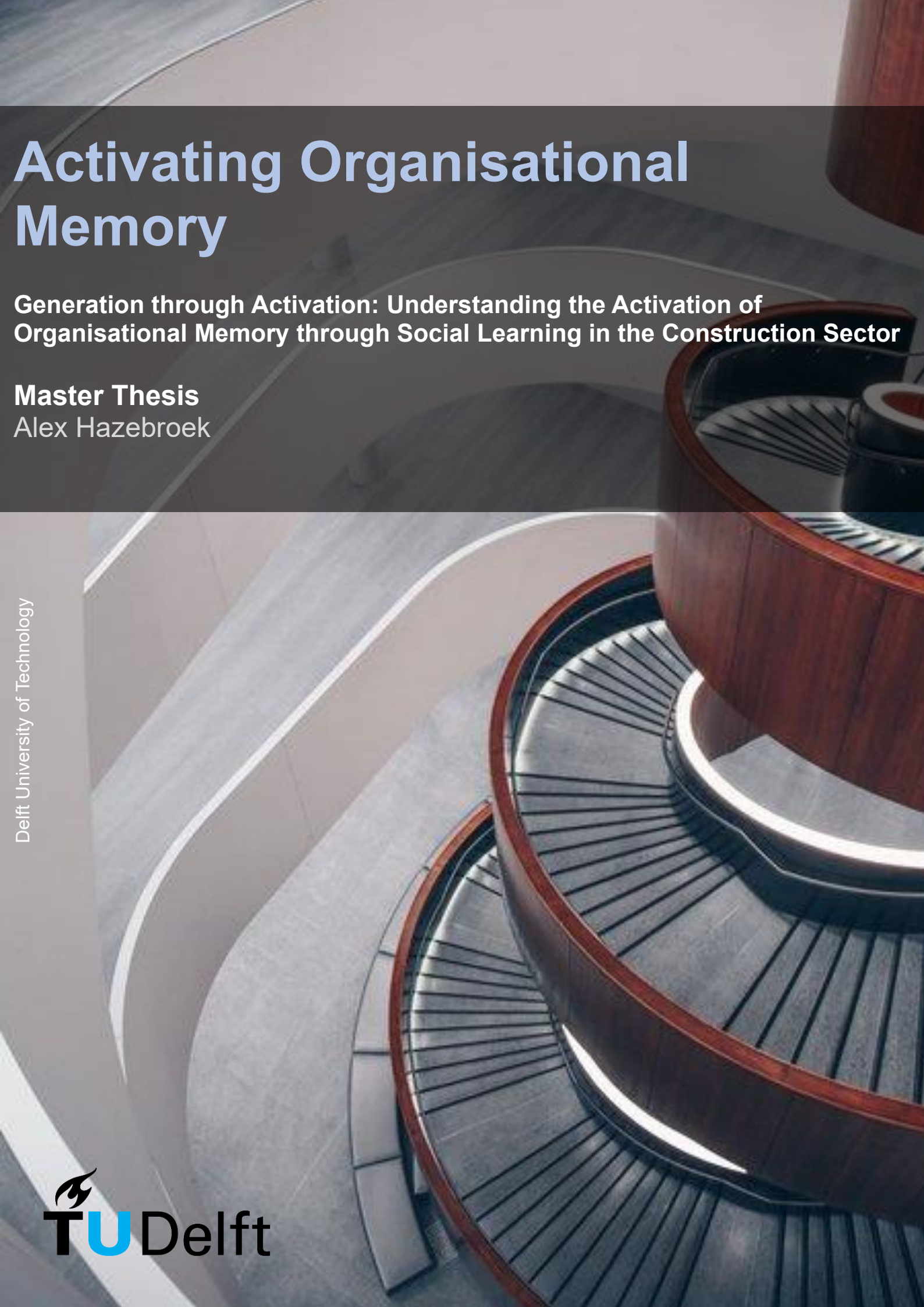

Activating Organisational Memory

Generation through Activation: Understanding the Activation of Organisational Memory through Social Learning in the Construction Sector

Master Thesis

Alex Hazebroek

Delft University of Technology

TU Delft

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Activating Organisational Memory

Generation through Activation: Understanding the Activation of Organisational Memory through Social Learning in the Construction Sector

by

Alex Hazebroek

To obtain the degree of Master of Science
at the Delft University of Technology

Student number:	5415705
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Graduation Thesis

Institution:	Delft University of Technology
Faculty:	Civil Engineering and Geosciences
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Graduation Company:	Count & Cooper

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COUNT & COOPER

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Preface

With pleasure, I am presenting the culmination of the past 10 months in this master's thesis. This is marking the end of my academic journey for now, one that has been unfolding over the past eight years since I have begun studying civil engineering at the HBO. My time at TU Delft has been an incredible journey, being filled with invaluable learning experiences in civil engineering and construction management, as well as with friendships that have been promising to last a lifetime.

First, I would like to express my gratitude to my committee, Sana, Marian, and Paul, for their insights and valuable feedback throughout this research. Your guidance has been leading me on new paths of curiosity, allowing me to explore and to refine my ideas. Your support has been crucial to the success of this thesis. Marian, thank you for your sharp, straightforward feedback that has been keeping me critical and has been pushing me to go further with my ideas. Paul, I am grateful for your fresh and different perspectives on memory, helping me to step outside my "literature treehouse" to embrace the broader journey of this thesis and to discover my inner researcher. Sana, thank you for all the insights during the bi-weekly meetings, for being there since the start of this thesis, and for providing guidance in navigating the thesis process.

I am deeply appreciative of all the professionals at Count & Cooper who have been participating in the interviews and workshops, generously sharing their experiences and perspectives. Your insights have been providing a strong foundation for this research, and without your input, this study could not have reached its depth. Casper, thank you for having a listening ear, for the discussions about the workshop design, for the last-minute adjustments before the workshop presentation, and for our coffee conversation on the rooftop.

Dirk, we have been working together nearly three years when I have been starting as a working student at Count & Cooper, first meeting to talk about my LIFO score. Since then, you have been a guiding influence, supporting me on a personal and on a professional level. From our early conversations and our talk on the ski-lift during winter sports, I have been knowing that I have been wanting you to be part of this thesis journey. Throughout this process, you have been explaining concepts through practical examples, helping me to see research through a new lens. Whether it has been on a Friday doing the "Karate Kid crane kick move" in the office to explain different perceptions of knowledge and learning, or during our in-depth conversations about how individuals can be activating and elevating the group's collective knowledge, you have been challenging my sometimes-stubborn thinking, having been teaching me a lot. Having been working with you has made me feel like an equal partner in exploring the activation of organisational memory. Thank you for the chance to learn from you on both a professional and a personal level and for giving me the space to grow and the confidence to 'build my own way' in this academic journey. Words can not be describing the smile that has been lighting up my face every time we have been talking.

To my family, close friends, and my girlfriend, who have been listening to every story and have been standing by me through the ups and downs during this thesis, I am holding you close in my heart. Your support has been a guiding light in this chapter of my life.

In closing, I am wishing you, the reader, an engaging and insightful read. I am hoping this thesis is sparking new ideas or inspires curiosity about the unknowns of activating organisational memory and will be offering a valuable example for workshop-based research. May this research be contributing to a deeper understanding of organisational memory and its role in activating the dynamic of the knowledge flows and the states for learning.

Alex Hazebroek
Delft, November 2024

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Executive Summary

Organisational learning has been essential to the success of project-based organisations, especially in the construction sector, where complex infrastructure projects require effective knowledge sharing, retention, and application. However, many organisations have been struggling to fully utilising their accumulated organisational memory, leading to inefficiencies and improvement opportunities have been missed. In this research has been investigated how social learning is activating organisational memory and is being applied within project-based organisations, addressing the main research question: *"How can organisational memory be activated through social learning practices in project-based organisations?'*

To explore this, the research has been structured into three parts. In part 1 the theoretical groundwork has been laid through a literature review on social learning, organisational learning, organisational memory in project-based organisations, and memory activation dynamics. In part 2 practical insights from semi-structured interviews with ten tender experts at Count & Cooper have been gathered. The thematic analysis of these interviews has been revealed how organisational memory, organisational learning, and social learning are interconnected within the dynamic environment of project-based organisations. In part 3 a problem-based learning (PBL) workshop simulating a portion of the tender process has been involved, providing practical observations on how social learning practices are influencing organisational memory use in decision-making.

The findings have been revealing a complex, dynamic flow within organisational memory, showing how it is being accessed and is being activated in non-linear ways through social learning practices. This research has been challenging the view of organisational memory as a static repository, showing it is continually being reshaped within project-based organisations (PBOs). Pattern recognition, emotional triggers, and competing memories have been shaping how organisational memory is being activated and being used. Through social learning, members are engaging with various forms of conscious, automatic, objectified, and collective knowledge, often uncovering overlooked or competing knowledge of the organisational memory. Social learning has been facilitating knowledge retention and application while guiding members through these diverse memory flows, aiding them in navigating and learning from organisational challenges.

This research has also been challenging Spender's linear framework of knowledge flow, illustrating how social learning can also be producing conscious knowledge directly from collective memory, bypassing formal objectified knowledge. AI, as external objectified knowledge, has been adding another layer by offering through its pattern recognition capabilities in its databases. When organisational memory is lacking immediacy or context, time constraints could be triggering negative emotional responses, discouraging reliance and association with internal databases. In such cases, members are turning to faster resources, such as AI or colleagues, for context-rich insights. While AI supports memory activation, it is also introducing competing memories, as irrelevant suggestions, requiring human validation to fit the organisation's context. Thus, consensus-building within social learning has been essential, as it is helping to validate and to align interpretations of both AI suggestions but also of organisational members, reducing the risk of competing memories and ensuring knowledge relevance and accuracy.

The workshops have been demonstrating how these knowledge flows have been operating in practice. Organisational members have been contributing distinct perspectives and level of experiences, fostering mutual pattern recognition that has been revealing different layers of organisational memory. However, PBO time pressures often have been restricting revisiting prior learnings, leading to siloed knowledge and contributing to organisational forgetting. Through social learning practices it has been seen that, less experienced members are being more focused on conscious, objectified knowledge, and are being benefitting from experienced members accumulated, automatic, and collective knowledge, while experienced members are being gaining fresh insights from less experienced members recent training of the organisational objectified knowledge. This exchange is bridging knowledge gaps, is aligning interpretations, and is enhancing awareness of organisational memory's multiple facets. By activating different parts of organisational memory, these dynamics are reducing corporate amnesia. Such dynamics have been showing that the shared insights from social learning are being essential for pattern recognition in accessing relevant parts of the organisational memory in responding to challenges and reducing competing, outdated memories.

The research has been highlighting a shift toward more structured social learning practices to ensure systematic sharing of insights across the organisation. While unstructured practices, such as informal mentorship, have been remaining essential for collaboration, time pressures in PBOs have often been limiting the revisiting of prior knowledge, causing insights to become siloed and leading to organisational forgetting. Yet, this process has also been promoting growth by discarding outdated knowledge, allowing room for innovation. Consequently, organisational memory has been emerging as both a valuable resource and a potential liability, depending on how it is managed and is used.

In conclusion, this research has been providing insights into how social learning practices are generating and activating organisational memory, allowing organisations to capitalise on it as a resource. Through social learning, members have been using pattern recognition, emotional triggers, and the resolution of competing memories to increase awareness of organisational memory's facets, ensuring relevant knowledge is being accessed, being applied, and being used for learning. This approach has been supporting decision-making, has been reducing corporate amnesia and has been fostering continuous learning across the organisation, preventing the reinvention of the wheel by drawing on different parts of organisational memory. By fostering environments where social learning is being encouraged where knowledge is being exchanged, validated, and applied by which organisations have been reducing knowledge fragmentation and forgetting, enhancing accessibility, and preventing silos. The findings are suggesting that project-based organisations would be benefitting from a hybrid social learning model combining structured and unstructured approaches.

This research has been highlighting one key insight to consider for future social learning research.

Balancing Social Learning and Memory Consolidation: While this research has not been directly observing the effects of continuous social learning, literature on memory consolidation has been suggesting that structured rest periods and recurring engagement have been supporting organisational learning. Memory consolidation, the process of stabilising short-term memories into long-term ones, has been helping to prevent cognitive overload and ensuring that organisational knowledge has been internalising rather than merely accessing. Future

studies could be examining the balance between social learning and necessary disengagement periods to determine if constant social engagement has been leading to cognitive overload and reducing learning effectiveness.

Key words
Project-based organisations; Organisational learning; Organisational memory; Social learning; Tender; Learning and Construction sector.

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1. Introduction

In this chapter, the research background and motivation have been outlined. The problem statement, objectives, research question, and sub-questions have been formulated and presented. The chapter is concluding with a discussion on relevance, in combination with a guide for navigating the thesis.

1.1. Research Background

In today's rapidly evolving construction industry, organisations have been facing challenges in effectively capturing, disseminating, retaining, and using knowledge within projects, as well as in transferring it throughout the entire organisation (Debs & Hubbard, 2023). Operating on a project-based model, the construction sector serves as fertile ground for knowledge creation and experience accumulation (Bartsch et al., 2013). Despite this potential, organisations have been struggling with intra-project learning, often falling into a frustrating cycle of 'reinventing the wheel' or contending with ‘corporate amnesia’, an organisational phenomenon where lessons are learned but fail to reach the wider organisational level, affecting inter-project learning (Chronéer & Backlund, 2015).

Research has been underscoring the critical role of organisational learning in project-based organisations. Organisational learning is the iterative process through which an organisation captures knowledge generated at the project level and disseminates it throughout, establishing or improving routines and practices. This emphasis stems from the potential value that prior project experiences hold for future projects Chronéer & Backlund, 2015; Elkjaer, 2004; Levitt & March, 1988). Captured knowledge then becomes part of the organisational memory, which serves as a dynamic repository of accumulated explicit and tacit knowledge, information, and project experiences retained over time (Koskinen, 2010). Organisational memory has been evolving continuously from updates within organisational learning, in tandem with the organisation’s dynamic project landscape, nurturing organisational growth. It has been allowing valuable insights to be embedded into broader organisational routines, processes, and practices, shaping the organisation's culture and enabling it to learn, adapt, and make informed decisions and therefore, ensuring continuity and effectiveness for future endeavours (Bratianu, 2015).

While the advantages of organisational learning are widely being recognised, the construction sector continues to seek improvement. Over the years, the industry has been investing in resources to address the unique and discontinuous nature of project-based organisations' effects on organisational memory (Debs & Hubbard, 2023). These solutions have been including technical interventions like knowledge management systems (Boh, 2007) and Building Information Models (BIM) (Vaz-Serra & Edwards, 2021), along with structural implementations of memory tools like Excel (Cacciatori, 2008) and lean construction practices (Gao et al., 2020; Ulewicz & Ulewicz, 2020). Although recent research has been illuminating general facilitators and barriers to intra- and inter-project learning across the organisation (Dutton et al., 2014; Liu et al., 2021), a gap remains in understanding why organisations are not fully capitalising on their organisational memory.

1.2. Motivation

Despite the emphasis on organisational learning and its role in capturing, disseminating, and utilising knowledge within the construction industry, a notable research gap has been emerging in understanding why project-based organisations have not been fully capitalising on their organisational memory and prior knowledge. Learning from the past is allowing organisations to anticipate future requirements and adjust behaviours (Dartey-Baah & Amponsah-Tawiah, 2011). While recent research has been exploring general facilitators and barriers associated with learning within and between projects (Dutton et al., 2014; Liu et al., 2021), the literature has been overlooking the human element of the problem, where organisational members are being often unaware of the knowledge within organisational memory and unable to fully benefit from organisational learning (Ankrah et al., 2008; Koch et al., 2019; Sunding & Ekholm, 2015).

The dynamic and transitory nature of project-based organisations has been challenging organisational learning within projects, amplified by the constant flux of team members, many of whom are being reassigned to different projects before completing tasks, limiting time and resources for intra- and inter-project knowledge exchange (Rhodes & Dawson, 2013). Once a project achieves its goal, the team is being disbanded, often preventing valuable lessons from being captured and leading to inefficient retrieval and application of organisational memory, ultimately underutilising the organisation's knowledge resources (Advice centre, 2022; Bhandary & Maslach, 2018).

Current discourse has been focusing on project and organisational levels of analysis, examining factors such as culture, trust, and leadership in project-based organisations. However, there is being a conspicuous absence of research linking social learning practices with the use of organisational memory (Brandi & Elkjaer, 2012; Koch et al., 2019; Sunding & Ekholm, 2015). This gap is representing a critical and underexplored frontier in advancing organisational learning. Recent studies in other fields, as highlighted by Zhang et al. (2022), have been underscoring the potential of social contexts to enhance individual learning processes, with collaborative engagements have been showing to improve behavioural performance and learning speed. This is further being evidenced by research from Ponton and Dondlinger (2022), who have been utilising social cognitive theory to discuss how self-directed learning in project-based organisations is being influenced by social environments. While social theories have been gaining traction in the construction sector, a clear link to organisational learning and memory has been remaining lacking, creating a cycle in which organisations have been struggling to activate their own organisational memory.

This research gap is underscoring the need for a nuanced exploration of social influences on the utilisation of organisational memory. By integrating group dynamics in social learning practices into the analysis, this research is seeking to uncover insights into how organisational members in project-based organisations are utilising the knowledge accumulated in organisational memory. Addressing this gap will not only deepen understanding of challenges in social learning for project-based organisations in the construction industry but are also offering actionable insights to break the cycle of underutilisation in organisational memory

1.3. Problem Statement

Project-based organisations in the construction sector have been encountering persistent challenges in harnessing organisational memory for effective learning and improvement (Ahmed & Jawad, 2022; Bhandary & Maslach, 2018; Chronéer & Backlund, 2015). Despite investments in knowledge management systems, Building Information Models (BIM), and lean construction practices, these organisations have been struggling to capitalise on their accumulated knowledge, resulting in a cycle of unused knowledge known as 'corporate amnesia.' Consequently, mistakes will continually to be repeated, and opportunities to improve project outcomes will be missed. While existing studies have been exploring facilitators and barriers at both project and organisational levels, they often are overlooking crucial individual-level social factors that influence the utilisation of organisational memory (Dutton et al., 2014; Liu et al., 2021; Nicolini & Meznar, 1995).

This problem has been reinforced by the dynamics of project-based organisations, characterised by frequent team member turnover, limited time for knowledge exchange, and the disbandment of teams upon project completion, all of which contribute to inefficient utilisation of organisational memory (Chronéer & Backlund, 2015; Eken et al., 2020). Current discourse has been concentrating on macro-level factors, such as organisational culture and leadership, leaving the construction sector with a limited understanding of how both environmental and cognitive factors influence individual learning and behaviour in project-based organisations (Ankrah et al., 2008; Sunding & Ekholm, 2015). Understanding the nature of knowledge and learning in this context is being crucial, as individuals may be unaware that they are actively learning at a personal level or are already possessing certain knowledge (Yepes & López, 2021). Individuals generate and store the knowledge being acquired from learning through observation and firsthand experience. This tacit knowledge, once internalised, can significantly be impacting behaviour, attitudes, skills, and perceptions, underscoring the importance of organisations fostering a conducive learning environment (Ren et al., 2020).

Therefore, a nuanced examination of social factors that are influencing individual organisational members in adapting to and utilising knowledge being stored in organisational memory are essential for addressing the challenges being faced by project-based organisations in the construction industry. By investigating individual-level factors in this analysis, this research is seeking to uncover insights into the extent to which social learning theories can be triggering the use of organisational memory. The study has been aiming to provide actionable insights to break the cycle of underutilisation in organisational memory, promoting effective learning, and enhancing the adaptability of project-based construction organisations.

Therefore, this research has been summarising the problem statement as follows:

The insufficient understanding of group interactions in social learning practices affects the utilisation of Organisational Memory in project-based construction organisations and allows corporate amnesia to persist.

1.4. Research Objective and Research Questions

The primary objective of this research has been to explore how social learning practices are activating and enhancing the utilisation of organisational memory within project-based construction organisations. It specifically has been aiming to understand how these practices are influencing knowledge sharing and retention during the tender phase of construction projects. These dynamics have been observed during a problem-based learning workshop that mimics a part of the tender process, providing practical insights into group dynamics and memory activation. By examining the interconnectedness of social learning, organisational learning, and memory processes, this research has been providing actionable insights to address the underutilisation of organisational memory, offering a deeper understanding of decision-making and learning practices in project-based environments.

To assess the problem statement, this research has been evaluating the following main question:

'How can organisational memory be activated through social learning practices in project-based organisations?'

The main question has been addressed through three sub-questions:

SQ1: ***What is the current understanding of the organisational memory, social learning and organisational learning according to literature?***

SQ2: ***What is the interconnectedness between organisational memory, social learning and organisational learning in practice?***

SQ3: ***How is organisational memory utilised during social learning practices?***

1.5. Relevance

The practical societal importance and scientific significance of this research has been aiming to contribute to the existing body of knowledge, advancing organisational learning in the construction sector.

1.5.1 Practical Societal Relevance

The practical societal relevance of this research has been lying in its potential to drive improvements in the construction sector. Infrastructure projects form the foundation of functioning societies and economies, are encompassing essential services and facilities such as transportation systems and utilities and are exerting a far-reaching impact on both regional and national scales (Fei et al., 2021). As the construction industry increasingly has been adopting a project-based approach, where projects are becoming a ground for learning and knowledge generation, this study has been delving into how social learning practices are being leveraged to activate organisational memory within infrastructure projects. By addressing the challenge of corporate amnesia within the construction industry, this research has been aiming to enable construction organisations to refine learning processes, to enhance decision-making procedures, to mitigate inefficiencies, and to more effectively utilise their collective knowledge.

In a practical sense, the findings could be empowering construction organisations to enhance their learning processes, to improve decision-making procedures, to reduce inefficiencies, and to capitalise on accumulated knowledge. This, in turn, will have the potential to contribute to the overall efficiency, safety, and sustainability of construction projects. Additionally, as the construction sector is playing a key role in societal development, the research outcomes may positively be impacting project results by reducing financial losses, optimising resource utilisation, and improving cost-effectiveness.

1.5.2 Scientific Significance

This research has been highlighting the limited focus on the social aspects surrounding organisational memory in project-based construction organisations. Going beyond existing studies, it has been delving into interpersonal factors within teams that have been influencing the activation of organisational memory. The recognised gap in current research is underscoring the necessity of a nuanced exploration of social aspects, providing insights into why organisational members may not be fully adapting to or utilising organisational memory. This focused approach is not only enriching academic knowledge but is also offering actionable insights to address underutilisation challenges, advancing organisational learning in the construction industry and promoting further academic debate and opening new avenues for research.

1.6. Research Context

To support the objective and answer the main question, this research has been divided into three segments, each corresponding to a sub-question and being structured around the aim, the method, and the intended outcomes.

1.6.1 Segment one: Literature Review

The initial phase has been involving an in-depth exploration of core themes central to this thesis, including social learning, organisational learning, organisational memory, and project-based organisations, with a specific emphasis on the tender phase within the construction sector. Given the importance of social and organisational learning, understanding current theoretical concepts in the context of project-based organisations is being essential. To achieve this, the research has been examining existing studies and frameworks, assessing their adaptability and applicability to the construction sector.

