Profiles - Overview

8.6.1 Anonymous1 – Consultant, Digitalisation in Public Sector

Professional Background: Consultant with 2.5 years' experience at a company specialising in the digitalisation of public sector entities (communal and state level).

Project Experience: Small teams (4 company + 4 client), projects last 5 weeks to 2 months. Focus on developing digitalisation strategies.

Knowledge Definition and Management: Knowledge includes digitalisation expertise, customer understanding, and project management skills.

KT Practices: Weekly/bi-weekly meetings, presentations summarising lessons learned, and project documentation. Handover documentation exists but varies in quality.

Challenges and Issues: Lack of standardised documentation, knowledge gaps during personnel changes, difficulties managing client expectations.

Notable Examples or Practices: Senior consultants providing daily feedback leveraging decades of experience.

Future Outlook / Recommendations: Centralised project database and weekly "lunchtime lessons learned" sessions to integrate knowledge sharing into daily work.

8.6.2 Anonymous2 – Project Manager, IT Consulting

Professional Background: Project manager with 10–12 years' IT consulting experience; company industry-independent, selling software solutions across sectors.

Project Experience: Software implementation projects, 6 months to over 2 years, cross-functional teams often including offshore members.

Knowledge Definition and Management: Knowledge considered a sellable commodity; structured via an "innovation portal" of 5,000+ reusable assets.

KT Practices: Centralized portal with IP action plans, onboarding packages, governance structures, shadowing, and open communication. Assets include project management, scoping, and configuration tools.

Challenges and Issues: Consultants sometimes do not utilize assets fully due to project stress; highly knowledgeable personnel may resist sharing niche knowledge.

Notable Examples or Practices: Asset sharing enabled meeting tight deadlines and efficient work distribution.

Future Outlook / Recommendations: Aim for 80–90% of projects to start with pre-configured reusables; structured mentoring, communities, and client platforms support knowledge sharing.

8.6.3 Anonymous3 – Operations Director, Consulting Firm

Professional Background: Operations director at a large Finnish consulting firm; experience across consultancy, client management, and project leadership.

Project Experience: Short projects (6 months to 1 year), rapid knowledge acquisition needed.

Knowledge Definition and Management: Knowledge gathered from external sources, stakeholders, and colleagues; shared via Slack, OneDrive, and morning coffee sessions.

KT Practices: Sharing industry insights, client-specific information managed by project leads; informal culture encourages discussion.

Challenges and Issues: Lack of formal KT structures; reliance on individual responsibility; duplication of materials.

Notable Examples or Practices: Public affairs knowledge sharing helped secure a client deal.

Future Outlook / Recommendations: Envisions AI-supported compilation of industry knowledge and a questioning culture to ensure mutual understanding; improving knowledge structures is currently low priority.

8.6.4 Anonymous4 – HR, Marine & Energy Sector

Professional Background: Former HR professional at a large marine and energy company; managed communications for strategic projects.

Project Experience: Projects around 1.5 years, multiple overlapping initiatives requiring coordination.

Knowledge Definition and Management: Broadly defined: policies, frameworks, handbooks, SOPs, templates, forms, and system instructions; knowledge management framework maintained by a dedicated role.

KT Practices: Framework documentation uploaded to a central database; informal mentoring, coaching, and community groups supported exchange.

Challenges and Issues: Lack of inter-project knowledge forums caused confusion; removed communication role worsened coordination.

Notable Examples or Practices: Project with poor KT led to stakeholder confusion and mismanaged change.

Future Outlook / Recommendations: Clear ownership, accessible and frequently updated knowledge, and dedicated discussion channels suggested for effective transfer.

8.6.5 Anonymous5 – CEO / Managing Director, IT Services

Professional Background: CEO of an IT services company, supervising projects, guiding teams, and managing onboarding.

Project Experience: Projects range from 1–2 people to 50–60, lasting 8 weeks to 2–3 years, across diverse industries.

Knowledge Definition and Management: Knowledge includes client-specific domain information, internal processes/methods, and development approaches (roadmaps, deliverables).