Question 1: ***What is the current understanding of the organisational memory, social learning and organisational learning according to literature?***

Aim: Understanding what organisational memory, social learning and organisational learning are meaning in the current academic discussion.
Method: Literature research**.**
Output: An analysis of current academic literature.

1.6.2 Segment two: Practice Interviews

In the second part of this study insights have been gathered through interviews, exploring the use of organisational memory and social learning practices being employed during tenders at Count & Cooper. Ten experts have been involved in the tender phase have been interviewed,

being selected based on their roles, experience, and tenure within the organisation to ensure a range of perspectives.

The interview data have been analysed using thematic analysis, a method well-suited for identifying and interpreting key themes. This approach is providing a structured framework to explore how organisational memory and social learning processes are being applied in practice, offering valuable insights into learning dynamics during tenders.

Question 2: ***What is the interconnectedness between organisational memory, social learning and organisational learning in practice?***

Aim: Understanding the interconnectedness between the academic literature and the social practices being used by Count & Cooper.
Method: Semi structured interview being analysed by means of thematic analysis.
Output: An analysis of the current being used social learning practices during a tender within a project-based organisation and the use of organisational memory.

1.6.3 Segment three: Practice Workshop

In the final part of this study how group dynamics have been influencing the use of organisational memory during social learning practices has been examined. A workshop simulating a portion of the tender process has been conducted to assess the impact of group interactions on the use of organisational memory. Drawing on findings from interviews, literature, and current practices, the workshop has been providing an opportunity to observe how group dynamics are shaping memory use during collaborative problem-solving.

The workshop has been including three distinct scenarios, each with specific limitations designed to influence group interactions with organisational memory. These limitations haven been varying across scenarios, impacting how participants have been engaging with both internal knowledge and external resources. This structure has been helping in assessing how each scenario's sequence and restrictions have been influencing access to organisational memory, as well as how participants are interacting, are sharing knowledge, and are learning.

Research Question 3: ***How is organisational memory utilised during social learning practices?***

Aim: To explore how group dynamics, including collaborative behaviours and interactions, are influencing the use of organisational memory during social learning practices.
Method: Workshop being based on the problem-based learning (PBL) framework, incorporating three scenarios with specific limitations to observe how these are affecting the group's use of organisational memory and their interpersonal interactions.
Output: Insights into how group dynamics are impacting the activation and the use of organisational memory, are providing a deeper understanding of how collaborative interactions are shaping decision-making and knowledge sharing in practical settings.

1.7. Reading Guide

To enhance clarity and readability, this research is providing a structured outline. Figure 1 illustrates the chapters of the thesis and their relationships to the research questions. This outline is highlighting how each chapter is addressing specific questions, ensuring a logical flow.

Following the introduction, in **Chapter 2** the research methodology is being presented, detailing the design and methods being used to achieve the research objectives. In **Chapter 3** relevant literature is being reviewed, focusing on the dynamics of project-based organisations, social learning, organisational learning, organisational memory, and interpersonal behaviours.

In **Chapter 4**, the analysis of interview data is being discussed, including interviewee selection and key findings. In **Chapter 5** the workshop design and targeted observations made during the workshop are being explained, while in **Chapter 6** workshop results are being presented.

In **Chapter 7** the discussing of the results, the assessing validity and the interpreting findings in the context of the research questions, and outlines study limitations are being delved into. In **Chapter 8** overall research conclusions, summarising key insights are being provided. Finally, in **Chapter 9** practical recommendations and suggestions for future research, bringing the thesis to a close are being offered.

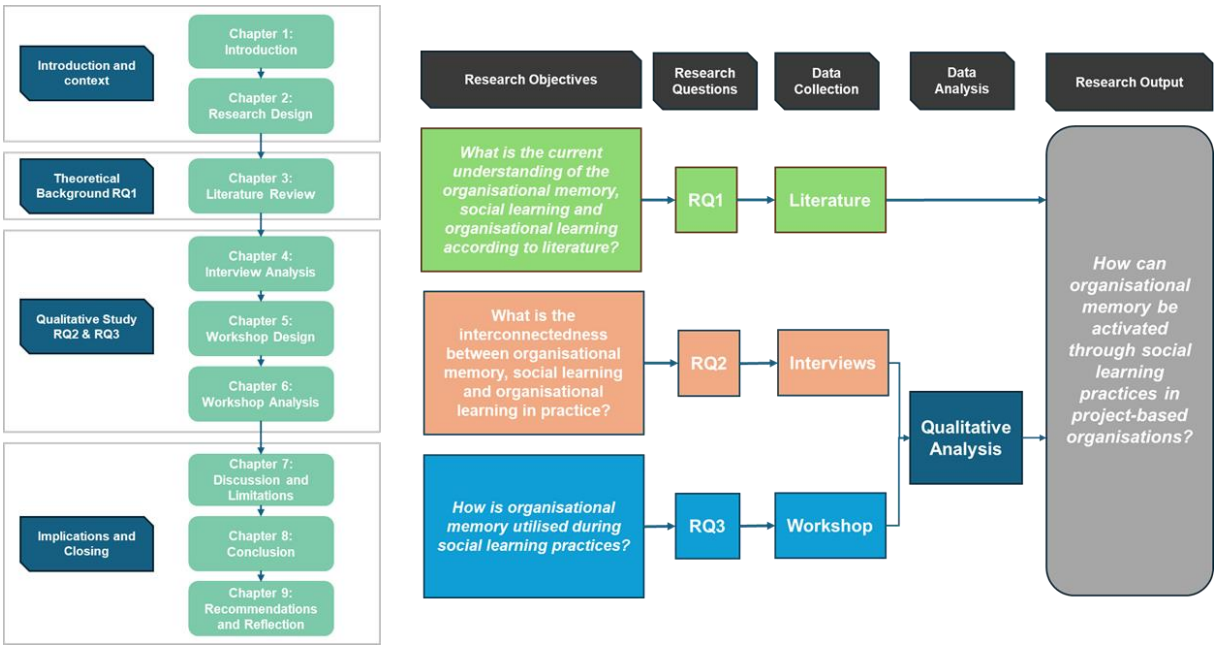

Figure 1 Thesis Guide (By Author)

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2. Research Design

In this chapter, the research design has been outlined, explaining the approaches and techniques being used to collect and analyse data from the interviews and the workshop. The following sections are providing an overview of the research scope, research approach, data analysis, sample instruments, sample size, analysis techniques, and is concluding with ethical considerations.

2.1. Research Scope and Boundaries

The scope of this research has been focused on redefining the understanding of organisational learning and memory by examining how these concepts are interacting within social learning practices. This study has been concentrating on the use of organisational memory during social learning, exploring how observation, imitation, and internalisation are being influenced by professionals in adopting more efficient methods (Forman, 2013; MDPI, 2023; Phua, 2013). While the impact of social learning strategies has been acknowledged, the specific influence of interpersonal behaviours on organisational memory utilisation has remained to be underexplored. This research has been addressing this gap by investigating the interconnections between social learning, organisational learning, and memory, specifically within the context of construction tenders. Tenders have been chosen due to the high turnover of team members, posing unique challenges to maintaining knowledge continuity and fostering organisational learning. Given the complexity and uncertainty inherent in the construction sector, this research is holding particular significance for enhancing knowledge retention and application.

However, certain aspects being outside the scope of this research due to time limitations:

1. Detailed project phase analysis: Analysis of the different phases of the different phases of construction projects will not be conducted. Instead, it be focussing on how organisational memory is being applied during tenders, using representative case studies.
2. Cross-sector and cross-regional comparisons: The research will primarily be concentrating on the construction industry in The Netherlands. It will not be involving with comparisons across different countries, sectors, or regions, limiting the generalisability of the findings.
3. Long-term evaluation of social learning practices: The study will be providing insights in tenders based on interview and workshop results, but it will not be including a long-term assessment of the social learning practices or their lasting effects over several tenders.
4. Observation of multiple social learning practices: Due to the complexity of observing several social learning practices during a workshop, only one social learning method, problem-based learning, has been selected to observe how organisational memory is being used and being valued.

2.2. Research Approach

This thesis has been employing a mixed-methods approach, combining qualitative research with a workshop-based method to gain a deeper understanding of how various aspects of organisational memory are being activated through small-group interpersonal interactions within social learning practices. The research design is aligning with the objective of exploring both theoretical and practical dimensions of activating organisational memory during tender processes in project-based organisations within the construction sector.

The choice of a mixed-methods approach has been particularly appropriate for this study, as it is enabling an investigation into the complexities of organisational memory activation. The qualitative methods have been allowing for an in-depth exploration of how social learning dynamics, organisational learning, and the use of organisational memory are unfolding in real time, while the workshops have been providing an interactive stage to observe how group interactions are influencing decision-making. This dual focus has been essential for understanding the interconnectedness between organisational memory, social learning, and organisational learning during tender processes. By combining multiple data sources, this research is ensuring data triangulation to strengthen validity.

The insights being gained from this research are contributing not only to theoretical knowledge but are also offering practical recommendations for activating organisational memory within social learning contexts. Qualitative data have been gathered through multiple methods, including semi-structured interviews and problem-based learning workshops, which are outlined in detail in the subsequent sections.

2.3. Interviews

The goal of the interviews has been to understand how organisational memory is being used, how the organisation has been learning, and which social learning practices are being conducted and influenced by behaviour. The interviews have been used both to orientate on the topic and to inform the workshop design. Conducted as semi-structured interviews, they have been allowing deviation from set questions to explore interesting comments and seek clarifications, ensuring comprehensive information is being gathered. The aim has been to identify overlaps and explore differences within the literature. The researcher has been making notes of key points and has been summarising transcriptions verbatim.

The interview guide can be seen in Appendix A.

To gather insights from the project management company, Count & Cooper, about practices and challenges in leveraging organisational memory within project-based organisations in the construction industry, two initial pilot interviews have been conducted to assess how questions are being perceived around the themes of social learning, organisational learning, and organisational memory, and whether any clarifications were being needed (van Teijlingen & Hundley, 2002). The information has been collected from the interviews has consisted of non-factual information and data, as it visualises perceptions and beliefs about the research topic. As stated by Seidman (2019), suggestive or leading questions have been avoided, focusing instead on the experiences and insights of respondents. Initial probing has provided a direction for further data collection and refinement of questions to minimise suggestive language. Interviewees have been encouraged to openly share and discuss the role social learning practices play in day-to-day life, how they use organisational memory, and the extent of organisational learning within the company.

2.3.1. Data Analysis Interviews

A semi-structured interview format has been used, combining open-ended and specific questions aligned with the research objectives. The interviews have been conducted either in person, one-on-one in the office, or remotely via Microsoft Teams to allow for flexible scheduling. Before each interview, respondents have been informed about the research

purpose, and prior permission has been obtained to use the interview data for research purposes. Detailed notes have been taken during the interviews. Each interview has been allocated a one-hour time slot, allowing for potential delays. The interviews have been commenced with broad questions, encouraging participants to share their experiences, perspectives, challenges, and insights. The interview guide has been covering various topics, including social learning practices, knowledge transfer mechanisms, challenges in preserving organisational memory, learning processes, behaviours, and strategies for continuous learning within Count & Cooper.

Interviews have been conducted in Dutch to enable participants to focus more on the content, and transcripts have subsequently been translated into English. Before organising the transcripts according to the conceptual data model for analysis, participants have been given an opportunity to review and validate their transcripts, ensuring accuracy and enhancing the credibility and reliability of the findings. Specific research analysis findings have not been shared with respondents to avoid influencing subsequent discussions, although the overall research results will be shared with them.

2.3.2. Sample Instruments and Analysis Interviews

For qualitative analysis, the coding process outlined by Strauss and Corbin has been used, consisting of three phases: open coding, axial categories, and selective core concepts coding, to facilitate analysis and derive insights (Boeije, 2019). Text fragments relevant to the research questions have been uploaded to Atlas.ti and labelled with open codes where applicable. Quotations have been capturing the full context of statements, while irrelevant sentences have been removed. The researcher has been interpreting the cause for each text fragment, with open codes representing both causes and consequences. Axial categories have been created as causes of the observations, grouping synonymous open codes within them, and further condensing them into key themes. Filters have been applied to exclude irrelevant data and explore different perspectives. The initial code list has been derived from the literature review and supplemented with additional codes from the collected empirical material.

Each interview has been coded and transcribed with unique identifiers. Statements are being referenced by interviewee number, followed by the quote number in the transcript (e.g., ID 1:5 refers to the transcript of interviewee 1 and quote 34). However, interview transcripts have been excluded from the appendix to protect participants' privacy and confidentiality, as detailed in the Data Management Plan and HREC form, available in Appendix C.

2.3.3. Sample Size and Selection Interviewees

The sample group from Count & Cooper has been had at least one year of experience in tenders or execution projects, ensuring familiarity with organisational processes. Their selected roles are providing operational insights into daily practices, decision-making authority, and end-to-end project management within project-based organisations. Given the dynamic nature of the industry, with frequently changing project team compositions, the interviews have not been focusing on any isolated tender or project team. However, members who have been participating in multiple tenders have been included in the sample to gain an organisational-wide perspective. This approach has been helping in understanding varying experiences across different tenders, projects, and external partners. The interviews have focused on capturing participants' experiences.

The total sample size has been determined by reaching data saturation, indicated when interconnective statements across transcripts have been repeated more than five times.

2.4. Workshop Problem Based Learning

The workshop has been aiming to assess the influence of interpersonal interactions in small groups during a social learning practice on the use of different parts of organisational memory. Drawing from interview findings, existing literature, and social learning practices used in the tender phase, the workshop has been serving as a social learning practice to examine how various parts of organisational memory are being accessed and applied.

The choice to conduct a workshop has been motivated by research indicating that social experiments in the educational sector can be uncovering both individual and collective learning processes within organisations. Studies by Mitchell and Nicholas (2006) and Nerantzi (2018) on cross-boundary work practices have been revealing how social experiments allow organisations to integrate diverse knowledge from other teams. To understand the influence of interpersonal interactions on the dynamics of a small group during a social learning practice related to organisational memory use, the theoretical framework of problem-based learning (PBL) has been guiding the workshop design (Smith et al., 2022). The workshop has been functioning as a social learning practice, facilitating social learning (Mellon et al., 2024).

The PBL framework, commonly used in medical and engineering sectors to foster diverse strategy development, has been actively engaging participants in collaborative learning to acquire new knowledge and skills. Learning has been structured around realistic scenarios reflecting organisational challenges or processes, with the problem driving the learning process. The workshop has been including three scenarios, each influencing how participants interact with organisational memory and prompting shifts in knowledge use and group dynamics.

The PBL framework has been presenting scenarios that are triggering participants to access and engage with parts of organisational memory. This design has been providing insights into how interpersonal interactions within a social learning practice are influencing which parts of the organisational memory being accessed, used, and valued across the organisation, offering opportunities to improve organisational learning processes.

The tender case developed for the workshop can be seen in Appendix B6, and the presentation in Appendix B7.

2.4.1. Data Analysis of Workshop

The workshop has been aiming to identify how interpersonal interactions in a small group are influencing decisions during collaborative engagement in the use of organisational memory. To facilitate social learning, the workshop has been serving as the social learning practice. Centred around problem-based learning, the workshop has been encouraging group members to learn through participation by solving the challenge in an interactive setting, allowing for discussion, brainstorming, and reflection on the knowledge within organisational memory. However, due to the complexity of the group's inconsistent use, discussion, brainstorming, and reflection will not be actively monitored.

The organisational memory has been based on Spenders (1996) framework, where knowledge has been divided into four categories: conscious (know-why), automatic (know-how), objectified (know-what), and collective (know-who). These four knowledge categories have further been classified into individual or social domains. An evaluation will be conducted during the workshop to determine which categories of organisational memory have been utilised.

The workshop has been mimicking a part of an already completed tender within the organisation, allowing participants to learn, build upon the existing body of knowledge, and to reflect on current organisational processes. This approach could be helping to highlight the importance of organisational memory and reveal the different ways it has been manifesting and can be accessed, providing learning opportunities and stimulating knowledge generation.

The extent of organisational learning will be assessed with a post-survey. While the workshop will not be explicitly aiming to guide the group into single, double, or triple-loop learning, an evaluation will be done to ask whether the group has been engaging in these forms of learning. This is aiming to understand whether the workshop could have been leading to single-loop learning or if, during or after the workshop, questions have been arising about why certain processes are being conducted in specific ways, prompting participants to consider re-evaluating and changing the overall approach.

2.4.2. Sample Instruments

To capture participants' interactions, dialogues, and outcomes during the workshop, a combination of qualitative and quantitative instruments has been selected. Drawing on the framework presented by Thoring et al. (2020), this section has been outlining the tools for analysing the dynamics of group discussions, tracking decision-making processes, and documenting key insights being generated during the session. The workshop will be conducted in Dutch to enable participants to focus fully on the content. The dialogue will be captured through audio recording and subsequently transcribed.

While the framework in figure 2 indicates the optimal evaluation methods, the following methods have been chosen to capture the empirical data effectively.

	Observation & Notes	Photography	Video Recording	Audio Recording	Survey & Questionnaire	Interview	Group Discussion	Artifact Analysis
People's Dialogues (during workshop)	◑	○	●	●	○	○	◑	○
People's Interactions (during workshop)	●	◑	●	○	○	◑	◑	○
Workshop Materials, Tools, Templates (e.g. Canvas,	●	●	●	○	●	●	●	●
Workshop Outcome Quality (e.g. Ideas, Strategy)	◑	○	◑	○	●	●	●	●

Figure 2 Evaluation Method framework (Thoring et al., 2020)

Observation Notes (ON): Observation has been used to capture actions in real-time, focusing on how participants have been engaging with one another, which knowledge is being used, and identifying any unforeseen actions. The facilitator has been noting these observations on an observation sheet, which will later be analysed for patterns, providing qualitative insights.

Audio Recordings (AR): Audio recordings have been used as a qualitative data source to capture dialogue during the workshop. Transcripts of these recordings will allow for a more detailed post-workshop analysis and will be helping mitigate potential bias in the dataset.

Surveys (SU): Surveys, both pre- and post-workshop (see Appendix B), have been used to capture participants' reflections on their experiences related to learning and to use of knowledge. The surveys are including qualitative open-ended questions to reduce researcher interpretation bias.

Artifacts Analysis (AA): Artifacts being generated during the workshop, such as digital and paper notes or content on a flip chart, have been providing tangible representations of participants' thought processes and outputs. These artifacts have been photographed to be preserved and analysed later.

2.4.3. Sample Size and Selection Participants

The determination of group size has been grounded in established literature on problem-based learning, which has been indicating that the optimal group size is ranging from four to seven participants. Hmelo-Silver (2004) have been suggesting groups of four to six participants to ensure active engagement, diverse perspectives, and effective problem-solving, while maintaining a manageable dynamic that is fostering heterogeneous competency.

In this study, eight participants have been divided into two comparable groups to represent organisational memory related to tenders. One group has been comprised of two Sr. Project Leads (with over four years of experience), one Consultant (with two to four years of experience), and one Project Analyst (with up to two years of experience). Participants have been selected being based on their availability and the criterion of not having been part of the tender being used in the workshop, allowing both groups to have comparable job titles, tender experience, and time within the organisation. This approach has been allowing for capturing diverse experiences with organisational memory across tenders and varied understandings of collective knowledge within the organisation, thereby providing a broad perspective.

2.5. Ethics

To ensure ethical data gathering, this research has been implementing multiple steps. Before each interview and workshop, participants have been receiving explanations of the research purpose, interview process, and intended outcomes. The research design and methods have been submitted to TU Delft's independent ethics committee for review and feedback, ensuring ethical compliance throughout the study. Consent has been remaining an ongoing process, allowing participants to withdraw at any stage or to revoke prior consent without penalty. Participants' consent has been secured, with interview and workshop results being anonymised, and content being left unmodified to uphold ethical standards in data analysis. Collected data has been stored on a secure, encrypted server and will be deleted upon research completion. Data pseudonymisation has been replacing identifying details with pseudonymous identifiers, aligning with the principles of respect for persons, beneficence, and justice.

For the workshop, a safe environment for participation has been established to encourage idea-sharing and open discussion. To create a productive and effective atmosphere, participants have been reassured that there will be no wrong responses. These principles are reflecting ethical standards of respect for persons and are promoting an inclusive, respectful environment conducive to open communication (States National Commission for the Protection of Human Subjects of Biomedical & Research, 1978).

3. Theoretical background

In this chapter key theoretical concepts are being explored, including organisational learning, memory, and social learning, how these concepts are interrelating within PBOs are being examined. Particular attention has been given to how social learning is being related to organisational memory, enabling teams to apply past knowledge to new challenges. In addition, there has been a focus on how interpersonal behaviour is influencing the use of organisational memory. This review is establishing the foundation for the subsequent stages of this research.

3.1. Challenges of Knowledge Retention and Transfer in PBOs

Project-based organisations are frequently finding themselves being trapped in a cycle of 'reinventing the wheel' or are suffering from corporate amnesia. These organisations are struggling to harness and apply the accumulated knowledge being generated within projects effectively. This issue is further being intensified by the inherently unpredictable nature of project-based work. The critical issue is to be capturing, disseminating, retaining, and using knowledge efficiently across projects and facilitating its transfer throughout the organisation (Ajmal & Koskinen, 2008; Allan Williams, 2001).

The dynamic and temporary nature of project-based work is placing a unique strain on organisational learning processes and the use of organisational memory. The routine influx and departure of team members, reassigned to new projects before their current assignments are being concluded, is limiting opportunities for intra- and inter-project knowledge exchange. Upon the completion of a project, teams are often being dissolved, leading to the fragmentation of the knowledge acquired by team members. This fragmentation is hindering the organisation's ability to learn from past experiences, resulting in inefficiencies in retrieving and applying organisational memory for future improvements (Kucharska & Bedford, 2020; Scarbrough et al., 2004). However, fragmented knowledge is not entirely being lost. There is being a need to rethink how fragmented knowledge can be activated and harnessed by organisational members in an environment where the dynamic nature of projects is presenting unexpected situations (Weick & Sutcliffe, 2006)

Before delving into the core themes of the review, it has been essential to establish a foundational understanding of the concepts of learning, knowledge, and memory through the lens of social learning, and to examine their interrelationships. This exploration has been providing insight into how these concepts are being perceived and applied differently at individual, team, and organisational levels (Bandura, 1971). Understanding these dynamics will be illuminating pathways through which existing knowledge can be leveraged to address novel problems, offering insights for overcoming the recurring issue of reinventing solutions in project-based organisations (Argote, 1999).

3.2. Challenges of Learning Dynamics in PBOs

Project-Based Organisations (PBOs) in the construction sector are being structured around executing projects rather than in continuous, uniform operations. This organisational structure is prevalent in construction due to the sector's project-centric nature, where each building or infrastructure project is unique, involving different clients, locations, requirements, and

challenges. While these projects are being fertile grounds for knowledge creation and innovation, their transient nature is posing a challenge to learning within the PBO and the seamless dissemination of knowledge across the organisation. This challenge is stemming from the dispersion of project teams upon completion, as members transition to new projects or roles, potentially leading to a fragmentation of knowledge (Buttler, 2016; Carrillo et al., 2013; Fuller, 2011; Paranagamage et al., 2012).

Project-based learning is encompassing a dynamic interplay between generating knowledge through project endeavours and the crucial process of documenting and transferring this knowledge for enduring organisational benefit. This dual approach has particularly been relevant in a PBO, where teams are navigating the unique and unpredictable challenges that projects are posing. Learning within such contexts has been categorized into intra-project learning, which is occurring within the confines of a single project, and inter-project learning, which is transcending individual projects to benefit the organisation as a whole (Bakker et al., 2011).

The PBO is acknowledging how critical it is to document the information being created in these projects using best practices or lessons learned. However, the effective utilisation of these lessons is often being overlooked. There is a misconception that merely capturing lessons is sufficient. The emphasis is frequently remaining on capturing knowledge rather than on the practical application and reapplication of it across projects and the organisation as a whole (Yang et al., 2019). The value of lessons learned from projects can only be realized when these insights are actively being implemented and reused in subsequent projects. This process intimately is involving individual team members, project teams, and the organisation, and can be linked to both intra- and interpersonal behaviours (Bartsch et al., 2013).

There is being a shift in the paradigm wherein social learning, learning with and through others, can be aiding in the activation of the learning process. This approach is placing learning at the centre stage, making the difference between merely storing knowledge and focusing on its actual application to foster learning.

The situation is highlighting that learning from projects is not just being about capturing and storing knowledge but about encouraging active learning by disseminating and applying this knowledge across the organisation. However, the effectiveness of this process is being affected by the size of the organisation; the larger it is, the more independently departments are operating from one another, making it more difficult to spread knowledge and to learn on an organisational level (Bartsch et al., 2013). Therefore, an active social learning strategy should be implemented at the organisational level to stimulate individual-level incentives for learning.

3.3. Codification and Personalisation of Knowledge in Organisations

Knowledge, in its essence, is being created through the structured blending of information, understanding, and skills that individuals or teams are gathering through educational or learning experiences (Ramírez et al., 2011). Knowledge is not merely being a personal asset but also a collective one, enabling teams to develop shared understandings and to enhance organisational learning. At the core of knowledge acquisition, processing, and utilisation is lying human cognition and social interaction. These elements are being crucial, forming the

foundation of how knowledge is being understood, shared, and applied within organisations (Wenger et al., 2015).

Knowledge within organisations is being disseminated through two primary approaches: personal interactions and documentation into databases or repositories. The first approach, known as personalisation, is being essential for sharing tacit knowledge, which is being inherently difficult to articulate. The second approach, referred to as codification, is suited for explicit knowledge due to its nature of being more easily transferable through various media (Scheepers et al., 2004).

Codification is involving extracting knowledge from individuals or teams and placing it into databases or repositories. This approach is leveraging the transferability of explicit knowledge and is enabling organisations to efficiently resolve recurring issues by accessing stored knowledge. However, the rapidly changing nature of Project-Based Organisations (PBOs) can be rendering codified solutions outdated quickly. Maintaining knowledge repositories is requiring continuous updates and resources. Therefore, it is being essential to allocate adequate capacity for this task to ensure the relevance and effectiveness of stored knowledge (Ajmal & Koskinen, 2008).

Personalisation is focusing on interactions between individuals to share and obtain knowledge. This approach is being used for tacit knowledge, which is challenging to document and often is lacking the necessary context when being recorded. Personalisation is involving direct communication, such as face-to-face meetings, mentoring, and collaborative problem-solving sessions. For instance, project teams might be holding regular brainstorming sessions to address unique challenges, allowing members to contribute to their tacit knowledge and to collectively develop innovative solutions (Brown & Duguid, 2001).

The cognitive processing of knowledge is involving multiple hierarchical structures in which the learners are processing knowledge and ideas in their minds by attending, receiving, processing, storing, and retrieving knowledge from memory. Effective cognitive processing is crucial for both individual learning and organisational knowledge management. It is enabling individuals to internalise explicit knowledge and to convert it into tacit knowledge through experience and practice (Kolb, 1984).

3.4. Social Learning in Organisational Contexts

Albert Bandura's social learning theory is stating that learning happens in a social context and can be occurring through observation or through direct instruction between individuals (Bandura, 1971). This approach is emphasising the acquisition of knowledge and skills through social interactions and shared experiences among individuals and artifacts, rather than being restricted to an individual process of thought (Brandi & Elkjaer, 2012). By leveraging social interactions and dynamics within a social setting, teams are developing shared practices, culture, norms, routines, and lessons learned through collaborative work in projects, as well as by documenting and sharing knowledge in databases or meetings. Bandura's theory is underscoring the significance of observing, modelling, and imitation, considering the environmental influences on human learning and behaviour as visualised in figure 3 (Bandura, 1971).

Edmondson and Moingeon (1998) are positing from a socially oriented perspective that learners are expanding their relationships with others and acquire knowledge while partaking in shared activities within specific socio-cultural contexts. Through learning, individuals are not retaining knowledge solely on a personal level; instead, it is being disseminated within and among artifacts and organisational members (Brandi & Elkjaer, 2012).

Having been establishing the theoretical foundation, the examination is now turning to how social learning is operating within the construction sector. In this context, social learning is referring to the collaborative process through which individuals within the industry collectively are acquiring, sharing, and applying knowledge and skills within a social context (Sunding & Ekholm, 2015; Warne et al., 2000). Social learning in construction is highlighting the collaborative learning process being needed in a dynamic industry where practical skills, problem-solving abilities, and adaptability are being essential to overcoming unexpected situations. Learning is being viewed as an active process connected to the outcomes of using organisational practices. By participating in social processes, learners are gaining an understanding of their functions and roles within the organisation (Brandi & Elkjaer, 2012). Teams are capitalising on their collective knowledge and experiences. Given that constructing knowledge is an being integral part of the learning process, social learning within an organisation can be connected to organisational learning (Bartsch et al., 2013; Nicolini & Meznar, 1995; Sunding & Ekholm, 2015).

Effective social learning processes are being crucial for improving knowledge sharing and innovation in project-based organisations. While Sunding and Ekholm (2015) are emphasising the collaborative nature of social learning in construction, Warne et al. (2000) are focusing on its role in problem-solving and adaptability.

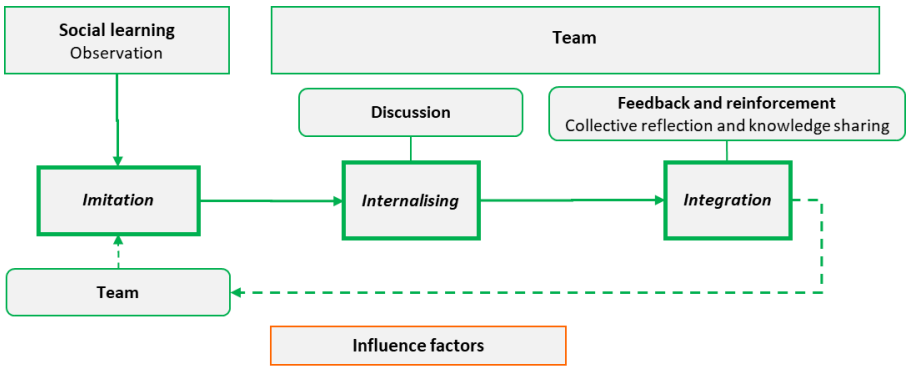

Figure 3 Phases of Social Learning (By Author)

3.4.1. Individual Learning through Social Learning

Individual learning theory is stating that learners build knowledge through various experiences, instructions, and practices, often in interaction with others or with phenomena. This theory is emphasising that individuals are developing the capacity to apply knowledge and are making connections between innovative ideas and prior understandings to address challenges, a process being termed 'learning by doing' or experience-based learning. Alternatively, learners may be using tools or systems to acquire knowledge, being referred to as 'learning by using'. However, the use of such tools is primarily relating to organisational processes and not to decision-making (Levinthal & March, 1993).

Individuals are engaging with learning through various modes, by which people are absorbing, processing, and retaining information. This can be visually, auditorily, verbally, physically, logically, socially and solitarily. Using different forms can be reinforcing learning and is involving the use of multiple senses to process and perceive information in different ways.

'Learning by doing' and 'learning by using' is representing foundational steps that are enabling the acquisition or modification of knowledge and the formation of memory. This process can be unfolding both consciously and unconsciously, highlighting the personal dimension of learning, where knowledge is being generated through individual experiences and cognitive processes. In contrast, social learning theory is situating learning within the context of organisation's communities of practice. According to this perspective, learners are developing their sense-making and knowledge creation processes through active involvement in the everyday practices of the organisation. This is situating learning within the specific socio-cultural contexts of an organisation, emphasising the importance of engagement and participation in shaping one's knowledge and skills (Brandi & Elkjaer, 2012).

The distinction between individual and social learning is lying in the fact that learning is not being isolated to self-directed activities but is rather occurring through roles and activities within the broader social environment and processes of the organisation. It is through these interactions, combined with the everyday dynamics of organisational life, that individuals are learning, growing, and are contributing to the collective knowledge and practices of their team (Brandi & Elkjaer, 2012).

3.4.2. Communities Of Practice

Communities of Practice (COP) are being a component of social learning theory. COP are being essential for understanding how learners acquire knowledge and skills within a socio-cultural context. Newcomers progressively are integrating into the practices of a community, which is being crucial for efficiently gaining the knowledge necessary for effective workplace performance. Warne et al. (2000) are underscoring the need for community members to adapt and respond to changes over time and in new situations, highlighting learning as a dynamic process within a social environment.

Learning within COP is raising critical organisational questions, including issues being related to power dynamics, access, transparency, and the evolving cycles of community practices. COP are forming a vital link between individual and organisational learning, focusing on how knowledge is being transmitted between community members and how practices can be propagated between communities, aligning them within the organisation (Peltonen & Lämsä, 2004; Warne et al., 2000).

Recent literature has further been elucidating the role of COP in organisational learning. For example, Wenger et al. (2015) have been discussing the concept of 'landscapes of practice', where multiple COP have been interacting within an organisation, creating a complex network of learning and knowledge sharing. This perspective highlights the interconnectedness of different COP and their collective impact on organisational learning.

Moreover, the role of leadership within COP has been a focal point in recent research. Leaders who have been actively participating in and support of COP can be enhancing the learning culture within an organisation, creating an environment where continuous improvement and

innovation are being encouraged (Bolisani & Scarso, 2014). This is aligning with the growing emphasis on collaborative leadership models that are recognising the importance of distributed leadership and the co-creation of knowledge within COP (Bolden, 2011).

3.4.3. Use of Social Learning theory in Construction Industry

In recent years, the construction industry has increasingly been embracing social learning practices to improve learning and organisational performance. Unlike traditional individual learning methods, social learning has been leveraging the collective knowledge and experiences of individuals within a social context. This shift has been driven by the recognition that collaborative engagements can be enhancing behavioural performance and learning speed, as evidenced by Zhang et al. (2022). The growing complexity of construction projects is necessitating more dynamic and interactive learning methods, making social learning a point of interest in the modern construction landscape.

Social learning is offering benefits to both individual learning and organisational knowledge development. Ponton and Dondlinger (2022) are highlighting the influence of social environments on self-directed learning in project-based settings, suggesting that interactions within a social context can be fostering deeper understanding and skill acquisition. This is aligning with the social learning theory as stated by Bandura (1971) which is stating that individuals are learning not only through their own experiences but also by observing others.

Various forms of social learning practices are being used within the construction sector, each contributing to the industries learning ecosystem. In the following sections these practices are being explored in detail, with examples highlighting their application in construction tenders and projects.

Observation and imitation learning, also being known as modelling, are involving in obtaining new behaviour or skills by watching others and replicating their actions. This method has particularly been effective in the construction industry, where complex tasks and safety procedures must be learned and adhered to. Styhre & Josephson (2007) have been finding that site managers in the Swedish construction industry play a crucial role as role models, with their behaviour influencing the practices of workers on-site.

Mentorship and coaching are personalised learning approaches where experienced individuals are being providing advice, support, and feedback to less experienced individuals. Albert and Routh (2021) are noting that these practices are being essential for developing technical skills and fostering professional growth within the construction sector.

Storytelling is a powerful tool for transferring tacit knowledge, experiences, and lessons learned from past projects to organisational members. Koskinen Pihlanto (2008) are arguing that storytelling is helping team members to understand best practices and to avoid past mistakes by sharing narratives about previous projects.

Knowledge construction through participation is involving engaging individuals in activities where they are actively building upon knowledge by interacting with others and the environment. Yan et al. (2023) are describing how discussions, brainstorming sessions, peer reviews, and workshops facilitate the creation and dissemination of new knowledge within

construction tenders. In turn, this is leading to more effective problem-solving and project outcomes.

3.5. Organisational Learning and its Social Foundations

The literature is describing organisational learning as an ongoing process within an organisation that is encompassing the acquisition, dissemination, and application of knowledge. The process is involving sharing both tacit and explicit knowledge from individuals or teams to others and is widely being regarded as a main objective of organisational learning to improve routines, practices and behaviour of the organisation (Levitt & March, 1988). In the review of Edmondson and Moingeon (1998), organisational learning has been associated with the continuous development and change of individual cognition and team collaboration, by which individual members function as agents of organisational action and are learning, through processes such as information diffusion, understanding organisational dynamics, communication patterns, and the encoding of routines and are thus permanently modifying the behaviour of certain processes (Chronéer & Backlund, 2015). It has allowed the organisation to adapt to its environment and to guide behaviour and decision-making. Peltonen and Lämsä (2004) have added the social process, a perspective in which organisational learning is not being limited to the individual but is revolving around the participation in communities of practice. In this case, the development of new knowledge and new ways of acting is being seen as part of the learning process. Organisational learning is a multifaceted process through which organisations are evolving by continuously improving and deepening the understanding of the roots of the problem being faced. This complex process can be dissected into distinct levels of learning, each representing a progressive deepening in the way organisations are reflecting upon, are challenging, and are changing the organisational strategies and assumptions, in response to problems and opportunities.

Within the theories of organisational learning, the most common three levels of learning are known as single-loop, double and triple-loop learning (Levitt & March, 1988). Each level is deepening further in understanding the underlying assumptions of the problem from correcting the mistake to modifying the very principles and protocols of the organisation itself. The levels are further extended, with the cycle of no learning by which an organisation is letting the information to be fragmented within itself and is failing to integrate and apply the generated knowledge on an individual level for organisational development. Organisational learning is also involving, unlearning, by which the organisation is phasing out outdated beliefs and old practices, a shift often being triggered by practices not leading to success or growth, allowing organisations to embrace new paradigms and to ensure continuous improvement (Wang & Ahmed, 2003).

3.5.1. Organisational Learning through Social Learning

Looking through the lens of the social learning theory with a perspective on organisational learning, is conceptualising learning as a continuous process that is being influenced by both the environment and organisational dynamics. According to Dutton et al. (2014), within the framework of social learning theory, learning is being seen as not just an internal process but is also as being influenced by external social factors and thus not related to individuals who are learning by changing their cognitive processes. Learning is being seen as an activity being embedded in everyday work and comes about through the experiences from others with collaborative creation, sharing, and application of knowledge among organisational members.

Organisations are being composed of diverse individuals, each bringing unique experiences, motivations, values, and behaviour forward. These individual characteristics, combined with specific work practices, artefacts, and organisational norms and regulations, are constituting the organisational context. Hence, organisational learning should not be narrowly focusing on modifying individual cognitive processes. Instead, organisational learning is a social phenomenon, emphasising the social interactions which are facilitating knowledge transfer and collective understanding within the organisation. Therefore, attention is being focused on the broader organisational context, with emphasis on the patterns of participation and interaction.

It is from this viewpoint that both individual and organisational learning can be seen from a social cognitive approach as a way of connecting cognition, social construction, and behaviour in organisational learning processes. This perspective is suggesting that effective organisational learning strategies must be accounting for the complex interplay between individual attributes and the organisational environment, promoting a culture that is supporting continuous learning through engagement and collaboration (Brandi & Elkjaer, 2012).

3.6. Organisational Memory Mechanisms in Learning and Decision-Making

Organisational memory is referring to the collective repository of knowledge, information, experiences, and practices that an organisation has been gathering over time. It is operating across individual, team, and organisational levels, with each level contributing to the accumulation and utilisation of memory used towards making decisions. This memory is enabling the organisation to not only be retaining important information for future use but also to learn from past experiences, both successes and failures (Bhandary & Maslach, 2018). Knowledge is no longer being viewed as a scarce resource within the construction sector, rather the focus is being placed on the capacity to choose the appropriate knowledge at the right moment in time (Brandi & Elkjaer, 2012). According to Stein (1995) organisational memory is being defined as *"the means by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of organisational effectiveness."* This definition is underscoring the impact of organisational memory on organisational performance, emphasising its dual role as both an asset and a constraint (Klein et al., 2007). However, processes, where information is being captured, interpreted and retained, are constituting a complex phenomenon that is extending far beyond the mere collection and storage of information.

The knowledge being stored with the organisational memory repository is being essential for organisational learning as stated by Huber (1991), it is allowing organisational members to enhance their learning. However, an organisational memory repository is not being a static repository but a facilitator of knowledge creation, aligning with the dynamic and processual nature knowledge within organisations (Klein et al., 2007). Information has to be internalised as organisational knowledge, to be retained and to be readily available for use. Consequently, not all information is being retained by an organisation. Therefore, it is being important to have specific storage and retrieval processes for the availability of organisational memory so that members can easily be accessing and presenting the information as useful knowledge at the specific moment that a decision is being made. As seen with individual memory the retrieval of knowledge can become difficult over time due to interference from new knowledge and the degradation of it. This is also being reflected in the transformation of retained material within

organisational memory. Thus, Stein (1995) has been adding the importance of maintaining the organisational memory, and minimising memory loss and decay.

Organisational memory is following the process of acquisition, retention, and retrieval of information and knowledge (Walsh & Ungson, 1991). However, the creation of knowledge is following a hierarchical order, it is starting from raw facts that are constituting data, when this data has been contextualised, it is becoming information and once this information has been internalised it is transforming into knowledge. This is the requirement for knowledge to be able to do acquisition, retention, and retrieval and to maintain this within the organisational memory. Conversely, the stored knowledge within the memory can also follow this process vice versa, degrading into mere information or data (Klein et al., 2007).

3.6.1. Classification of Organisational Memory

Knowledge can be defined as explicit knowledge, codified, and easily being shared as documented procedures and policies, and tacit knowledge, more personal, context-specific, and harder to articulate towards social networks and relationships. Spender (1996) has been combining the classification of the knowledge type with the knowledge source, individual and social knowledge within organisational memory. The model of Spender is diving into the interactions connecting knowledge, learning, and memory together. A matrix is classifying the intangible assets and skills of organisational knowledge into four categories as being demonstrated in table 1:

Table 1 Organisational Memory Framework (Spend, 1996)

	INDIVIDUAL	SOCIAL
EXPLICIT	Conscious knowledge	Objectified knowledge
TACIT	Automatic knowledge	Collective knowledge

1. The first type is individual explicit knowledge being referred to as **conscious knowledge**. It can be documents, manuals, databases, and other formal records. However, individuals have been learning this knowledge.
2. The second type is individual tacit knowledge being called **automatic knowledge.** It relates to knowledge being stored and retrieved from personal memory and being developed through personal experience and it is context specific.
3. The third type is the organisation's social explicit knowledge being titled **objectified knowledge**. This is relating to the codified standardised processes and organisational routines being shared and standardised within the organisational databases.
4. The fourth type, social tacit knowledge being mentioned **collective knowledge**, is being symbolised by the knowledge that is being shared among members of the organisation by social interactions and shared experiences, encompassing unwritten norms and cultural aspects of the organisation. It is being incorporated into institutional and societal practices and cultures.

Spender's framework is outlining how different types of knowledge, conscious, automatic, objectified, or collective are interacting and evolving within organisations as been shown in figure 4. Typically, knowledge is beginning as collective, being generated through social interactions and teamwork. As it is becoming formalised, it is transitioning into objectified knowledge, being codified in manuals or databases. When employees are actively using this information in decision-making, it is being transformed into conscious knowledge, and over time, the repeated use is turning it into automatic knowledge, being embedded in routines and requiring little conscious effort. This automatic knowledge can then be fed back into collective knowledge through further social interactions, completing the cycle.

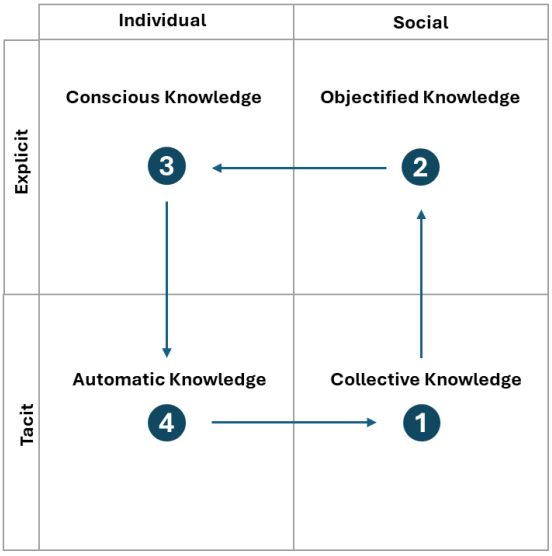

Figure 4 Dynamic flow of Organisational Memory (Spender, 1996)

3.6.2. Organisational Forgetting

Organisational memory is evolving from the shifts in the working environment, from new knowledge generations or from improvements of the organisational capabilities and while new knowledge has been added, it can be causing knowledge being lost or being reshaped. Organisational forgetting is the term being used to describe the phenomenon of organisational memory being lost. There are multiple factors under which organisational forgetting occurs. It can be happening when knowledge is not relevant in the current setting and is becoming outdated (Bhandary & Maslach, 2018), when storage systems are not having the capacity or the strategy to maintain memory (Stein, 1995), and restructuring of organisations or high turnover of employees (Advice centre, 2022).

3.6.3. Effects of Organisational Memory on Performance

The importance of organisational memory is being examined as a counterintuitive yet essential element of effective organisations. The idea is that organisational memory is serving as a reservoir from which knowledge of the past is guiding present activities, which is making it vital to the operation of organisations. However, it can also be serving as a constraint, preventing the organisation from performing efficiently and adapting to new information due to holding on prior irrelevant knowledge (Klein et al., 2007).

The methods of using organisational memory can be forcing an organisation to make distinction between which knowledge being relevant to be stored into the repository but can also be causing missing valuable ones. This can be due to the actor's prior knowledge and the current task at hand, knowledge search is being influenced by background and experiences of the actor. Therefore, the sought-after knowledge must be connected with the actors' parameters to be able to be found (Cacciatori, 2008). However, this is also being related to storing information. Individuals will be present knowledge being based on their different educational and occupational backgrounds.

Supporting computer-based memory systems will be increasing costs by the need for managing and maintaining the extensive requirements of the databases memory function. The size of the repository and its contents will be causing burdens on the users in terms of the processes of acquisition, retention, maintenance, and retrieval due to not finding the relevant knowledge within these systems. Olivera (2000) has been stating, computer-based memory systems often contain knowledge that is too general, and for more specific knowledge, personal consultation through interaction is being necessary. The codification of knowledge to such depth and specificity in organisational memory can be challenging, involving complex processes of acquisition, retention, maintenance, and retrieval and despite the importance of having detailed documented information it potentially can be leading to disappointment with its performance.