KT Practices: Structured blueprints for large projects, centralized knowledge hub, knowledge champions, and Slack channels.

Challenges and Issues: Global teams complicate transfer; poor sharing can lead to frustration, trust issues, and reinvention of solutions.

Notable Examples or Practices: Standardized approach enabled rapid scaling of Scrum teams.

Future Outlook / Recommendations: Generative AI (e.g., GPT) envisioned to provide instant, role-specific access to organizational knowledge.

8.6.6 Anonymous6 – Development Project Leader, Automotive Industry

Professional Background: Project leader for a major transmission project (budget €300M, 250–300 FTEs), holds mechanical engineering/mechatronics degrees, pursuing MBA.

Project Experience: Long-term automotive development project with frequent stakeholder changes.

Knowledge Definition and Management: Project-specific knowledge tracked via gate reports, presentations; company SPICE level two certified.

KT Practices: Problem tracking system, cluster heads for functional areas, weekly core team meetings, informal knowledge sharing via personal networks.

Challenges and Issues: Non-standardized, project-specific knowledge difficult to transfer; onboarding relies on informal networks.

Notable Examples or Practices: Job rotations and international assignments support knowledge exchange.

Future Outlook / Recommendations: Encourage informal office interactions and structured job rotations; early-stage AI tools for expert identification.

8.6.7 Anonymous7 – Project Manager / Practice Development / Business Development

Professional Background: Multi-faceted role in project, practice, and business development; experience across software, process, and management consulting.

Project Experience: Budgets from six-digit to multi-million euros, teams from few members to over 60.

Knowledge Definition and Management: Three pillars: enabling knowledge (pre-project), project-specific knowledge (for client), organizational knowledge (for future use).

KT Practices: Customer workshops, presentations, technology-supported documentation (ERP tools, business process modelling); internal mentoring, forums, and JIRA for structuring discussions.

Challenges and Issues: Language barriers, quality of documentation, structuring complex information, ensuring customer absorption.

Notable Examples or Practices: Tools and structured documentation enable rapid onboarding; continuous customer feedback ensures knowledge is applied.

Future Outlook / Recommendations: Maintain organizational knowledge via databases and experienced personnel; focus on reusable, structured documentation.

8.6.8 Anonymous8 – Project Manager / Consultant, IT Service Provider

Professional Background: Project manager and consultant for German IT service provider; research focus on supply chain digitalization and data spaces.

Project Experience: Research project budget €1.2M (40% funded by German Federal Ministry), consortium of 8 partners, team of 5–6.

Knowledge Definition and Management: Knowledge evolves implicitly; includes processional knowledge (how to work together) and topic-specific expertise (e.g., data spaces).

KT Practices: Glossary creation, Confluence-based repository for documentation; collaboration and discussions build shared understanding.

Challenges and Issues: Time-constrained maintenance of knowledge base; differing interpretations of key terms across languages and disciplines.

Notable Examples or Practices: Interval checks and final project clean-up ensure knowledge accessibility.

Future Outlook / Recommendations: Clear, accessible knowledge and outsider perspective essential for broader usability.

8.6.9 Anonymous9 – CTO, Mid-Sized IT Company

Professional Background: CTO with 27 years' IT experience; career includes software development, project management, and leadership roles.

Project Experience: Transitioned from startup projects (rapid delivery, minimal documentation) to larger, long-term projects and public sector contracts (3–6 months).

Knowledge Definition and Management: Initially Word-based master documents; now Agile with Confluence, Figma, Canva for collaborative real-time documentation.

KT Practices: Shared repositories for architectural decisions, informal weekly lunches for tacit knowledge, integration into KPIs; AI-based "knowledge graph" (Jarvis) being developed to automate knowledge capture.

Challenges and Issues: Ensuring team solutions are documented and shared; balancing documentation with billable project time.

Notable Examples or Practices: Agile documentation and AI initiatives enhance accessibility and onboarding.

Future Outlook / Recommendations: AI-supported knowledge capture accelerates skill acquisition, reduces reliance on individuals, and improves project continuity.