Thus, Chiva and Alegre have been stating, to acquire specific knowledge within the organisation there is a social process, the knowledge seeker is seeking assistance at the knowledge provider, combining the former's needs with the latter's experience and expertise to create new knowledge. To access specific knowledge from the organisational memory, a social approach is being needed to access person-centred knowledge (Chiva & Alegre, 2005).

3.7. The Role of Memory and Knowledge in Facilitating Learning

The processes of learning, memory, and knowledge are deeply interconnected, each playing a crucial role in cognitive functioning as visualised in figure 5. Learning is depending on the effective encoding and storage of information in memory, and it is necessary to acquire and expand knowledge. Memory is providing the repository of knowledge from which can be drawn upon to understand and engage with the world. Knowledge, in turn, is supporting further learning by providing a framework that is aiding in the creation of new information. Together, these processes are enabling individuals to shape how new information and experiences are being interpreted.

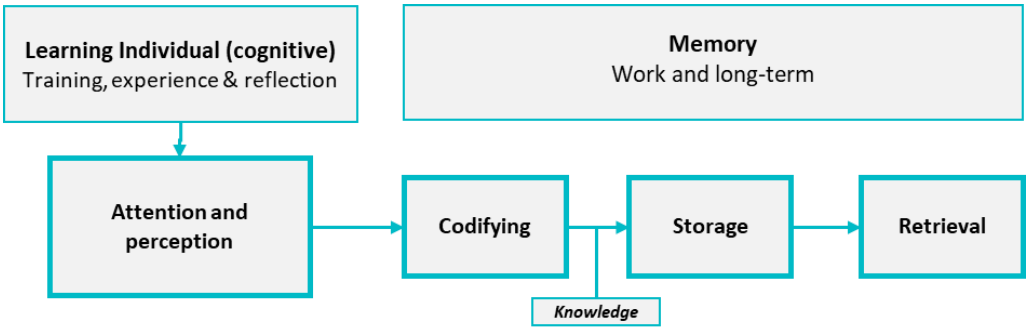

Figure 5 Relation between Learning, Knowledge and Memory (By Author)

3.8. Dynamics and Triggers in Organisational Memory and Learning

In organisational learning, memory is serving as a foundational mechanism for retaining and applying knowledge across new and recurring challenges. The activation of organisational memory, the way how knowledge is being recalled, being shared, and being adapted, can be occurring through various pathways, each influencing how employees are learning and making decisions. Key mechanisms, including pattern recognition, competing memories, emotional

triggers, and memory consolidation, collectively shaping this process. In the following sections these dynamics are being explored in depth, examining how each contributes to both the strengths and the limitations of organisational memory in fostering adaptable, informed responses within the workplace.

3.8.1. Pattern Recognition through knowledge sharing

Pattern recognition from the organisational memory is enabling employees to identify recurring themes and structures from past experiences, is allowing relevant knowledge to be applied to new challenges and learning. This process, vital for decision-making, has been emerging from both social interactions and codified knowledge. Bandura's social learning theory (1971), is highlighting that individuals are internalising patterns by observing others, creating cognitive shortcuts that enhance problem-solving. Together, sharing explicit and tacit knowledge is building a collective repertoire of patterns that is activating organisational memory, enabling intuitive responses to complex tasks. However, reliance on pattern recognition can be limiting organisational adaptability. As Fortwengel and Keller (2020) have been observing, overdependence on familiar patterns can be creating 'organisational path dependence', where outdated solutions are repeatedly applied. Balancing pattern recognition with flexibility by integrating diverse knowledge sources, cross-functional knowledge sharing, and digital tools, are preventing cognitive silos, enriching organisational memory, and ensuring that pattern recognition will be remaining an adaptive asset for decision-making without restricting creative problem-solving.

3.8.2. Competing Memories in Decision-Making

Competing memories will be arising when employees recalling multiple, often conflicting or outdated experiences in response to new situations, leading to varied interpretations knowledge and information that is complicating decision-making (Valle et al., 2019). Cognitive Interference Theory is explaining this dynamic, showing how competing memories are contributing to anchoring (reliance on familiar memories) or availability bias (preference for easily being recalled solutions), which can be resulting in applying obsolete information to current challenges. Social interactions in team settings or accessing codified knowledge may be activating these competing memories, wherein individuals or databases are bringing diverse experiences that enriching perspectives but also increasing cognitive bias potential. Levitt and March (1988) concepts of single- and double-loop learning are further illustrating how repeated reliance on familiar solutions (single-loop learning) can be reinforcing outdated responses without considering their current relevance, risking misalignment with the organisation's evolving context. To manage these challenges, organisations can be conducting knowledge audits and reflective practices to systematically validate and update knowledge in databases. Additionally, AI-driven knowledge management systems can be streamlining organisational memory by filtering information being based on date and relevance, reducing cognitive overload from outdated or conflicting records.

3.8.3. Emotional Triggers in Organisational Memory

When individuals are sharing knowledge, they often are conveying emotions being tied to their experiences, which are serving as powerful triggers for activating subconscious memories. These emotional cues are influencing how individuals are interpreting new information which will be impacting the decision-making and interpersonal understanding. Emotions are being shared in discussions can also be resonating and be affecting the collective knowledge, being

strengthening organisational memory. Barsade and Gibson (2012) have been finding that positive emotions are tied to successful projects encouraging teams to recall and replicate effective strategies, embedding best practices within organisational memory. Similarly, Almeida and Kogut (1999) have been illustrating that shared emotional experiences are fostering camaraderie and trust, creating a psychologically safe environment that is enabling individuals to access and to share implicit knowledge. However, while emotions are adding depth to organisational learning by infusing shared experiences with nuance, they also carrying the risk of biasing memory recall. Emotions can be idealising or criticising past events, leading to biased decision-making. An employee who is recalling a particularly stressful project may be avoiding similar strategies in the future, even if they have been proven effective, highlighting the need for balanced interpretation in order to prevent skewed organisational responses.

3.8.4. Memory Consolidation in Organisational Memory for learning

Memory consolidation, the process of transforming short-term memories into stable, long-term memories, is enabling employees to retain essential information without experiencing cognitive overload. In organisational settings, rest periods or breaks in both information processing and social interactions are supporting this consolidation, allowing knowledge to solidify. Diekelmann and Borns (2010) research is underscoring the need for periodic “knowledge disengagement” to effectively learn and transfer information from short-term to long-term memory, suggesting that continuous access or exposure to information, especially in busy or socially demanding work environments, may be disrupting this process. These disengagement periods are providing employees with essential time to reflect and filter insights, supporting deeper learning and enhancing recall. Additionally, Sparrow et al. (2011) are describing how digital knowledge systems, by keeping information constantly accessible, can be leading to transactive memory overload. In this state, employees may be relying on readily available data but are struggling to internalise that deeply. This is highlighting the importance of structured rest periods allowing employees to internalise knowledge fully, enhancing both retention and application of organisational memory.

3.9. Closing Remarks Literature Review

This chapter has been serving as a stepping stone in exploring the academic discussions surrounding key theoretical concepts in project-based organisations, focusing on social learning, organisational memory, organisational learning, and memory activation dynamics. It has been highlighting the intricate interrelationships among these elements, each playing a distinct role in the continuous cycle of knowledge utilisation, activation, and learning within organisations. In addressing the first sub-question, *“What is the current understanding of organisational memory, social learning, and organisational learning according to literature?”,* this chapter has been establishing a foundational understanding of these concepts within the academic landscape. The insights being gained from this literature review will be relevant for addressing the sub-questions related to the interview analysis and workshop results in the subsequent stages of this thesis.

In the first part of the theoretical background, learning and knowledge transfer in project-based organisations (PBOs) have been explored. PBOs are often trapped in a cycle of "reinventing the wheel" or experiencing "corporate amnesia" due to the fragmented nature of project work (Bakker et al., 2011; Buttler, 2016). The temporary composition of teams, organisational size, and frequent staff turnover have been making it challenging to capture,

retain, and transfer knowledge across projects, leading to inefficiencies in applying and using organisational memory for future improvements (Kucharska & Bedford, 2020; Swan et al., 2010). Despite these challenges, PBOs are offering fertile ground for knowledge creation. Effective learning, however, is requiring addressing knowledge fragmentation by rethinking how this knowledge can be activated and used within dynamic project environments.

In the second part, Bandura's (1971) social learning theory has been introduced, asserting that learning occurs through observation, modelling, internalising, and interaction within social contexts. In PBOs, this theory has been critical for fostering shared practices and norms that support both individual and organisational learning (Brandi & Elkjaer, 2012). In the construction sector, social learning has been vital for transferring tacit and explicit knowledge during collaborative, problem-solving activities ((Sunding & Ekholm, 2015). A key aspect of social learning is the formation of Communities of Practice (COP), where individuals are collectively acquiring, sharing, and applying knowledge through participation in shared activities and groups. This is facilitating continuous learning and ensuring that lessons learned will be disseminated throughout the organisation (Warne et al., 2000; Wenger et al., 2015).

PBOs can use various social learning practices to foster collaboration and knowledge sharing. Formal and informal mentorship and coaching have been providing structured support for professional development, while storytelling is serving as a tool for transferring tacit knowledge through narratives (Koskinen & Pihlanto, 2008). Participation in workshops, brainstorming sessions, digital sharing platforms, and peer reviews is helping individuals and teams to construct and to share new knowledge, driving effective problem-solving (Yan et al., 2023). These practices are maintaining a dynamic flow of knowledge that is enhancing both problem-solving and is fostering a culture of continuous learning in ever-changing project environments (Bartsch et al., 2013).

In the third part of the review, organisational learning has been examined as a continuous process through which organisations are acquiring, sharing, and applying both tacit and explicit knowledge to improve routines, behaviours, and decision-making (Levitt & March, 1988). In PBOs, this process is essential, as past project knowledge must be informing future actions. However, the temporary nature of project teams is often leading to knowledge fragmentation, limiting opportunities for reflection and hindering the transfer of lessons learned (Buttler, 2016; Carrillo et al., 2013). Organisational learning has been understood as a social process being embedded in daily interactions, being fostered through collaboration and communities of practice, ensuring continuous co-creation and application of knowledge (Peltonen & Lämsä, 2004).

From a social perspective, learning has been occurring collectively through interactions between individuals, teams, and the organisation as a whole. Social learning theory has been highlighting that shared experiences have been driving learning in daily work (Dutton et al., 2014). Single-loop, double-loop, and triple-loop learning are offering different levels of insight, from correcting mistakes to challenging core assumptions. In PBOs, addressing knowledge fragmentation is requiring embracing these deeper levels of learning and fostering a culture of engagement, reflection, and adaptability (Brandi & Elkjaer, 2012).

In the fourth part the concept of organisational memory has been delved into. Huber, 1991 and Stein (1995) have been highlighting that organisational memory is not merely a passive

repository of past knowledge; it is requiring active engagement through social interactions and group dynamics to be effectively being utilised. Spender's (1996) framework has been providing a detailed classification of organisational memory, dividing knowledge into conscious knowledge (individual explicit), automatic knowledge (individual tacit), objectified knowledge (social explicit), and collective knowledge (social tacit), as shown in table 1 and figure 4. This framework has been helping to identify the different types of knowledge being used and accessed within an organisation.

Bhandary and Maslach (2018) have been expanding on this by stressing the need for a clear organisational strategy and identity to ensure long-term storage and retrieval of organisational memory, safeguarding its relevance over time. Olivera (2000) has been addressing the complexity being involved in codifying knowledge to a level that is allowing it to be a standalone and understandable, emphasising that such detailed documentation is often challenging to achieve. In contrast, Chiva and Alegre (2005) have been arguing that accessing specific knowledge from organisational memory is requiring a social approach, particularly for person-centred, tacit knowledge that is best being shared through direct interactions.

While the effective application of organisational memory has been preventing repeated mistakes and promoting continuous learning, Klein et al. (2007) have been arguing that holding onto outdated or irrelevant knowledge can be hindering an organisation's ability to adapt to new circumstances. Thus, organisational forgetting has become a crucial part of the adaptation process, allowing the organisation to shed obsolete knowledge and to make room for new insights (Bhandary & Maslach, 2018). This dual nature of organisational memory has been underscoring the need for balance, recognising both its benefits and challenges, particularly in dynamic project environments.

In the fifth part the dynamics of organisational memory have been examined through four key processes that have been facilitating or hindering learning and decision-making. Pattern Recognition has been shaped through social interactions and codified knowledge, enabling employees to identify recurring themes from past experiences and allowing relevant knowledge to be applied to new challenges. This has been aligning with Bandura's social learning theory (1971) which has been emphasising that individuals are learning patterns by observing others, creating cognitive shortcuts for problem-solving. However, as Fortwengel and Keller (2020) have been noting, over-reliance on familiar patterns has been leading to "organisational path dependence," where outdated solutions are repeatedly applied. Integrating diverse knowledge sources and digital tools has been mitigating this risk by enriching organisational memory, ensuring pattern recognition will be remaining an adaptive asset.

Competing memories are complicating decision-making as employees are recalling conflicting or outdated experiences, leading to biases like anchoring and the application of obsolete knowledge (Valle et al., 2019). Levitt and March (1988) single- and double-loop learning concepts are showing how repetitive solutions can be reinforcing outdated responses, risking misalignment with changing contexts. Knowledge audits and AI-driven systems are addressing these challenges by filtering relevant information and supporting knowledge validation in social interactions.

Emotional Triggers have been adding depth to organisational memory, as shared emotions are influencing how employees are interpreting and recalling information. Positive emotions linked to successful projects have been reinforcing best practices within organisational memory, as shown by Barsade and Gibson (2012), while shared emotional experiences have been fostering a safe environment for implicit knowledge exchange, as seen in COPs (Almeida & Kogut, 1999). However, emotions have also been biasing recall, leading employees to idealise or criticise past experiences, which has been affecting decision-making. Balancing emotions in organisational memory has been essential to avoid skewed responses.

Memory Consolidation has been crucial for transforming short-term insights into long-term organisational memory. In organisational contexts, rest periods have been supporting this consolidation, allowing knowledge to solidify (Diekelmann and Born, 2010). Continuous exposure, particularly in demanding environments, has been disrupting consolidation. Sparrow et al. (2011) have been cautioning against transactive memory overload, where reliance on accessible digital data may be hindering deep internalisation. Structured rest periods have been allowing employees to retain and apply knowledge effectively, enhancing the organisation's overall memory and learning capacity.

In essence, the theoretical background has been demonstrating that learning in project-based organisations is a complex social phenomenon rather than a simple linear process of knowledge capture. Social learning practices have been acting as key mechanisms for accessing, sharing, and applying knowledge from organisational memory through various activation pathways. Pattern recognition, competing memories, emotional triggers, and memory consolidation have been collectively shaping this process. This literature review has been providing a foundation for the interview analysis and workshop evaluation. Using , Spenders' (1996) framework of organisational memory seen table 1 and figure 4, the workshops and interview analysis have been examining how conscious, automatic, objectified, and collective knowledge are being utilised, enabling a deeper understanding of knowledge-sharing processes in group settings.

This approach has been establishing a clear method for exploring the interconnectedness of social learning, organisational memory, and organisational learning, as well as the impact of social learning practices on organisational memory. It has been paving a clear path for practical exploration of these interconnections in the chapters that follow.

4. Interview Analysis

In this chapter the results gathered from 10 semi-structured interviews, aiming to understand the current interconnectedness of social learning, organisational learning, and organisational memory within a project-based organisation, particularly during the tender phase will be presented. Employees from Count & Cooper have been participating in these interviews.

The chapter has been organised as follows: it begins with background information about the interview participants. Next, is the analysis of the inductively derived themes, Technical, Social, and Organisational synthesised from the data. Following is the analysis of each theme to examine the interconnectedness between social learning, organisational memory, and organisational learning in practice. The chapter is concluded with a summary of the key findings.

4.1. Interviewee details

Following the outline of the methodology, participants have been selected based on their involvement in the tender phase. These participants have been bringing a range of experience, from one to 20 years, along with varying tenures within the company. This variation has been providing insights into how experience is influencing the use of organisational memory during the tender phase. Such diversity has been offering a broad view of the processes involved, capturing a spectrum of practices and challenges. Table 2 presents a detailed overview of the participants, including their roles and years of experience.

The interview guide in Appendix A is addressing key areas related to the use of organisational memory, common social learning practices in tenders, and the influence of tenders on knowledge and learning. The semi-structured format has been allowing flexibility to explore these topics in greater depth, depending on participants' responses. The study is including 10 interviews, each lasting approximately one hour. Following the interviews, the conversations have been transcribed. To ensure validity and reliability, participants have been reviewing their interviews and have been verifying that the transcripts are accurately reflecting their views and opinions.

Table 2 List of Participants Interviewed for the Semi-structured Interviews

Number	Job Title	Experience with tenders	Time in company
I	Project Analyst	± 1 years	± 1 year
II	Team Lead	± 4 years	± 5 years
III	Project Lead	± 6 years	± 2 years
IV	Team Lead	± 2 years	± 4 years
V	Project Analyst	± 2 years	± 1 year
VI	Sr. Project Lead	± 5 years	± 1 year
VII	Sr. Project Lead	± 20 years	± 9 years
VIII	Team Lead	± 6 years	± 5 years
IX	Project Lead	± 1 year	± 6 years
X	Consultant	± 4 years	± 1 year

4.2. Thematic Analysis and Categorisation of Interview Data

The thematic analysis of the interview data is following a three-tiered coding process of open, axial, and selective coding, to ensure a thorough, systematic examination. Using Atlas.ti, the data has been categorised to provide an overview of relevant factors related to organisational memory, social learning practices, and learning within tenders and the organisation.

The open codes are revealing connections between text fragments on organisational memory, social learning practices, and organisational learning. Due to the interwoven nature of these concepts, where organisational memory is underpinning social and organisational learning, categorising them independently has been proven challenging. An inductive approach has been used to develop 10 axial codes and three overarching domains Technical, Social, and Organisational based on conceptual similarities within the data. These domains have been providing a nuanced framework for interpreting the interview data and capturing the interconnectedness of the thesis's main concepts.

Each domain has been offering a distinct lens for understanding the findings. In the Technical domain has been addressed how the digital form of knowledge has been formalised and stored, highlighting the organisation's information systems. In the Organisational domain the formal processes and strategies have been represented for accessing and using organisational memory, as well as how the dynamic nature of project-based organisations has been effecting knowledge retention and transfer. Finally, in the Social domain the informal knowledge-sharing practices and interpersonal interactions, extending beyond formal structures to capture social learning's influence on organisational memory have been emphasised. Together, these domains have been enabling a cohesive view of how organisational memory is being created, shared, and applied through social learning and used for organisational learning, accommodating the overlapping and interconnected aspects of the main theoretical concepts.

Figure 6 is illustrating the frequency with which each axial code has been mentioned by the interviewees. The table is listing axial factors in rows and interview numbers in columns, with numbers representing the discussion frequency for each code. This layout has been providing an overview of the interconnectedness and prominence of axial codes across the interviews.

	Co-Occurrence	Organisational			Social						Technical	
		O.1 Barriers to Learning and Knowledge Utilisation	O.2 Formal modes of Knowledge Sharing and Learning	O.3 Impact of Team Dynamics on Learning	S.1 Approachability Culture	S.2 Informal modes of Knowledge Sharing and Learning	S.3 Learning by Doing and Using	S.4 Mentorship-driven learning	S.5 Structured and Initiative-Based Learning and Knowledge Sharing	S.6 Training Gaps in Onboarding and Ongoing Development	T.1 AI Use	T.2 Digital System Use
Organisational	O.1 Barriers to Learning and Knowledge Utilisation	0	12	33	2	18	5	3	7	5	1	22
	O.2 Formal modes of Knowledge Sharing and Learning	12	0	10	2	2	6	2	7	4	0	12
	O.3 Impact of Team Dynamics on Learning	33	10	0	3	17	4	5	4	3	1	12
Social	S.1 Approachability Culture	2	2	3	0	18	5	4	3	1	0	3
	S.2 Informal modes of Knowledge Sharing and Learning	18	2	17	18	0	8	9	8	3	2	10
	S.3 Learning by Doing and Using	5	6	4	5	8	0	4	2	3	0	2
	S.4 Mentorship-driven learning	3	2	5	4	9	4	0	4	2	0	3
	S.5 Structured and Initiative-Based Learning and Knowledge Sharing	7	7	4	3	8	2	4	0	0	0	1
	S.6 Training Gaps in Onboarding and Ongoing Development	5	4	3	1	3	3	2	0	0	0	2
Technical	T.1 AI Use	1	0	1	0	2	0	0	0	0	0	1
	T.2 Digital System Use	22	12	12	3	10	2	3	1	2	1	0

Figure 6 Co-occurrence of Axial codes in interviews (By Author)

4.3. Identification of Emerging Themes and Factors

The following sections are elaborating on each theme and the factors associated with each axial code. The themes being identified in the empirical study are providing a foundation for understanding the interconnected relationships between the concepts and the relevant factors from the literature review. This mapping is aiding in formulating a strategy to address the main research question. Overlaps between factors are selectively being categorised within the relevant codes and themes. Each theme is encompassing multiple findings from the empirical research, with axial codes underlying each factor, as shown in figure 7.

This exploration is offering insights into the specific factors being related to the use of organisational memory, applied social learning practices, and the processes through which learning is occurring. By examining each theme individually, the nuanced relationships and implications for the main research question are being explored.

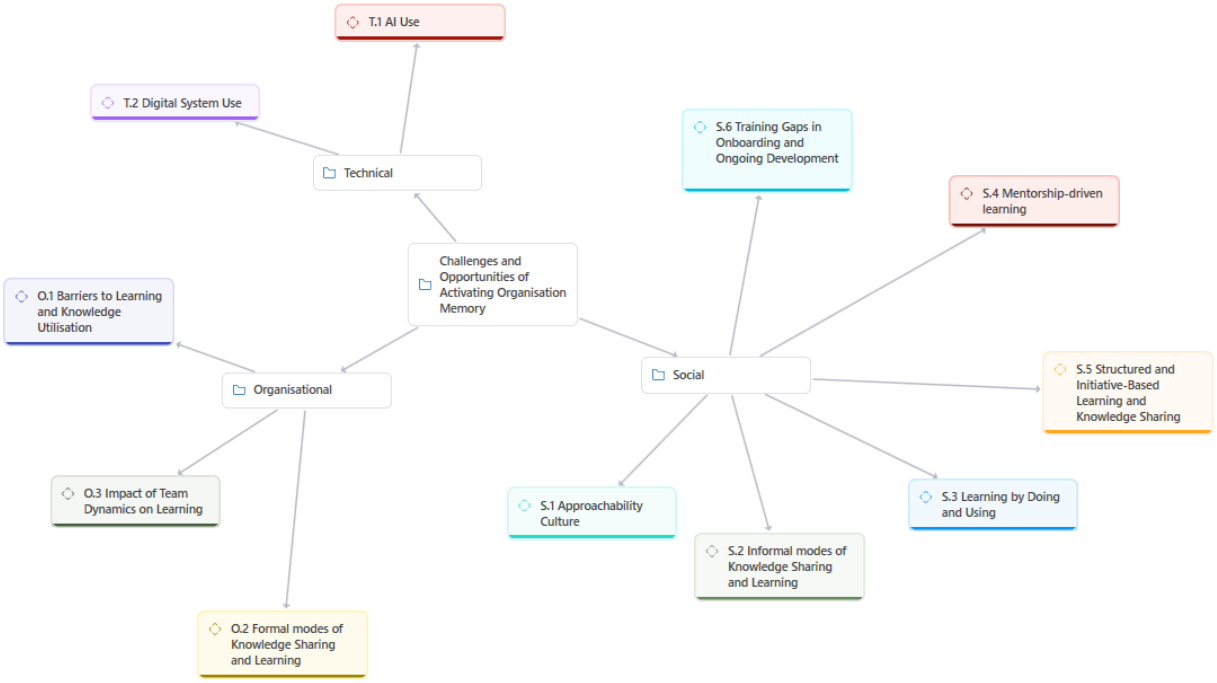

Figure 7 Main Theme's overview (By Author)

4.3.1. Domain Technical

In recent years, the construction sector has increasingly been integrating information systems to enhance sharing and learning processes across projects and within organisations. These systems are centralising information, thereby improving the accessibility of organisational memory. In the technical domain tools for comparing and locating information, as well as the growing interest in using AI to navigate databases have been explored. Interviewees have been highlighting challenges in evaluating the quality and relevance of existing information. Figure 8 presents an overview of the relationship between the axial codes and the open codes

being used, while figure 9 shows the frequency of open codes in the rows being related to the technical domain as being stated per interviewee as can be seen in the columns.

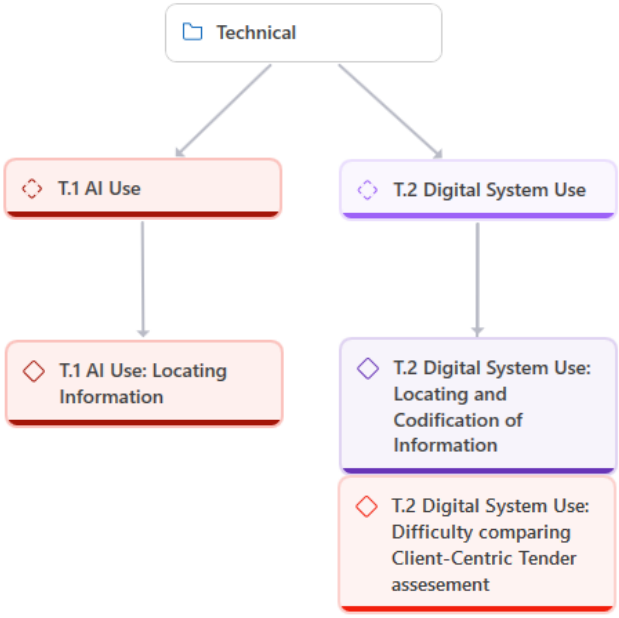

Figure 8 Technical Theme and Factors (By Author)

	1: I	2: II	3: III	4: IV	5: V	6: VI	7: VII	8: VIII	9: IX	10: X	Totals
T.1 AI Use: Locating Information			2		1		1	1	1		6
T.2 Digital System Use: Difficulty comparing Client-Centric Tender assesement	4		1		1	1	3	1			11
T.2 Digital System Use: Locating and Codification of Information	4	3	2	3	4	3	2	7	3	1	32
Totals	8	3	5	3	6	4	6	9	4	1	49

Figure 9 Frequency of Technical Open codes per interviewee (By Author)

AI use

Five participants have been mentioning AI tools being integrated into the company's workflow, particularly in relation to accessing and managing objectified knowledge associated with tenders in the company's databases. AI is being viewed as having a potential to improve the access and retrieval of objectified knowledge from internal databases. This is due to users' reliance on their familiarity and or unfamiliarity with the databases when interacting with and locating objectified knowledge. Newcomers are having more difficulties in searching the database. As Interviewee VIII has been noting, *''Currently, it is being explored how AI can assist in using databases, as it is not always easy to trace where information is stored. Navigating the database and familiarity with it, depends on how often you interacted with it.'' (Team Lead, ID 8:10) similar noted by (Project Lead ID, 3:16) & (Project Analyst, ID 5:21).*

Despite the growing role of AI, employees have continually to rely on the experienced colleague's automatic knowledge, particularly when dealing with information that had been needing more context. This is suggesting a balance between the use of AI and human collaboration. As Interviewee III has been explaining, *''In practice, we approach colleagues to see if they have the experience about it. We ask them if there is any relevant text or background*

information available instead of using an AI." (Project Lead, ID 3:17) similar noted by (Project Analyst, ID 5:5).

The AI tools being employed have primarily being used to gather information by generating summaries based on the objectified knowledge available in the database. These tools are being perceived as beneficial for quickly retrieving information, potentially addressing challenges that have been arising from infrequent database use and the heavy reliance on users' familiarity with the system. However, there is a recognition among participants that human interactions will be remaining essential for achieving a deeper understanding and a contextual insight by using the automatic knowledge.

Digital System Use

Employees have frequently been expressing the need for a more structured approach to post-tender client assessments. The absence of objectified knowledge about the standardised processes for classifying and analysing post-tender evaluations has been resulting in an inconsistent identification of the strengths within each tender submission.

Although employees are often engaging in informal comparisons between their current tenders and previous ones based on automatic knowledge, there is no objectified knowledge about the structuring for comparing client assessments. As Interviewee I has been remarking, *''You do notice that colleagues are comparing it themselves. I did this on this project, we did that on this project. [...] But to my knowledge, there is no such comparison. We did a tender on this specific infrastructure in the past, but we did not compare this tender. [...] In this way, we haven't looked at the tender process yet." (Project Analyst, ID 1:17) similar noted by (Sr. Project Lead, ID 6:6).*

This is further being challenged by the variation in evaluation methods being used by different clients, making the process inconsistent. The lack of a framework for determining which knowledge should be codified, or how to assess the quality of the tender products, is making it harder to ensure that essential information is quickly being accessible, stored, effectively shared and made into objectified knowledge. As Interviewee VIII has been explaining, *''Currently, there is no framework for determining which knowledge should be codified, the relevance and quality of it, and if it already exists. It is now based on how the tender was assessed by the client and which bids performed well, used as an indication of whether the knowledge contained is good. However, it raises the question of whether certain aspects have the same score or not. Besides this, it is difficult to compare tenders with each other due to different evaluation forms, standards, and methods used by the clients." (Team Lead, ID 8:9) similar noted by (Project Lead, ID 3:15).*

As a result, there has been uncertainty about whether the objectified knowledge being gained from previous tenders is relevant, up-to-date, or applicable to new tenders. Employees have been expressing a desire for more structured, in-depth evaluations of successful and unsuccessful tenders, in order to replicate the factors that have been contributing to positive outcomes.

4.3.2. Domain Social

The Social Domain is playing a crucial role in fostering learning and knowledge sharing within the organisation. In this section key elements such as Learning by Doing, Mentorship-driven learning, and the use of both Formal and Informal Knowledge Sharing practices are being

explored. The interviews with professional in the industry have been shedding light on the importance of these factors in developing organisational memory and the gaps in formal training, especially during onboarding and ongoing development.

Quotes from interviews are being used to illustrate how informal, everyday interactions, such as spontaneous problem-solving or casual discussions, have been bridging the gaps being left by formal training methods. Figure 10 provides a breakdown of the relationship between the axial codes and used open codes and figure 11 shows the frequency of open codes in the rows being related to the Social domain as being stated per interviewee as can be seen in the columns.

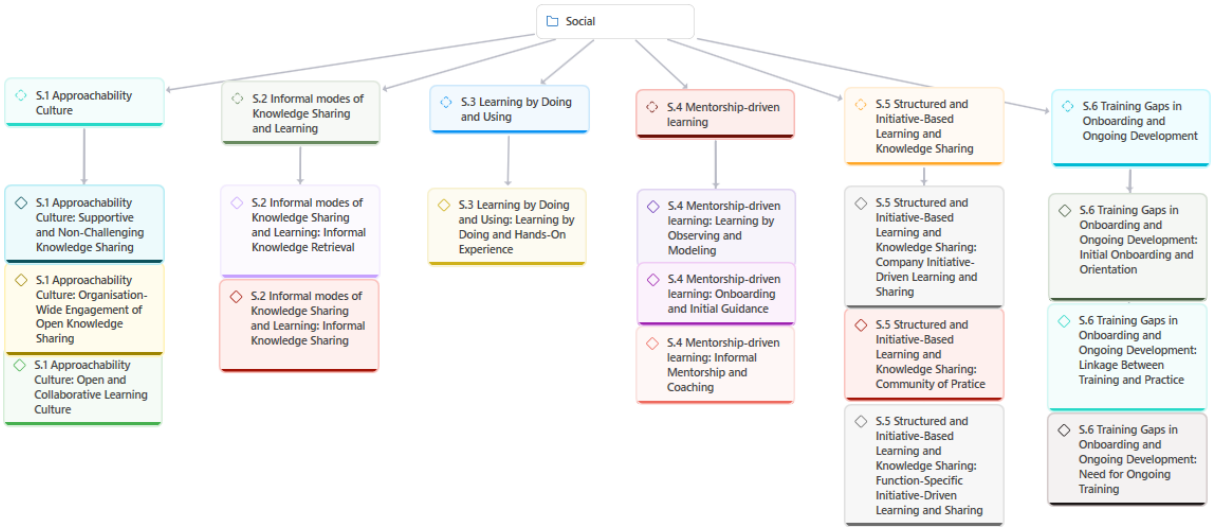

Figure 10 Social Theme and Factors (By Author)

	1: I	2: II	3: III	4: IV	5: V	6: VI	7: VII	8: VIII	9: IX	10: X	Totals
S.1 Approachability Culture: Open and Collaborative Learning Culture	4			1		1		2		1	9
S.1 Approachability Culture: Organisation-Wide Engagement of Open Knowledge Sharing	7	1			2	1		3			14
S.1 Approachability Culture: Supportive and Non-Challenging Knowledge Sharing					1				1		2
S.2 Informal modes of Knowledge Sharing and Learning: Informal Knowledge Retrieval	10	1	2	2	2	5	2	5	4	2	35
S.2 Informal modes of Knowledge Sharing and Learning: Informal Knowledge Sharing	7	3	6	3	5	3	4	3	9	2	45
S.3 Learning by Doing and Using: Learning by Doing and Hands-On Experience	6	2	5		1	1	2	5	1	2	25
S.4 Mentorship-driven learning: Informal Mentorship and Coaching	5		1		3						9
S.4 Mentorship-driven learning: Learning by Observing and Modeling	4		3		2		1	1	2		13
S.4 Mentorship-driven learning: Onboarding and Initial Guidance	1	1	1		1						4
S.5 Structured and Initiative-Based Learning and Knowledge Sharing: Community of Pratice	5				2				2		9
S.5 Structured and Initiative-Based Learning and Knowledge Sharing: Company Initiative-Driven Learning and Sharing	2	1	1			1		2		1	8
S.5 Structured and Initiative-Based Learning and Knowledge Sharing: Function-Specific Initiative-Driven Learning and Sharing		1	1		1				2		5
S.6 Training Gaps in Onboarding and Ongoing Development: Initial Onboarding and Orientation	1	1	2		2			1	1		8
S.6 Training Gaps in Onboarding and Ongoing Development: Linkage Between Training and Practice		1	3						3		7
S.6 Training Gaps in Onboarding and Ongoing Development: Need for Ongoing Training					2				3		5
Totals	52	12	25	6	24	12	9	22	28	8	198

Figure 11 Frequency of Social Open codes per interviewee (By Author)

Approachability Culture

Respondents are frequently describing the openness of the company's organisational culture, where asking questions and learning from one another are being integral aspects of daily operations. This openness is primarily facilitated through social interactions, promoting a supportive environment for knowledge sharing and activating the organisational memory. The culture encourages both conscious, automatic or collective knowledge exchange, with inquiry being a central practice. As Interviewee IX has been stating, *''Yes, definitely it is an open culture. You won't feel challenged by a tender manager when he is laying out a new project and you ask him questions.'' (Project Lead, ID 9:12) similar noted by (Project Analyst, ID 5:1).* This is suggesting that the company fosters an environment in which employees both starters and employees with longer tenures in the company are being encouraged to raise inquiries without fear of criticism or judgment.

The organisation is actively cultivating a setting where team members are feeling comfortable seeking clarification or guidance, which is being fundamental to fostering collaboration and curiosity. This question-friendly culture is extending beyond individual teams, encompassing the entire organisation. Employees from different departments or tender teams are feeling at ease when approaching colleagues for advice, support, or knowledge. Interviewee I has been remarking, *''If I am working with my tender team on a particular tender, it is just as easy to go to a colleague working on a different tender to discuss certain matters or ask questions.'' (Project Analyst, ID 1:40) similar noted by (Consultant, ID 10:5).* The openness has been reducing barriers between teams, encouraging cross-functional communication and collaboration.

In addition to promoting openness, this organisational culture has been contributing to the development of a learning environment. Employees are not only being encouraged to share knowledge but are also being motivated to continuously enhance their skills through these interactions as experienced by starters. The willingness to share information across teams facilitates a more inclusive and collaborative atmosphere, reducing hesitancy in seeking assistance and contributing to the collective knowledge. This is being further supported by the observation of Interviewee V, who has been noting, *''You can ask any question, and it's addressed respectfully. This creates a culture where people remain curious and aren't afraid to ask questions, which helps keep the learning process alive. It's a kind of open, question-friendly culture, making it easy to approach people.'' (Project Analyst, ID 5:1) similar noted by (Team lead ID 4:1).* This statement is suggesting that the culture is fostering ongoing learning, where the exchange of knowledge will be remaining active and dynamic from both starters and employees with longer tenures in the company.

Informal modes of Knowledge Sharing, Retrieval, and Learning

Informal knowledge sharing and retrieval are holding a role in the organisation's operations. Rather than relying on learning solely from objectified knowledge in databases or structured knowledge sharing sessions or trainings, knowledge is often being disseminated and activated through spontaneous, unstructured interactions. These are including casual conversations, sparring sessions, and interpersonal exchanges of automatic and collective knowledge that are taking place naturally among all colleagues being involved in tenders and throughout the broader organisation.

Employees frequently looking for experienced colleagues with relevant automatic or collective knowledge, finding that informal discussions are providing valuable insights and practical advice. This mode of knowledge exchange is often being seen as advantageous for clarifying processes, obtaining immediate feedback, and contributing to personal and professional development. Interviewee IX has been stating, *''Both. Yes, so I use a lot of SharePoint and everything that is on SharePoint about tenders. Certainly, but I also call, for example, a colleague who has a lot of experience with tenders.'' (Project Lead, ID 9:38) similar noted by (Project Analyst, ID 5:15).*

Learning by Doing and Using

The company is adopting a supportive approach to learning, allowing all employees to choose their preferred learning styles or use tools and online courses to explore new learning styles. However, specific learning styles are not being prescribed or formalised by the organisation; instead, they are being shaped by individual initiatives. As Interviewee III has been noting, *''And which learning and workstyle you use best, that is ultimately from your own initiative. [...] But that is not from the organisation itself.'' (Project Lead, ID 3:5) similar noted by (Team Lead, ID 8:5).*

Following the initial training being provided by the company, starters are relying primarily on hands-on experience and learning by doing to further develop their skills. While the organisation is supporting all employees in pursuing online courses relevant to their roles, the initiative for learning will be remaining with the individual. As Interviewee IX has been remarking*, ''I need to practice to really understand something. [...] So, I have to do it, especially with tenders. I need to learn through hands-on experience and along the way. It's really up to the individual. While training is offered, [...] it's up to each person to take notes and apply the lessons. Whether or not you internalise and use what you've learned is a personal responsibility.'' (Project Lead, ID 9:34) similar noted by (Project Analyst, ID 1:4).*

Employees have been adopting their own style and pace of learning, resulting in varied approaches to conscious and automatic knowledge retention and application. Ultimately, the internalisation of knowledge is the responsibility of the individual.

Mentorship-driven learning

Participants are highlighting the importance of informal learning and the role of mentorship in navigating both project-related tasks and broader career development. During the onboarding of starters, they are being paired with employees with longer tenures in the company as senior project leads who are guiding them through key work processes and essential objectified and collective knowledge, including the unspoken rules and best practices. As Interviewee V has been noting, *''There's coaching throughout the entire process. For instance, I've sometimes struggled with writing measures, how to get to the core quickly, and what works best with graphics. I've received a lot of help and advice from tender management and my team lead in these areas.'' (Project Analyst, ID 5:31) similar noted by (Project Analyst, ID 1:35).*

While formal buddy systems and mentorship programmes are existing, much of the mentorship is occurring informally, with senior colleagues offering advice and coaching on an ad-hoc basis. These interactions are often focussing not only on specific job tasks but also on broader career development and the acquisition of competencies. Interviewee I has been remarking, *''But what is interesting is that you actually learn from colleagues. For example, my colleague, who*

has guided me very intensively, picks up documents very quickly. You then notice that you start doing the same. So, you immediately think, 'Hey, wait, I saw her do that last time,' and you begin to replicate it." (Project Analyst, ID 1:16) similar noted by (Project Lead, ID 3:32).

Learning in this environment appears to occur organically through daily interactions, observations, and "learning by doing," complementing more formal training programmes. This is allowing employees to be gradually assimilate into the company culture, acquiring nuanced skills and behaviours through a combination of imitation, intuition, and informal and formal mentorship.

Structured and Initiative-Based Learning and Knowledge Sharing

The company is employing both formal and informal mechanisms for knowledge sharing, which are integral to the exchange of automatic and objectified knowledge as lessons being learned and experiences being gained during tenders. While group discussions and stand-up events are regularly being organised, there is increasing interest in implementing more structured and frequent knowledge-sharing sessions of automatic knowledge being tailored to specific functions. These sessions would be allowing employees to share updates and insights more effectively. As Interviewee III has been noting, *''During the tender process, it's also useful to have a separate group, comprised only of delivery managers, to discuss similar issues or share experiences. This helps in exchanging valuable insights and lessons learned. For the first time, we're planning a session in August, exclusively for delivery managers." (Project Lead, ID 3:21) similar noted by (Project Lead, ID 9:26).*

In addition to formal structures, employees have been initiating knowledge exchange events, motivated by a desire to share automatic knowledge as personal experiences and insights. Interviewee I has been explaining, *''Yes, participation is voluntary, and the invitation is extended to everyone. It's entirely up to you whether you're available or not. [...] We aim to ensure these mistakes aren't repeated in future tenders. However, this isn't part of our standard process; it's an initiative we started, primarily led by a colleague who's been with the company for a long time. While it may seem obvious, she felt it would be valuable for many people to hear and share this information." (Project Analyst, ID 1:28) similar noted by (Team Lead, ID 8:14).* These initiatives have been providing valuable opportunities to gain experience from each other and to retain and to build objectified and collective knowledge for and across teams.

Moreover, the company has been establishing communities of practice having the fresh perspectives of newer employees with the deep expertise of the more experienced members, to ensure ongoing learning within specific sectors of the construction industry. These communities are not only helping preserve collective knowledge but are also allowing teams to build on the collective knowledge of past experiences, fostering a culture of continuous improvement.

Training Gaps in Onboarding and Ongoing Development

Employees, both starters and those with a longer tenure in the company, have frequently been discussing the gaps in tender-related training and the challenges they are facing in retaining and applying objective and collective knowledge over time. During onboarding, standard tender training sessions and workshops are being provided. However, employees are reporting that the conscious knowledge being gained during these sessions is often becoming outdated or insufficient when they are being assigned to tender's months or even years later. As

Interviewee V has been stating, *''I think there are some trainings that cover best practices, and these are maintained and included in tender training sessions. However, they mostly occur during the onboarding of new employees. I believe these should happen more frequently, perhaps as refreshment courses or something similar. Not just a basic overview, but something deeper.'' (Project Analyst, ID 5:23) similar noted by (Project Lead, ID 9:29).* Refresher courses for existing employees would be enabling them to reactivate the conscious knowledge gained from more recent tenders since their initial training.

The company is maintaining a tender manual, which is incorporating lessons learned and best practices. However, employees have been noticing that valuable insights from tenders are not being consistently linked back to the tender manual or related presentations, resulting in gaps in the objectified and collective knowledge. Interviewee III has been remarking, *''When I became a delivery manager, I received a presentation from several colleagues. They explained the basic principles, how we approach our work, and what is expected. However, this orientation was only done once. The lessons learned and the insights gained afterward are not consistently revisited or linked back to that initial presentation.'' (Project Lead, ID 3:24) similar noted by (Team Lead, ID 2:8).*

Although the objectified knowledge in the tender manual is periodically being updated, most of the employees are typically consulting it only during their initial onboarding, rather than being revisiting it regularly. This limited engagement with updated information and resources beyond the onboarding phase is resulting in employees not being fully aware of the evolving objectified knowledge as best practices and lessons learned over time.

4.3.3. Domain Organisational

The structure and strategy of an organisation is influencing its learning capabilities and adaptability. In this section is being explored how these factors are shaping organisational learning and memory. Based on interviews with industry professionals, the theme has been delving into the impact of team and tender dynamics on learning processes and evaluation, as well as the role of formal mechanisms for knowledge sharing, retrieval, and utilisation. It is also examining barriers to learning, such as misalignment between organisational strategy and learning objectives. Figure 12 illustrates the interplay between the axial codes and the open codes used and figure 13 shows the frequency of open codes in the rows being related to the organisational domain as being stated per interviewee as can be seen in the columns.

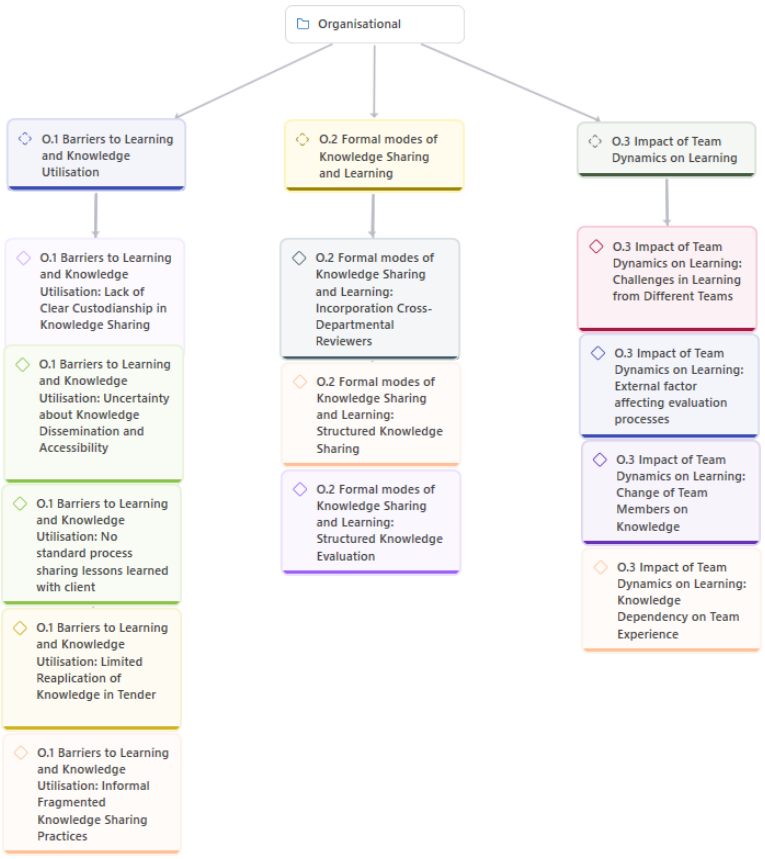

Figure 12 Organisational Theme and Factors (By Author)

	1: I	2: II	3: III	4: IV	5: V	6: VI	7: VII	8: VIII	9: IX	10: X	Totals
O.1 Barriers to Learning and Knowledge Utilisation: Informal Fragmented Knowledge Sharing Practices	6	2	17	3	2	1	2		4	2	39
O.1 Barriers to Learning and Knowledge Utilisation: Lack of Clear Custodianship in Knowledge Sharing		2			1		2	1	1		7
O.1 Barriers to Learning and Knowledge Utilisation: Limited Reaplication of Knowledge in Tender	1	3	5	3		2	7	2	3		26
O.1 Barriers to Learning and Knowledge Utilisation: No standard process sharing lessons learned with client			1	1		1					3
O.1 Barriers to Learning and Knowledge Utilisation: Uncertainty about Knowledge Dissemination and Accessibility	2	1	2	2	4	2	1	2	3	1	20
O.2 Formal modes of Knowledge Sharing and Learning: Incorporation Cross-Departmental Reviewers	2		1	1	1			1	1	1	8
O.2 Formal modes of Knowledge Sharing and Learning: Structured Knowledge Evaluation	3	1	3		2	2		1	5		17
O.2 Formal modes of Knowledge Sharing and Learning: Structured Knowledge Sharing	5	2	7	1	5	1	1	4	3		29
O.3 Impact of Team Dynamics on Learning: Challenges in Learning from Different Teams		1	12				1				14
O.3 Impact of Team Dynamics on Learning: Change of Team Members on Knowledge	1	1	1			1	2	1	2	2	11
O.3 Impact of Team Dynamics on Learning: External factor affecting evaluation processes	1		6		4	2	1	1	8	1	24
O.3 Impact of Team Dynamics on Learning: Knowledge Dependency on Team Experience	3	2	4	2	4	1	3	3	3	3	28
Totals	24	15	59	13	23	13	20	16	33	10	226

Figure 13 Frequency of Organisational Open codes per interviewee (By Author)

Barriers to Learning and Knowledge Utilisation

While learning is occurring throughout the tender process, automatic and conscious knowledge as best practices or insights are being collected at the conclusion of tenders and is being stored as objectified knowledge in a database. Interviewees both starters and experienced, frequently have been highlighting the absence of a formalised process for systematically integrating objectified knowledge at the start of new tenders. Employees have been noting that they are often relying on informal, collective knowledge-sharing practices during the initial stages of new tenders, rather than drawing upon the objectified knowledge from previous tenders. As a result, much of the objectified knowledge being gained will be remained siloed as collective knowledge within certain individuals or being stored in databases that are not actively being used across the organisation. As Interviewee IX ha been remarking, *''We don't refer back to previous lessons learned sessions at the beginning of a new tender, but we share our experiences in the first meetings or informally at the coffee machine.'' (Project Lead, ID 9:11) similar noted by (Project Lead, ID 3:8).*

The lack of an objectified knowledge-sharing process is causing teams to be relying on collective knowledge sharing, depending on the interactions between colleagues, which could be leading to overlooking valuable insights. This is causing repeated learning of the same objectified or collective knowledge, reducing efficiency. Employees are recognising the importance of capturing automatic, conscious and collective knowledge in lessons-learned sessions and in implementing their findings, but time pressures are often preventing them from accessing or consulting the objectified knowledge. Interviewee III has been stating, *''It should be that way, but we haven't implemented it. We often say at the start of a project that we'll learn from lessons learned in the past. However, in my experience, this hasn't been done concretely.'' (Project Lead, ID 3:9) similar noted by (Sr. Project Lead, ID 7:6).*

Moreover, interviewees both newer employees and with longer tenures in the company, have been expressing the unclear responsibility for managing and sharing these insights, leading to a diffusion of responsibility and exacerbating the issue. It is being unclear what happens to the objectified knowledge, where it can be accessed, or how it is being reintegrated into the organisation. Interviewee V has been observing, *''Yes, I think the lessons learned are documented and stored somewhere. I believe that's the case, but I'm not sure where they are kept. I also don't know how widely they are shared. I assume there are some kinds of goals, but I don't know exactly where to find them.'' (Project Analyst, ID 5:17).* Interviewee VIII has been adding, *''It is important to know which knowledge needs to be documented and who should be the custodian of this knowledge.'' (Team Lead, ID 8:17).*

Formal modes of Knowledge Sharing, Retrieval, and Learning

The organisation has been implementing a range of formal practices for the systematic retrieval and sharing of automatic and conscious knowledge. These practices are particularly evident during the tender process. Regularly scheduled activities such as daily stand-ups, weekly project management meetings, brainstorming sessions, and lean planning workshops providing structured opportunities for knowledge exchange. These formalised sessions are focussing on discussing progress, addressing challenges, and facilitating collaboration across teams. As being remarked by Interviewee V, *''In addition, we have daily stand-ups, at least on the tender I'm currently working on. During these first fifteen minutes of the day, we discuss what everyone will be working on. It's a pleasant way to work because it helps us track progress on our products.'' (Project Analyst, ID 5:6) similar noted by (Project Analyst, ID 1:12).* However,

despite the structured nature of these formal settings, some interviewees have been noting that certain opportunities for automatic and conscious knowledge sharing within communities of practice have become less prioritised over time, leading to a potential reduction in their overall effectiveness.

The organisation is employing structured internal review processes during the transition between different phases of the tender process. Feedback has been gathered from multiple sources, including experienced individuals not directly being involved in the tender as well as external consultants. The inclusion of external reviewers has been providing fresh perspectives and objective insights, using the conscious and collective knowledge, which are valued for their contribution to refining and improving the tender outcomes. Being noted by Interviewee VIII, *''In the transitions of the different phases, brainstorming sessions and reviews are done by the team but also by externals to have an outsider's perspective.'' (Team Lead, ID 8:16) similar noted by (Project Lead, ID 3:13).*

In addition to ongoing reviews, the organisation is conducting structured end evaluations to assess the overall effectiveness of the tender process. After each tender, an evaluation is being undertaken, during which the team reflects on key aspects such as process efficiency, collaboration, and product quality. As being highlighted by interviewee I, *''Yes, except for the lessons learned, that is something we do as standard after we have completed a tender.'' (Project Analyst, ID 1:22) similar noted by (Project Lead, ID 9:4).* The aim is to evaluate what has been working well, to identify areas that are requiring improvement, and to adjust for future tenders. This process is not only retrospective but also forward-looking, but objectified knowledge of lessons learned from previous tenders is intended to be implemented in future tender initiatives.

Impact of Team Dynamics on Learning and Evaluation

Employees have frequently been identifying challenges in fostering collaboration and retaining knowledge during tender processes. While the organisation has been establishing procedures, there is a noticeable lack of structured opportunities for reflection, knowledge sharing, and collaboration. As Interviewee III has been noting, *''At every phase of a tender, there should be a point where we sit together in groups. Tender managers and delivery managers need to signal when they have a tender and when there's another one. This coordination should prompt us to organise not only the process for the tender itself but also the surrounding processes. The goal is to facilitate learning from each other. By doing so, we can share insights, strategies, and best practices, ensuring that we're not working in isolation but leveraging collective knowledge and experience to enhance our overall approach.'' (Project Lead, ID 3:12).*

Employees are often working in team isolation, with limited cross-departmental interaction, despite similarities in tender requirements. The high-pressure environment, characterised by tight deadlines and workload intensity, is resulting in a focus on immediate production rather than on learning and reflection. As Interviewee IX has been highlighting, *''Time is a constant constraint, and we're always busy. [...] We jumped straight into a new tender that had already been in progress for a few weeks, but nothing substantial had been done on it yet. [...] So, we had to hit the ground running again, immediately getting caught up in all the deadlines.'' (Project Lead, ID 9:8) similar noted by (Sr. Project Lead, ID 6:7).*

The organisation is struggling to balance the demands of immediate production with the need for structured knowledge-sharing practices. Even when automatic, conscious and collective knowledge is being shared, it is often being done only at the conclusion of a tender, which is limiting opportunities to apply or disseminate best practices during transitions between different tender phases or across tender teams.

Additionally, collective knowledge retention is being hindered by frequent team changes, as new members join ongoing tenders without adequate onboarding or the opportunity to gain experience from previous tenders. Although SharePoint is being available as an objectified knowledge repository, starters are often reluctant to use it, relying instead on informal interactions with colleagues. As Interviewee VII has been observing, *''In a team with new colleagues in the organisation, the level of relevant knowledge is relatively low and relies heavily on colleagues who have been with the company for a longer period.'' (Sr. Project Lead, ID 7:7) similar noted by (Team Lead, ID 8:11).*

4.4. The Interplay of Social Learning, Organisational Memory, and Learning

A thematic analysis of ten semi-structured interviews with tender professionals at Count & Cooper has been highlighting the interconnectedness of organisational memory, organisational learning, and social learning. Using an inductive approach, three overarching domains, Technical, Social, and Organisational have been developed directly from the data to capture the complexity of these interwoven concepts. These data-driven themes have been offering a practical framework for analysing the findings: in the Technical domain the focus has been on how knowledge is being formalised and stored, in the Social domain the informal, interpersonal knowledge-sharing practices has been captured, and in the Organisational domain the formal processes and strategies for accessing organisational memory has been addressed. Together, these domains are enabling a clearer understanding of how organisational memory is activated through social learning, how it is underpinning continuous and organisational learning, and how all three concepts are reinforcing one another to foster a dynamic learning environment.

4.4.1. The Interactions Between Organisational Memory and Social Learning

The process of social learning and organisational memory is being iterative and cyclical. Social learning practices such as mentoring, peer interactions, cross-departmental reviews, and casual discussions are not only drawing upon but are also feeding into organisational memory evident in both theme's '**S.2**: **Informal'** and **'O.2: Formal modes of Knowledge Sharing, Retrieval, and Learning'**. This memory is serving as a repository that will be guiding future decision-making and learning. Rather than being a static process, social learning continuously accesses and reinforces various levels of organisational memory, ensuring its relevance in the organisation's daily operations and interactions.

The interview data are revealing that these social learning practices are deeply embedded in the organisation's socio-cultural fabric. While they are allowing for the rapid exchange of both conscious, automatic and collective knowledge, the reliance on informal exchanges is often leading to fragmented retention. Interpersonal interactions as can be seen in '**S.2'** are being effective for providing context-specific insights, but are tending to bypass formal knowledge repositories, leaving gaps in the organisation's objectified knowledge. The data is indicating the role of the theme's **'T.1: AI Use'** and **'T.2: Digital Systems Use'** in accessing objectified knowledge yet is emphasising that these tools cannot fully be replacing the nuanced context-

rich understanding being gained through interpersonal interactions. This is underscoring the importance of integrating social learning practices with digital systems, using both conscious and collective knowledge to ensure that objectified knowledge will be remaining accessible and usable across the organisation.

Having informal interpersonal interactions to access organisational memory can also be posing challenges for long-term knowledge retention. Although these exchanges are promoting the development of conscious and collective knowledge, they may not always be converting into objectified knowledge, which is essential for ensuring continuity in organisational learning. The interview findings are underscoring the theme **'O.1: Barriers to Learning and Knowledge Utilisation'** that is arising when there is no systematic process for converting informal knowledge into formal, codified knowledge as can be seen in **'T.2'**. This issue is particularly being prevalent in project-based organisations, where teams will be disbanding after completing tenders or employees will be leaving the organisation as can be seen in theme **'O.3: Impact of Team Dynamics on Learning and Evaluation'**. Without systematic processes to codify and retain, the knowledge being shared during these informal exchanges '**S.2'**, valuable insights are risking being forgotten over time, creating gaps in organisational memory that are weaken its role as a foundation for future learning and decision-making.

4.4.2. Social Learning as a Bridge for Continuous Organisational Learning

Organisational learning is intrinsically linked to the dissemination and application of the knowledge stored in organisational memory, as it is being translated into actionable practices throughout the organisation. However, interviews have been revealing that gaps in formal knowledge-sharing mechanisms are often obstructing this process as seen in the theme of '**S.6: Training Gaps in Onboarding and Ongoing Development'**. While organisational memory is retaining both tacit and explicit knowledge for future decision-making, the interviews have been highlighting that insights are not always effectively being linked back to formal training or reference materials, such as the tender manual. The uncertainty of individuals 'being related to locating objectified and collective knowledge combined with unclear responsibilities for managing and retrieving organisational knowledge is exacerbating organisational learning as it is being connected to **'O.1'**. This is resulting in gaps in objectified and collective knowledge of the organisation.

Interestingly, interviewees have been noting that they have typically been consulting the tender manual during their initial onboarding but have been rarely revisiting these resources afterwards. This is suggesting that knowledge internalisation is often being a personal responsibility and initiative, leading to fragmented engagement with updated information and resources as being referred by theme '**S.3: Learning by Doing and Using**'. Bypassing objectified knowledge, the use of social learning practices to engage with the conscious and collective knowledge of colleagues for context-specific insights is serving as an alternative way as can been seen '**S.2'** into staying informed about the evolution of both objectified and collective knowledge over time, indirectly contributing to organisational learning through informal channels.

Social learning practices are therefore playing a role in bridging this gap by enabling access to conscious and collective knowledge to enhance organisational learning. This is showing that organisational learning must be extending beyond static repositories and be considering the human element, the collective knowledge retained in individuals' minds and being shared

through interactions. Yet, with structured processes to codify and integrate collective knowledge into the organisational routines of the theme **'T.2: Digital Systems Use'**, organisational learning may be remaining inconsistent, dependent on the informal and fragmented nature of social learning.

4.4.3. Dynamic Nature of PBOs on using Organisational Memory and Learning

The dynamic nature of project-based organisations (PBOs) as marked by shifting team compositions, high time pressures, and the rapid turnover of projects, is creating unique challenges for effectively using organisational memory and fostering continuous learning. Although formal processes like post-tender assessments are existing, interviewees have expressing uncertainty about where to find these documents or have been deprioritising their use due to time constraints and workload as being stated in the themes '**O.1: Barriers to Learning and Knowledge Utilisation'** and **'O.3: Impact of Team Dynamics on Learning and Evaluation'**. This has often been resulting in objectified knowledge remaining unused and failing to become part of the organisation's conscious knowledge. It is posing a risk to organisational learning, as valuable objectified knowledge may remain being siloed within databases and is not becoming part of the conscious knowledge of the organisation. The organisation is instead being depended on its collective knowledge as part of its learning cycle. Having frequent team changes or new members joining the organisation, could be resulting in teams in the need to relearn the same lessons repeatedly, reducing the overall effectiveness of organisational memory utilisation.

Organisational memory is operating at various levels, and while objectified knowledge is being stored in databases its effectiveness is being contingent upon codification and contextual understanding. The organisation has been adopting various social learning practices in order to use its objectified knowledge by exploiting its collective knowledge. The company's open and approachable culture is fostering an environment conducive to social learning through informal and formal knowledge exchanges as can be seen in the themes '**S.1: Approachability Culture**' and **'S.4: Mentorship-driven learning**'. Employees are feeling comfortable seeking advice across teams, which are reinforcing social learning and knowledge sharing. Having this supportive environment and approach to learning, wherein employees with longer tenures in the company are taking part in the mentorship program, are being essential to help starters explaining the unspoken rules and best practices of the organisation. This is supporting the continuous transfer of collective knowledge and conscious knowledge, when objectified knowledge is lacking context. In addition, the organisation is providing room to initiate knowledge exchange events being motivated by a personal desire to share collective knowledge as being mentioned in the theme '**S.5: Structured and Initiative-Based Learning and Knowledge Sharing**'. Therefore, while objectified knowledge is not necessarily being turned by individuals into conscious knowledge, the collective knowledge being related to the objectified knowledge is being shared across teams through social learning practices and is therefore, being turned into conscious knowledge navigating through the barriers as being stated in '**O.1**'.

4.5. The Interconnectedness between Social Learning, Organisational Memory, and Learning

To partially address the second sub-question: *"What is the interconnectedness between organisational memory, social learning, and organisational learning in practice?"*, the thematic analysis is demonstrating how these elements have been interacting and are being reinforced one another in the activation process of shaping knowledge capture, retention, application and learning within and from the organisational memory as illustrated in figure 14. This interconnectedness has been emerging through a dynamic cycle in which social learning practices have been facilitating the activation of organisational memory both by transferring tacit and explicit knowledge and by enabling participants to recognise patterns within their own knowledge. This pattern recognition is empowering organisational members to identify and draw upon familiar knowledge forms within organisational memory, enhancing the efficiency of knowledge application and reinforcing its relevance in various project contexts. In turn, organisational memory is severing as a foundation for both continuous and organisational learning, with social learning practices consistently utilising and feeding knowledge back into organisational memory across projects, further supporting the organisation's capacity to adapt and learn over time.

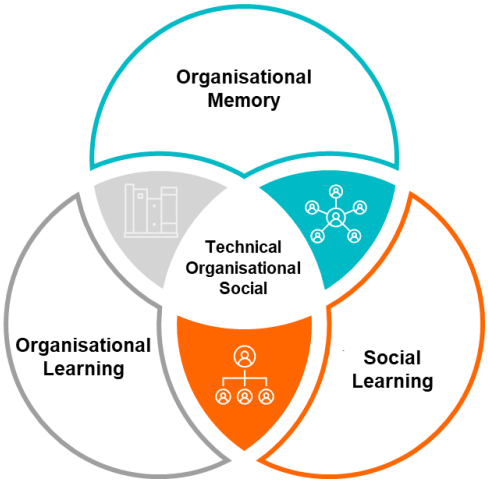

Figure 14 Interconnectedness between organisational memory, social learning and organisational learning (By Author)

While this analysis has highlighted the potential and limitations of current knowledge-sharing practices, it does not fully answer the sub-question. Further exploration of these insights will be occurring in the discussion, where they will be examined in relation to relevant literature, before being concluded in the final chapter. Nonetheless, this analysis is providing an initial understanding of how social learning, organisational memory, and organisational learning have been functioning together within tender processes. The analysis is also noting that, although the organisation's culture and structure have been supporting both formal and informal learning, the prevalence of informal practices may have been leading to organisational forgetting, risking the loss of valuable collective knowledge if not being captured within the wider organisation. However, this forgetting has been proven advantageous in some cases, allowing the organisation to shed outdated practices in favour of innovation that will be driving progress.

Understanding how the technical, social, and organisational domains are connecting to the human aspect of the use of organisational memory and learning will be essential for addressing the underutilisation of organisational memory and the corporate amnesia. The next chapter will be going into how these challenges could be further investigated through the workshop methodology, which has been designed to gain insights in how social learning practices are influencing the utilisation of organisational memory.

5. Workshop Design

In this chapter an overview of this workshop that has been designed to explore the impact of a social learning practice on the use of organisational memory is provided. Two groups of four participants have been selected based on their experience with tenders, tenure in the organisation, and not to have conducted the original tender being used for the workshop. The workshop has been focusing on three different scenarios, each affecting the group dynamics and the use of organisational memory. The workshop has been structured around a stakeholder analysis being based on a previous tender, mimicking a part of the tender process. Finally, the chapter is outlining the operationalisation of key variables and indicators.

5.1. Participants selection for the workshop and group size

Following the outline of the methodology, the participants for the workshop have been selected being based on the recommended optimal group sizes of four to seven to encourage active participation and diverse perspectives for problem-based learning (Hmelo-Silver, 2004). For this study, eight participants have been divided into two comparable groups, each four members as can be seen in table 3 and table 4. The groups have been reflecting a range of experience levels with tenders and time spent in the organisation. Participants are chosen based on their availability and to not have been involved in the tender of Count & Cooper being used for the workshop. This group size has been ensuring a balance of varied viewpoints and experiences while maintaining effective group dynamics, promoting active problem-solving and capturing a broad understanding of organisational memory being related to tenders.

Table 3 List of Group 1 Workshop Participants

Group 1	Job Title	Tender Exp.	Domain	Time in company
G1A1	Project Analyst	± 1 years	Infrastructure	± 1 year
G1A2	Consultant	± 1 years	Infrastructure	± 4 years
G1A3	Sr. Project Lead	± 10 years	Energy	± 1 years
G1A4	Sr. Project Lead	± 3 years	Infrastructure	± 5 years

Table 4 List of Group 2 Workshop Participants

Group 2	Job Title	Tender Exp.	Domain	Time in company
G2A1	Project Analyst	± 0 year	N/A	± 2 years
G2A2	Team Lead	± 2 years	Hydraulic	± 4 years
G2A3	Sr. Project Lead	± 5 years	Energy	± 1 years
G2A4	Sr. Project Lead	± 1 years	Infrastructure	± 3 years

5.2. Workshop Agenda

The workshops have been conducted with one group consisting of four persons at a time. The duration of the workshop has been from an hour up to 1.5 hours and has taken place in a meeting room. The group has been presented with two scenarios each being conducted from the other, causing the group to change their approach of the use of organisational memory and interpersonal group dynamics.

The workshop has been based on a past infrastructure tender of Count & Cooper, which has been translated into a fictitious project with similar characteristics, as can be seen in Appendix B.6. Therefore, the solution and the procedures could be found in and derived from the objectified knowledge of the organisational memory, which is encompassing the original tender evaluation or similar and the organisational tender manual procedures. In addition, this has been allowing to check whether the guidelines of how to conduct a stakeholder analysis being provided during the training of Count & Cooper is being part of the conscious or automatic knowledge of the group or if the group will be using its collective knowledge, past experiences, for making the analysis. This additionally has been allowing to reflect whether or not the sequence of the different scenario's has been effecting the output of the workshops.

Each group has been following a different sequence of the scenario's as can be seen in figure 15 and the different use of organisational memory per scenario being displayed in table 5, 6 and 7 in white. Group 1 has been starting with scenario 1A on the left side and has then been moving to scenario 2 in the centre. Wherein group 2 starts off with scenario 1B on the right side and moves to scenario 2 in the centre. The rationale for having the two groups following different sequences has been to assess whether the sequence of group 1, where participants first work individually, use objectified organisational knowledge to access the tender manual procedures or original tender evaluation or if they rely more on their conscious or automatic knowledge in the scenario 1A. This allows the see whether if the scenario 1A affects the group dynamics and the use of objectified or collective knowledge in scenario 2. Group 2 is initially restricted to working in the group, for the researcher to observe whether the group members follow the formal organisational processes from the conscious or automatic knowledge to complete the tender assignment or if they rely more on collective knowledge. In scenario 2, the group has no limitations and therefore, could be using objectified knowledge to verify if correct frameworks have been applied.

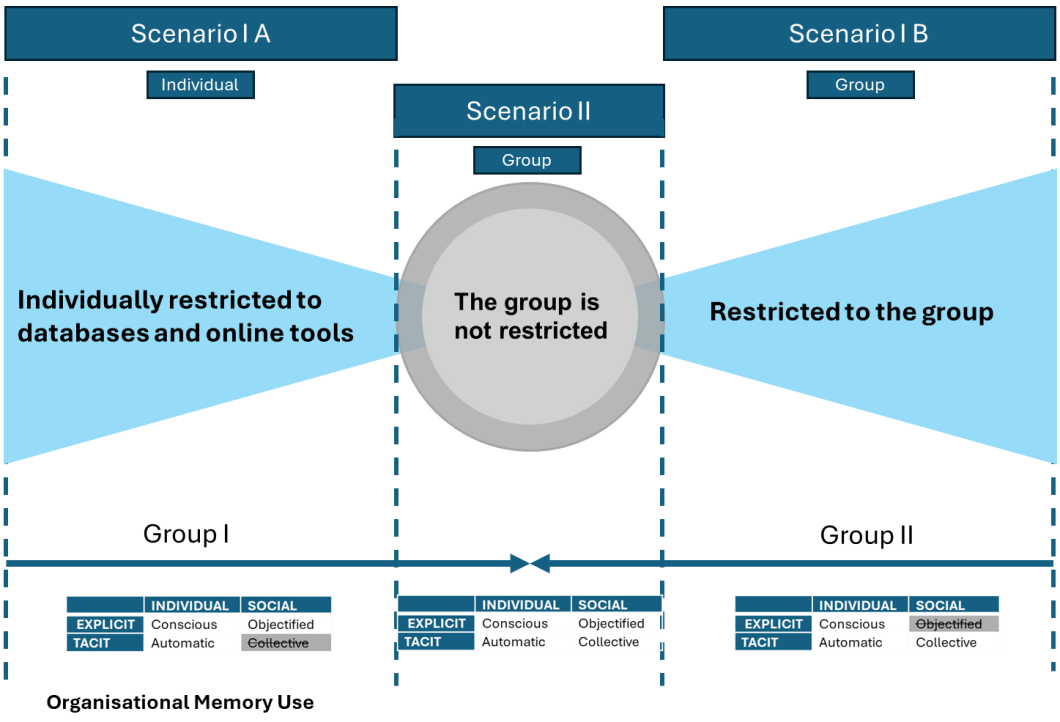

Figure 15 Overview Scenario Sequence Per Group (By Author)

Next, each of the scenarios will be explained.

5.2.1. Scenario 1 A, individual restricted to databases and online tools

The A scenario has been based on the principles of organisational memory and knowledge management by Nonaka (2009) and Walsh and Ungson (2009). The group has individually been limited to their own conscious, automatic and objectified knowledge to solve the assignment, without relying on social interactions. This constraint has been allowing for an examination of the effectiveness of the organisation's stored knowledge and also the expertise of the individual in problem-solving when social interactions are being excluded as can be seen in table 5.

Walsh and Ungson (2009) have been emphasising the role of stored information from an organisation's history in decision-making, highlighting the importance of various internal databases or external sources. Nonaka (2009) has been underscoring the significance of the accessibility of knowledge repositories for effective knowledge creation and problem-solving. By restricting the group to the individual use of digital resources and own expertise, this scenario has been aiming to evaluate how well these knowledge repositories are functioning without the influence of social interactions.

Table 5 Scenario 1A Observed Organisational Memory

	INDIVIDUAL	SOCIAL
EXPLICIT	Conscious	Objectified
TACIT	Automatic	~~Collective~~

5.2.2. Scenario 1 B group restricted to personal experience and collaborative knowledge

Scenario 1B has been based on the principles of experiential and social learning by Kolb (1984) and (Bandura, 1971). The group has been restricted to using only their conscious, automatic or collective knowledge as personal experiences or learned organisational processes to address the problem, without access to objectified knowledge in the forms of organisational tools or documentation. This constraint has been allowing for an evaluation of the role of personal and group knowledge and the influence of interpersonal interactions in problem-solving when external resources are unavailable as seen in table 6.

The experiential learning theory has been emphasising that learning is occurring through experience, identifying personal experiences as crucial for learning and development, especially when other resources are inaccessible. The social learning theory is highlighting the importance of social interactions in learning, positing that individuals are acquiring knowledge by observing and interacting with others. By limiting the group to personal experiences, this scenario has been aiming to assess if interpersonal group dynamics is effecting the use of the organisational memory.

Table 6 Scenario 1B Observed Organisational Memory

	INDIVIDUAL	SOCIAL
EXPLICIT	Conscious	~~Objectified~~
TACIT	Automatic	Collective

5.2.3. Scenario 2, unrestricted access

The second scenario is being based on the principles of the Resource-Based View (RBV) theory and the Social Capital Theory (SCT), as being articulated by Barney (1991) and Nahapiet and Ghoshal (2009). The project team has had unrestricted access to all the forms the organisational memory, representing an ideal state where team members can freely be interacting and using any available resources as can be seen in table 7.

The unrestricted access scenario is being supported by the RBV and SCT theory, which is positing that an organisation's success is relying on all of its resources and networks. With unrestricted access, this scenario is evaluating how or if the group will be utilising all available resources and interactions to solve the problem.

Table 7 Scenario 2 Observed Organisational Memory

	INDIVIDUAL	SOCIAL
EXPLICIT	Conscious	Objectified
TACIT	Automatic	Collective

5.3. Workshop Set-Up

The workshop assignment in Appendix B.6, is being based on a previous infrastructure tender conducted by Count & Cooper. Due to the complexity and duration in getting through a full tender process within the workshop's time limit, the scope has been placed on the starting phase of the tender, specifically on the stakeholder analysis. This focus is particularly being relevant because stakeholder analysis is a deliverable in the 'bronze' phase of the tender process, and the insights being gained from it, are influencing subsequent decisions. The provided input has been making it possible to conduct the analysis within the time limit of the workshop.

The reason to focus on this process is because the organisation is providing a training on onboarding on how to conduct a stakeholder analysis, outlining the appropriate frameworks and methodologies. During this training it is being explained that the analysis should be conducted with a Power and Interest matrix to categorise the impact of each stakeholder on the tender. The stakeholders should be divided into two categories, first one is who can influence the primary processes, and the second one is who will be impacted by the work activities. The 'how to' of this process can subsequently be found in the digital tender manual stored in the database.

This prior training and tender manual should be enabling the participants to conduct the analysis individually or within a group accordingly to the companies processes during the workshop. This is providing the opportunity to observe whether the group will be reverting to the objectified knowledge in the form of the established tender manual where this process has been defined or if the interactions are causing the group to rely on conscious, automatic or collective knowledge sharing. In addition, the participants are being able to find similar tender products being related to the tender being used for the assignment. The workshop's outcomes can also be compared with the actual results of the original tender, indicating if there is consistency in the tendering process across different contexts.

5.4. Operationalisation: Variables and Indicators

During the workshop, several key aspects will be captured and monitored, with each scenario being designed to highlight different elements. To identify the types of organisational memory being used, Spender's framework will be employed. In addition, other relevant factors will be monitored throughout the workshop. These factors have been selected for their potential impact on organisational memory and interpersonal dynamics. Insights from interview analyses have been used in the structuring the observations for the three distinct scenarios.

The survey questions being used for the workshop can be seen in Appendix B. The tables in Appendix B.8, are outlining the methods and specific questions or observations that will be used to capture the data of the six observation points being addressed below.

- **Q1 - Types of Organisational Memory Accessed**: The specific forms of organisational memory being used during the workshop, such as explicit individual knowledge, tacit individual knowledge, social explicit knowledge, or social tacit knowledge. This will be providing insights into the length and depth of memory utilisation.
- **Q2 - Impact of Team Experience and Relationships**: The effect of participants' experience with tenders and tenure within the company on group interactions and the use of knowledge.
- **Q3 - Evaluation of Knowledge Sources**: How the group is assessing the relevance of knowledge being retrieved from databases or personal experiences, determining the effectiveness of selected organisational memory sources. This is including noting the availability of knowledge and whether the group or individuals find related documents or experiences applicable to the current context.
- **Q4 - Decision-Making Processes**: Whether decisions are being based on standardised organisational processes or unwritten norms. This is involving examining the balance between formal guidelines and informal, culturally embedded practices.
- **Q5 - Comparison of End Product**: Whether the final product being created during the workshop is being similar to the product produced in the related tender, providing a measure of consistency and alignment with past practices.
- **Q6 - Learning Outcomes:** The extent of individual learning being achieved during the workshop and if newly acquired knowledge will be integrating into the organisation.

5.5. Workshop Kick-off Orientation

Before starting the assignment, the following orientation steps have been carried out in both workshops. Each participant has been receiving a printed copy of the assignment, along with a pen, marker, and sticky notes. A flipchart has been available in the room, and all participants will be having access to a laptop. Once everyone is being present, the facilitator will be outlining the workshop objectives, will be explaining the research question of the thesis and finally what the different scenario's during the workshop will be entailing. Then the HREC form will be introduced and discussed.

Participants next will be completing the 'pre-workshop' form, by which will be collected personal data being related to their tender experience and trainings. While they are filling in the form, the email will be sent containing a digital version of the assignment and links for document submission. After the forms have been submitted, the facilitator will be presenting the background of the assignment and will be outlining the group's expectations. The presentation is in Appendix B.6 and the assignment is in Appendix B.7.

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6. Workshop Findings

In this chapter the findings from the problem-based learning workshops, designed to explore how interactions during a social learning practice are influencing the activation and utilisation of organisational memory within project-based construction organisations are presented. The workshops have been focused on decision-making processes of a stakeholder analysis and the use of organisational memory on knowledge sharing and retention during the tender phase. A more detailed summary of the workshop decision-making strategy and organisational memory use, learning and knowledge retention approaches and approaches to stakeholder positioning data per group and scenario can be found in Appendix B.9.

6.1. Workshop Results Group 1

Workshop 1 has been consisting of two scenarios being aimed at exploring participants' approaches to decision-making, organisational memory use, learning, and stakeholder positioning. In Scenario 1A, participants have been working individually with the option to consult external sources. In Scenario 2 unrestricted collaboration and the use of external sources has been allowed.

The group's experience with tenders, being outlined in table 3, is revealing a range of backgrounds. The group has been following varied levels of tender management training at Count & Cooper. The consultant, [G1A2], has been completing the Analisten tender management training in their first year and the Consultant training in their third year. The project analyst, [G1A1], has recently been completing the Analisten training in February 2024, while the senior project lead, [G1A3], have been participating in the internal training for delivery managers in 2024. The senior project lead, [G1A4], has been completing the L2 tender management training in 2021. While the members of the group have been sharing a diverse range of tender management training, their experience with conducting stakeholder analyses has been varied. [G1A2] and [G1A3] have had prior experience, and [G1A1] have currently been involved in the process, whereas [G1A4] has had no prior experience, highlighting the group's diversity in expertise.

6.1.1. Comparing Scenario 1A with Scenario 2

In comparing Scenario 1A and Scenario 2 for Group 1, several notable differences and similarities have been emerging across the decision-making strategy, the use of organisational memory, the learning outcomes, the stakeholder positioning, and the knowledge retention.

In Scenario 1A, participants have been employing diverse decision-making strategies. Several, including [G1A3], [G1A2], and [G1A1], have been utilising the Power and Interest (P&I) matrix to categorise stakeholders, primarily drawing on conscious and automatic knowledge from prior experiences. In contrast, [G1A4] has been adopting a more analytical approach, relying on specific criteria for stakeholder classification, indicating a reliance on automatic or collective knowledge. Although both [G1A3] and [G1A4] have been acknowledging the potential value of objectified knowledge, none of the participants have been consulting external sources due to time constraints. Instead, they have been relying on automatic, conscious, and collective knowledge being derived from previous tenders. This scenario is underscoring participants' tendency to depend on personal experience, with limited engagement with formal organisational memory tools, such as the tender guidebook.

In Scenario 2, group discussions have been playing a prominent role, leading to a collaborative decision-making process. The group have been utilising a flip chart to align their conscious and collective knowledge, which has been allowing [G1A4] to benefit from shared insights into the use of the P&I matrix, being compared to Scenario 1A. Notably, the experience of [G1A4] has been contributing to the discussion by leveraging [G1A4] automatic and collective knowledge. Unlike in Scenario 1A, some participants, including [G1A4], [G1A3], and [G1A1], have been consulting external resources, such as the internet, to quickly access and clarify aspects of the P&I matrix, demonstrating the use of objectified knowledge from external sources. This has been marking a key difference: while in Scenario 1A has been depended on individual decision-making and prior experience, in Scenario 2 has been incorporated external knowledge, which has been activating both conscious and collective knowledge and contributed to a refined collective stakeholder ranking. However, it is worth noting that none of the participants has been consulting internal objectified knowledge.

The learning outcomes have also been differing across the scenarios. In Scenario 1A, participants have been reporting an average score of 3.75/10 for learning something new, with three out of four stating they had already been familiar with the stakeholder analysis process. In contrast, Scenario 2 has been showing an increased learning outcome score, averaging 6.5/10, with participants such as [G1A4] acknowledging the benefits of group discussions in effectively applying the P&I matrix. This outcome is reflecting the enhanced learning that is occurring through collaboration, as participants are refining their understanding of stakeholder prioritisation by exchanging insights and perspectives.

The approach to stakeholder positioning has also been showing variation between the two scenarios. In Scenario 1A, participants have been offering differing stakeholder analyses. While [G1A2] and [G1A1] have been providing a top six stakeholder ranking using the P&I matrix, their explanations have been relatively brief. Conversely, [G1A3] has been delivering a more detailed explanation, though without a visual representation, and [G1A4], unfamiliar with the P&I matrix, has been producing a structured analysis being based on specific criteria. In Scenario 2, the group has been adopting a more unified approach, producing a well-prioritised stakeholder analysis using the P&I matrix. Group discussions have been facilitating a more consistent and thorough explanation of the stakeholders' rankings, with key indicators such as financial influence and environmental permits guiding the analysis. Although there have been slight variations in stakeholder rankings, the collective analysis in Scenario 2 has been more detailed compared to the individual approaches seen in Scenario 1A.

Finally, regarding knowledge retention and sharing, both scenarios underscored the importance of formal documentation. In Scenario 1A, participants such as [G1A1] and [G1A2] have been proposing uploading their approaches to SharePoint for long-term accessibility, while [G1A3] and [G1A4] has been advocating for a combination of formal documentation and verbal communication, through platforms such as Yammer or in stand-up meetings.

6.2. Workshop Results Group 2

Workshop 2 has been consisted of two scenarios being designed to evaluate participants' approaches to decision-making, organisational memory use, learning, and stakeholder positioning. In Scenario 1B, participants have been working collaboratively and couldn’t excess

objectified knowledge, and in Scenario 2, participants have been encouraged to use external sources and to engage in unrestricted collaboration.

The group's experience with tenders, shown in table 4, is highlighting a range of backgrounds. Regarding their tender management training at Count & Cooper, the group has been displaying varying levels. [G2A1] has been completing the analisten tender management training in February 2024, while [G2A2] has been attending the analisten tender management training in 2020 and has later been participating in a short version of the Consultant training in 2023. [G2A4] has no formal tender management training, whereas [G2A3] has been completing an informal tender training in December 2023. This variety of training experiences has been contributing to differing levels of expertise within the group.

6.2.1. Comparing Scenario 1A with Scenario 2

In comparing Scenario 1B and Scenario 2 for Group 2, several key differences and similarities have been emerging across the decision-making strategy, the use of organisational memory, learning outcomes, and stakeholder positioning.

In Scenario 1B, participants have been relying on the group discussions to shape their understanding of the task and have been applying the Power and Interest (P&I) matrix. Given the time constraints, the group collectively has been opting for the P&I matrix due to its familiarity and efficiency. [G2A1]'s conscious knowledge of the matrix has been playing a role in guiding the use of the (P&I) matrix, while participants such as [G2A2] and [G2A3] have been highlighting how open communication within the team has been facilitating alignment of insights and consensus-building. The group has primarily been drawing on conscious and collective knowledge from previous tender experiences, with [G2A4] and [G2A2] particularly emphasising the value of prior knowledge in shaping decision-making. Group dynamics have been essential, as participants openly have been sharing their experiences and have been collaboratively brainstorming. Overall, the group has been relying on its collective knowledge, and the absence of objectified knowledge or external resources has not been perceived as a limitation.

In Scenario 2, the decision-making process has notably been enhanced by the use of external objectified knowledge, particularly AI. Due to the time constraints, participants have been finding AI to be a valuable tool for supplementing their initial stakeholder analysis, including entities such as ProRail and RWS, within the P&I matrix. Both [G2A3] and [G2A1] have been noting that the group's open environment for raising questions has been fostering productive dialogue, which in turn has been refining their stakeholder rankings. The integration of AI has been introducing new insights to the group's analysis, although participants have been recognising the need for critical evaluation of AI-generated suggestions, especially when inconsistencies were being identified. The use of AI has been enabling the group to reflect on both conscious and collective knowledge while incorporating external objectified knowledge. While time-efficient, the tool required careful validation to ensure the accuracy of the analysis.

Regarding learning outcomes, Scenario 1B, the participants have been reporting an average score of 7/10. Participants such as [G2A4] and [G2A3] have been indicating that the workshop has been reinforcing their understanding of how to apply the P&I matrix, and [G2A1] has been noting that the collaborative nature of the task led to new insights from the knowledge sharing. The group has been appreciating the structured approach to stakeholder analysis and the

ways in which discussions have been enhancing their learning. In contrast, Scenario 2 has been showing moderate learning outcomes, with an average score of 6.5/10. Although participants acknowledged the value of AI in enhancing their analysis, it has been requiring careful validation to ensure the accuracy of the analysis. In addition, [G2A3] and [G2A2] have been feeling that the session provided few new insights being compared to previous experiences.

The perceived need to share knowledge has been similarly high in both Scenario 1B and Scenario 2, with an average score of 7.25/10. Participants such as [G2A1] and [G2A2] have been expressing a strong desire to share their insights and methods with others in future projects, particularly in the context of teaching others to improve their outcomes. All participants have been emphasising the importance of integrating AI earlier in future analyses while stressing the need for critical evaluation of AI-generated insights. Although the group has been recognising the value of external tools, they have been cautioning against disseminating such knowledge without thorough validation.

When it had be coming to stakeholder positioning, Scenario 1B has been showing the group producing a well-structured stakeholder analysis using the P&I matrix. The conscious knowledge of [G2A1] and [G2A2] have been providing a solid foundation for the analysis, while [G2A3] and [G2A4] have been underscoring the importance of group alignment and consensus in shaping the final outcome. The stakeholder analysis has been reflecting the team's diverse experiences, with key indicators such as stakeholders' roles in financing, environmental permits, and project scope informing their ranking decisions. The results have been largely consistent with the initial analysis, with only minor variations in how certain stakeholders have been ranked. In Scenario 2, the group has been generating a revised stakeholder ranking, being shaped by group discussions and external inputs from AI. Although AI has been providing fast insights about the stakeholder ranking, participants have been acknowledging the need for critical reflection to ensure the accuracy of the rankings. Time constraints have been leading the group to using AI to gain quick results, but this has been balanced by drawing on their conscious and collective knowledge from previous experiences.

6.3. The Influence of Social Learning Practices on Organisational Memory and Decision-Making

The comparison between individual and group decision-making in the workshop scenarios has been providing a partial answer to the third sub-question: *How is organisational memory utilised during social learning practices?* It has been highlighted how social learning practices do more than simply facilitate the exchange of insights; they have actively been triggered and shaped organisational memory to influence decision-making. Participants across both groups have been demonstrating varied approaches to applying the Power and Interest (P&I) matrix, being shaped by recent training, experience, and time pressure. Through social learning practices, participants have been sharing or recognising familiar insights being derived from conscious, automatic, objectified, and collective knowledge. However, this process has also been surfacing conflicting and non-conflicting memories, making it to be essential to validate the relevance of these insights within the current context. Organisational memory has further been activated through emotionally shared experiences linked to successful tenders or impactful stakeholder interactions, bringing subconscious knowledge to the forefront. These emotionally resonant activations have been leading to the prioritisation of knowledge

associated with positive or negative outcomes, reinforcing strategies that have previously been proven effective or cautioning against past pitfalls.

6.3.1. Differences between the Workshops

Between the workshop scenarios, differences have been emerging in the stakeholder decision-making process, particularly in the use of internal versus external objectified knowledge.

Differences between Stakeholder decision-making process

The differences between Scenarios 1A, 1B, and Scenario 2 for both groups have become apparent in their approaches within Scenario 2. In Scenario 2, Group 1 has initially been aligning the various frameworks being used for stakeholder classification and the results from Scenario 1A, translating individual outcomes into a cohesive group result. This outcome has then been refined further through the group's conscious, automatic, and collective knowledge.

Group 2, by contrast, has been focusing in Scenario 2 on refining and improving the outcomes from Scenario 1B, using external objectified knowledge to challenge and enhance their previous results. Since the group has already been agreeing in Scenario 1B on a framework for conducting the stakeholder analysis, the refinement has been emphasising critical evaluation and enhancement through additional insights.

In Scenario 2, Group 1 has been centring its efforts on synthesising knowledge from group discussions to integrate individual outcomes, with discussions primarily addressing the placement and alignment of individual results. In contrast, Group 2 has been concentrating on refining their initial results by leveraging external objectified knowledge, such as AI, to gain new insights and further validating their outcomes.

The Role of Internal and External Objectified Knowledge

Both groups have been founding external objectified knowledge, information from sources outside the organisation, particularly useful, especially under time pressure, as AI or the internet allows quick access to relevant information. The time constraints of the workshop have not only been influencing the use of objectified knowledge but have also been effecting the depth of engagement with it. In both groups, objectified knowledge has been helping resolve uncertainties related to the P&I matrix, such as clarifying terminology and activating conscious and collective knowledge. Group 2, however, has been going a step further, using AI-generated suggestions to refine their stakeholder ranking.

While AI has been providing fast insights into stakeholder prioritisation, Group 2 participants have recognised the importance of critically evaluating AI-generated suggestions against their collective and conscious knowledge to ensure relevance and accuracy. This need for validation illustrates how AI, despite recognising familiar patterns within broader databases, may still be producing suggestions that are not fully aligning with the organisation's specific context, functioning almost as competing memories that must be assessed before use. This process has been showing that balanced discussions, combined with objectified knowledge, can be enhancing decision-making by drawing and validating multiple forms of organisational memory.

Interestingly, neither group has been consulting internal organisational objectified knowledge, such as the SharePoint database, to clarify the stakeholder analysis method or matrix quadrants, instead turning to external sources like Google or AI. This reliance on external

knowledge may be suggesting a potential disconnect between the contextual information stored within the organisation's memory and the immediate practical needs of participants working under time constraints. This gap could also be linked to emotional triggers, specifically to the uncertainty where knowledge is being stored or the perceived difficulty in accessing it quickly. Such uncertainty can be deterring participants from engaging with internal databases, pushing them toward faster, external sources that will be providing immediate clarity.

Comparison of Individual vs. Group Learning

Comparing individual work in Scenario 1A with group work in Scenario 1B and Scenario 2 has been revealing that working individually has been leading to a perceived lower level of learning. In contrast, group-based scenarios have been resulting in higher learning outcomes due to the refinement of stakeholder prioritisation through the exchange of insights and perspectives. Knowledge sharing have been emerging as the primary driver of learning and knowledge generation across both groups, indicating that social learning practices are more productive than individual learning by doing.

6.3.2. Similarities between the Workshops

The workshop scenarios have been sharing similarities in how training and experience have been influencing decision-making, knowledge retention and sharing, consensus-building, and the role of organisational memory, ultimately leading to comparable outcomes.

Training and Experience in Decision-Making

Notable distinctions have been arising in how recent training and tender experience have been impacting the use of the P&I matrix. Participants who have recently been completing tender management training have been tending to advocate for the matrix's formal application during stakeholder analysis, while those with more experience but with a training longer ago are being less familiar with it. Nonetheless, experienced participants have been contributing significantly through automatic and collective knowledge, guiding the group's prioritisation within the matrix. This interaction has been revealing the activation of the organisational memory through pattern recognition: recent trainees have been contributing structured insights, while senior participants, drawing on accumulated experiences, have been shaping the discussions by applying familiar patterns from past tenders, helping the group intuitively prioritising key stakeholders and enhancing the overall quality of the analysis.

Knowledge Retention and Sharing

Regarding knowledge retention and sharing, both groups have been stressing the importance of formal documentation, such as on platforms like SharePoint, for ensuring long-term accessibility. They have been advocating for combining formal documentation with verbal communication tools like Yammer or stand-up meetings to facilitate knowledge exchange. Both groups also have been emphasising the need to reflect on existing objectified knowledge, such as tender guidebooks, to avoid redundancy. Group 2 further has been suggesting using tools like AI earlier in the analysis process to grasp tasks quickly, while underlining the importance of critically evaluating AI-generated insights. Though they have been noticing the value in external tools, they have been cautioning against disseminating unvalidated information.

Consensus-Building and the Role of the Organisational Memory

Both groups have instinctively begun aligning and validating the automatic, conscious, objectified, and collective knowledge of participants by using a flip chart. This tool has been

facilitating consensus-building and a shared understanding during discussions. The open environment for raising questions has been encouraging productive dialogue, allowing participants to collectively reflect on, assess, and refine their initial ideas. Through this process, competing memories, some insights being relevant while others potentially outdated or irrelevant, can be recognised. In both groups, certain individuals have been naturally assuming roles in managing the flip chart and guiding the discussion. This spontaneous division of tasks has been highlighting the significance of open communication and teamwork in achieving consensus, as participants have been collaboratively navigating conflicting insights to strengthen stakeholder analysis.

Across both groups, the role of sharing automatic, conscious, and collective knowledge has been elevating the group's understanding and task engagement. The workshops have been showing that different participants contribute distinct aspects of these knowledge types, and through shared discussions, the group's collective knowledge base has been activated and elevated. Pattern recognition of the organisational memory has been emerging as participants have been identifying familiar elements and recurring themes in stakeholder analysis, allowing them to connect past experiences with the current task. These group discussions have been enabling participants to leverage each other's knowledge and to recognise relevant patterns in ways that have not been possible individually. Interestingly, participants unfamiliar with the objectified knowledge of the P&I matrix have been acquiring conscious knowledge through these discussions, demonstrating how collective insights have been informing and constructing individual understanding without necessarily resorting to objectified knowledge.

Outcomes of the workshops

The individual's outcome of Group 1 in Scenario 1A has been producing divergent perspectives and outcomes regarding the P&I matrix, yet still in alignment with task requirements and original outcomes, showing their effective application of prior knowledge. Group work in Scenario 1B and Scenario 2 has been activating multiple forms of organisational memory, conscious, collective, and use of external objectified knowledge, leading to a better understanding of the task and improving the overall quality of the stakeholder rankings. The results in Scenario 2 of both groups have been aligning with key arguments significant in the original tender process, closely resembling the initial stakeholder analyses. This has been underscoring the value of group collaboration in enhancing both decision-making processes and knowledge sharing.

While the rationale for classifying stakeholder positions has been similar across both groups, their perception of stakeholder weight within the P&I matrix has been varying as can be seen in figure 18 and figure 20, reflecting the subjective nature of classifying stakeholders.

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7. Discussion

This chapter has been built upon on the findings from Chapter 4, in which the interconnectedness between social learning, organisational learning, organisational memory and memory activation dynamics has been explored. In Chapter 6, social learning practices have been examined on the influence and the use of organisational memory. The aim of this chapter is to relate these findings to existing theories, allowing for deeper interpretation of the research results. The study's limitations are also being acknowledged, considering the factors that may be affecting the generalisability of its findings.

7.1. Purpose of the Study

This study has been aiming to improve the understanding of how social learning practices can be activating and enhancing the utilisation of organisational memory in project-based construction organisations. By examining the groups influence during a social learning practice on knowledge sharing and learning during the tender phase, the research has been seeking to explore how social learning practices have been contributing to organisational learning processes and organisational memory use. Through a mixed-methods approach, combining interviews and a problem-based learning workshop, the study will be uncovering actionable insights to break the cycle of underutilisation of organisational memory and to foster more effective learning in the construction industry.

7.2. Alignment with Literature

The interconnectedness between social learning and organisational memory has been strongly supported by Bandura's (1971) social learning theory, which has been positing that learning is occurring through observation, modelling, and interaction within social contexts. Social interactions have been activating organisational memory by triggering the pattern recognition of past knowledge and applying it to current contexts. The dynamic feedback loop between organisational memory and social learning has been demonstrating how these processes have been reinforce and reshape each other, creating a continuous cycle that has been strengthening both decision-making capabilities and the organisational learning needed to adapt to new challenges, as posited by Walsh & Ungson (2009) and Brandi & Elkjaer (2012).

Additionally, the concept of Communities of Practice (COPs), as outlined by Wenger et al. (2015), is highlighting the structured nature of social learning with Count & Cooper. Through peer interactions and group discussions, participants have been sharing conscious, automatic, objectified and collective knowledge in a manner similar to COPs, both formally but also through informal channels. The ability to bypass formal repositories and to activate tacit knowledge has been reflecting Argote and Guo's (2016) argument that tacit knowledge transfer has been most effective when it occurs through participation in shared activities rather than through formal documentation alone. This is underscoring the importance of learning by Yan et al. (2023) that it is not only happening through formal mechanisms but also within interactive group environments, where social exchanges are driving the activation of leveraging organisational memory in fast-moving environments of PBOs.

The collaborative problem-solving and group dynamics having been observed during the workshop has been illustrating how social learning has been integrating individual insights and

has been reinforcing the dynamic nature of organisational memory, as been highlighted by Huber (1991) and Chiva and Alegre (2005). Group 1's ability to overcome individual limitations by leveraging collective knowledge in Scenario 2 has been emphasising how social learning has been bridging gaps within organisational memory, activating memory through social interactions that have been triggering pattern recognition between the different types of knowledge in the organisational memory. This has been enabling organisational memory to thrive when being engaged through social interactions rather than by rigid processes. The workshop Scenario 1B and Scenario 2 have been shown to lead to higher perceived learning outcomes and improved decision-making compared to individual efforts in Scenario 1A. This is aligning with Salas et al. (2008) and Lave and Wenger (1991) who have been emphasising the effectiveness of team-based and situated learning, framing learning as socially and contextually embedded. By drawing on the different levels of knowledge from the organisational memory social learning co-creates collective knowledge and thereby improving decision-making and problem-solving capabilities in group contexts.

Overall, these findings reinforce Bakker et al. (2011) view that organisational memory in PBOs is critical for overcoming knowledge fragmentation in dynamic and temporary teams. Combined with Bartsch et al. (2013), who have been emphasising the importance of shared knowledge in enhancing decision-making and learning processes, this is underscoring how collaboration and informal knowledge-sharing practices drive effective knowledge use and retention in real-time learning environments like Count & Cooper.

7.3. Challenging the Literature

Workshop findings are aligning with several academic sources but are revealing contrasting perspectives on the role of internal objectified knowledge as repositories. Klein et al. (2007) have been warning that relying on outdated or irrelevant knowledge can be stifling innovation, which will be resonating with participants' tendency to bypass internal objectified knowledge repositories in favour of external tools, such as AI or internet. This behaviour is suggesting potential organisational forgetting or insufficient updating of internal knowledge systems, challenging the assumption that objectified knowledge is always serving organisational needs and is highlighting the risk of competing memories arising not only from individuals but also from digital systems. Similarly, Bhandary and Maslach (2018) have been emphasising the importance of effective retrieval systems for sustaining organisational memory, an insight that has been contrasting with the workshop findings indicating underutilisation and uncertainty around internal repositories, as echoed in interviews. This hesitancy may also be stemming from emotional triggers, where past experiences with the difficulty of locating relevant knowledge within these repositories creating a negative association, discouraging further interaction and prompting individuals to seek alternative sources.

Interviews have been revealing that project-based organisations (PBOs) are struggling to formalise knowledge due to frequent team disbandment in dynamic settings (Kucharska & Bedford, 2020). Olivera (2000) has been asserting that while codifying knowledge is being complex, it will be remaining essential for long-term retention. Participants' use of AI as a workaround for inefficiencies in the codification and localisation of objectified knowledge has been highlighting the need to enhance internal systems to prevent knowledge fragmentation. However, as AI has been relying on its own pattern recognition to retrieve insights, this can be introducing irrelevant insights from competing memories that may not be aligning with current

contexts, underscoring the need for validation before use. This raises concerns about the adequacy of internal repositories for real-time decision-making, challenging Buttler's (2016) assertion that internal organisational memory should be a primary resource. Kane (2019) is adding that digital systems are increasingly vital for retention in knowledge-intensive industries, cautioning that reliance on informal exchanges can be leading to fragmented organisational knowledge, especially when teams are disbanding, or key employees are leaving. Interviews and workshops are underscoring the risk that automatic and collective knowledge may never be transitioning to objectified knowledge, limiting its use for future teams without formal mechanisms in place (Bhandary & Maslach, 2018).

Spender's framework is outlining how different types of knowledge, conscious, automatic, objectified, or collective are interacting and evolving within organisations as shown in figure 16 on the left side. Typically, knowledge is beginning as collective, being generated through social interactions and teamwork. As it is becoming formalised, it is transitioning into objectified knowledge, being codified in manuals or databases. When employees are actively using this information in decision-making, it will be transforming into conscious knowledge, and over time, repeated use will be turning it into automatic knowledge, embedded in routines and requiring little conscious effort. This automatic knowledge can then be fed back into collective knowledge through further social interactions, completing the cycle.

However, the findings from the workshops and interviews have been challenging this linear model by revealing alternative knowledge flows. In practice, conscious knowledge can be generated directly from collective knowledge through social learning, bypassing the formalisation process that leads to objectified knowledge a can be seen in figure 16 in the middle. This deviation from Spender's model, is suggesting that informal, interpersonal exchanges can be elevating group knowledge without the intermediary step of codification. Additionally, the results also indicate that when objectified knowledge lacks proper codification or context, external objectified knowledge, such as from online sources, is being utilised to enhance both conscious and collective knowledge as being displayed in figure 16 on the right side. These observations are suggesting that Spender's theory underestimates the role of external objectified knowledge and the influence of social learning practices in the dynamics of knowledge generation and activation, highlighting the need for a more flexible understanding of how knowledge is evolving in organisations.

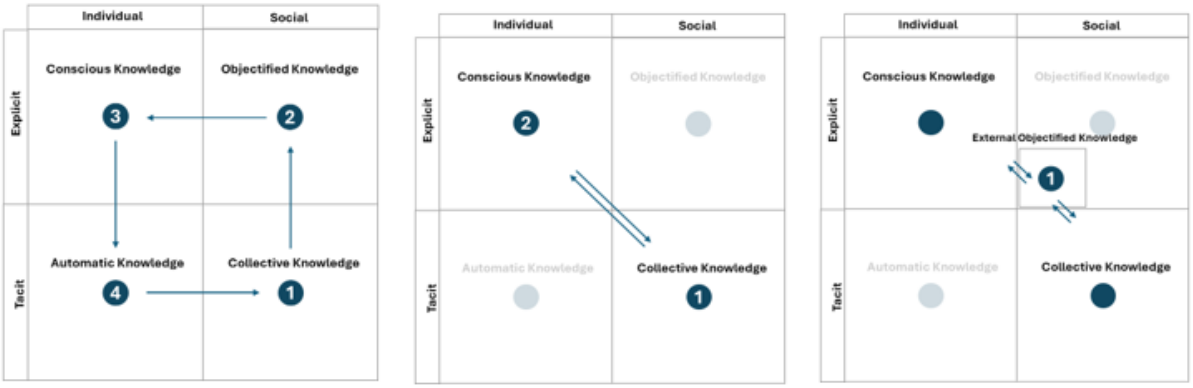

Figure 16 Dynamic flow of Organisational Memory

7.4. Unexpected Findings

An unexpected finding from the analysis has been the preference of the participants' for using external objectified knowledge, such as AI and Google, during time-sensitive tasks. Interviews have been revealing challenges in accessing internal objectified knowledge due to uncertainties in database structure and the dynamic nature of project-based organisations (PBOs). This reliance on AI is suggesting a disconnect between the organisational memory and practical needs under time-sensitive tasks, questioning AI's role in decision-making. While Mikalef & Gupta (2021) have been arguing that AI is supporting rapid data access, workshop participants have been noting that AI-generated insights still will be requiring human validation, aligning with Ripers (2014) who has been emphasising human judgment for reliable, context-specific information. This is highlighting the need for a balanced approach that leverages AI's efficiency while ensuring the reliability and contextual accuracy of machine-generated outputs.

Another insight has been revealing that formal knowledge repositories are often being underutilised after onboarding, and participants will instead be gaining conscious knowledge from social learning practices. Interviews and workshop data have been suggesting that informal interactions, such as group discussions and peer exchanges, are more effective in constructing individual understanding than formal systems. This has been challenging the assumption that conscious knowledge must be derived exclusively from objectified sources. Drees et al. (2023) have been noting that in fast-paced environments, formal systems may be perceived as less relevant or accessible, leading employees to favour interpersonal knowledge exchanges. Consequently, social learning practices are filling the gaps being left by underutilised formal repositories, as participants have been building understanding through sharing automatic or collective knowledge rather than through direct consultation of objectified knowledge. These findings are in contrast with Bhandary & Maslach's (2018) argument that formal documentation is essential for long-term learning. In dynamic settings like project-based organisations (PBOs), informal and adaptive learning practices are often superseding structured knowledge retention approaches, indicating a need to balance formal and informal mechanisms to support effective learning.

Finally, the workshops have also been revealing the importance to visually aligning discussions and task understanding. It has been helping participants not only sharing knowledge but also ensuring mutual understanding through feedback, reinforcing shared comprehension in real-time. Ramaswamy and Ozcan (2018) have been underscoring that communication is a two-way process and is requiring feedback loops to ensure mutual understanding. The use of visual aids in the workshop, has been acting as physical feedback loops to confirm alignment among team members shared insights, reducing the risk of competing memories by creating a unified reference point. This has been reinforcing the critical role of ensuring shared understanding in collaborative learning environments.

7.5. Theoretical Implications

The findings have been contributing to a more nuanced understanding of the relationship between social learning, organisational memory, and learning. First, they have been reinforcing the theoretical position that organisational memory is not a static repository but a dynamic construct, continuously being accessed and being reshaped through social learning practices (Argote and Guo, 2016). The workshop and interview findings have been illustrating how different forms of organisational memory, conscious, automatic, objectified, or collective

knowledge, have been activated and been reconfigured during group discussions. This is not only minimising the need to "reinvent the wheel" but is also decreasing corporate amnesia by enhancing tacit knowledge sharing. It is highlighting the relevance of organisational learning theory and its connection to both formal and informal knowledge-sharing practices. While Huber (1991) and Crossan et al. (2011) have long been emphasising the role of formal learning systems, this study has been showing that organisational learning in PBOs must be accommodating both structured and unstructured forms of knowledge exchange. This is extending the current literature by suggesting a dual-path approach to learning, where formal repositories and structured processes for knowledge sharing are being combined with social learning practices to sustain organisational learning.

The analysis has also been challenging certain theoretical assumptions, particularly regarding the relationship between organisational memory and the use of external objectified knowledge. The use of external tools such as AI has been revealing gaps in current models of organisational memory, as being noted by Klein et al. (2007) and Bhandary and Maslach (2018). The underutilisation of formal knowledge repositories is calling for a re-evaluation of the Spender (1996) and Kane (2019) models, which are placing significant emphasis on formalised knowledge retention systems. This study has been extending the theory by incorporating the complexities of modern knowledge management on organisational memory, where knowledge boundaries are increasingly porous, and the organisation can be benefitting from external objectified and external collective knowledge. The role of AI is presenting new theoretical challenges, particularly in balancing the efficiency of AI tools with the need for human validation and oversight of AI-generated content, as having been explored by Mikalef and Gupta (2021). This is raising the question for the literature: how can organisations be balancing the need for formal knowledge systems with the inherently informal nature of social learning? The findings are suggesting that PBOs are requiring a hybrid model that is integrating both approaches, an area that is still remaining underexplored in current research.

7.6. Practical Implications

From a practical perspective, the findings have been suggesting that PBOs would be benefitting from formalising the balance between informal and structured knowledge-sharing practices. The interview analysis has been highlighting the positive impact of both formal and informal knowledge sharing and learning, along with Communities of Practice (COP), in bridging knowledge gaps between experienced and newer members. This combination has been promoting a continuous flow of organisational memory, enhancing decision-making and learning. However, long-term retention is risking fragmentation if insights are not consistently being documented or shared, leading to the risk of "reinventing the wheel" and increased corporate amnesia. The organisation has been undertaken one-off initiatives to implement structured knowledge-sharing sessions across functional groups, similar to the COP model, and some interviewees have been initiating topic-specific sessions. Both the interview and workshop results have been indicating that, while informal exchanges remain vital, there is a clear need for these sessions to become part of a more organised framework. This structured approach is supporting ongoing collaboration and is ensuring that valuable insights are systematically being preserved within the wider organisation’s collective knowledge.

The workshop has been showing that both experienced and less experienced members have been contributing valuable yet distinct forms of organisational knowledge. Less experienced

members have often been relying on conscious knowledge from the organisation's objectified sources, such as recent tender management training, bringing fresh perspectives grounded in codified processes. In contrast, experienced members have been drawing on automatic and collective knowledge, sharing insights accumulated over years of practice. This diversity is helping to overcome competing memories by drawing on complementary levels of organisational memory, activated through social learning and pattern recognition within group discussions. Embedding structured processes to harness these contributions would be helping mitigate knowledge fragmentation and organisational forgetting, supporting sustainable organisational learning. This approach would be ensuring that the unique insights of both experienced and newer members are systematically begin shared and utilised across the organisation and within tenders. However, it is also raising an important question: at what stages of the tender process or during which decision-making moments are junior or senior perspectives most needed to enrich the group's level of organisational memory?

The growing use of AI tools is presenting practical considerations. While AI is providing rapid information access, it is relying on its own pattern recognition, which can occasionally be generating competing memories or irrelevant insights for the current context. This is highlighting the need for human expertise to validate AI outputs and ensuring alignment with organisational needs. PBOs should be ensuring digital tools complementing rather than replacing nuanced understanding that social learning offers. The workshops and interview results have been revealing an underutilisation of objectified knowledge and uncertainty in locating information, suggesting a need for clearer roles in knowledge management. Assigning knowledge champions or stewards could be helping that informal learning is being formalised and integrated into objectified and collective knowledge of the organisational memory. Implementing these roles, could be reducing knowledge fragmentation, making insights from tenders more accessible across projects and reinforcing the integration of both formal and informal knowledge into the organisation's collective knowledge, thus supporting long-term learning and improved decision-making.

7.7. Limitations

This research, conducted within the single context of Count & Cooper, may be carrying organisation-specific biases. The company's culture, knowledge management systems, and social learning practices may have been shaping the findings, limiting their applicability to larger or more hierarchical organisations facing different organisational memory activation challenges. Future research could be addressing this gap by comparing multiple organisations to examine how diverse cultures, structures, and practices shape the patterns and differences in how organisational memory has been activated and utilised.

The sample size, particularly for interviews, has been relatively small and limited to Count & Cooper's tender phase. While this has been allowing for a focused analysis of the organisational practices, it has been restricting the generalisability of the findings. A larger, more varied sample across organisations, sectors, and project types would be offering broader insights into social learning and organisational memory use in project-based contexts. Expanding beyond construction tenders could be further revealing differences in practices across project phases.

Workshops, though flexible, are introducing limitations in replicability and generalisability. Results are highly context-dependent and may not be apply broadly across different settings. Participants may be feeling pressured to conform to perceived researcher expectations or the organisational culture, impacting data authenticity by not expressing their true thoughts and experiences. Ensuring voluntary, unbiased participation will be essential but challenging in this format. This is introducing ethical complexities and can be compromising the authenticity of the data collected.

The task description in the workshop, designed to avoid specific references to formal processes, may have been influencing how participants have been approaching the stakeholder analysis. This lack of explicit guidance has been leading to variations, with some groups creating a power-interest grid while others have been submitting only a top six stakeholder list. This is suggesting that the absence of clear instructions has been contributing to variations in how participants have been approaching and understanding the task.

The applicability of the simulated tender process has been presenting limitations in realism. While real tenders are allowing for months of analysis, participants in this fictional tender had been given only 20 minutes per scenario, likely leading to more superficial analyses and selective use of organisational memory and approach. Furthermore, none of the participants has had prior experience with the workshop tender, and detailed requirements had been provided only during the session which may have been causing the contextual understanding of the workshop. These constraints are highlighting the challenges of replicating the depth of actual tender processes within the limited scope of the workshop.

Another limitation of this research has been lying in the difficulty of drawing firm conclusions on minimising corporate amnesia within PBO’s due to constraints in participant experience levels during the workshop. Although efforts have been made to match experience levels between groups, participant selection has been limited by the availability of organisational members and the need to exclude those who had previously been participated in the Count & Cooper tender being used in the problem-based learning workshop. Therefore, it has not been feasible to include highly experienced members, such as ‘tender managers,’ without risking potential bias in the workshop outcomes.

Moreover, while Count & Cooper is being a relatively young organisation, the overall expertise level among its employees is being high. This general experience level, however, has not been captured in the workshop data, which has been impacting the ability to assess the relationship between experience and corporate amnesia conclusively. Nevertheless, this research has been providing insights into the role of organisational memory activation in knowledge dissemination and organisational learning. By emphasising the importance of systematically activating organisational memory, these findings are offering a nuanced understanding of how PBOs can be preventing the redundancy of "reinventing the wheel," even if definitive conclusions regarding experience levels and corporate amnesia cannot be made.

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8. Conclusion

In this research the role of social learning and organisational memory within project-based construction organisations in the Dutch construction sector has been investigated, particularly during the tender phase. In this study has been examined how social learning is shaping the activation and use of organisational memory, focusing on how social learning practices are influencing knowledge retention and application in a highly dynamic, project-based environment. By analysing the interactions and behaviours that have been occurring in the problem-based learning workshop, this research has been aiming to uncover how social learning can be breaking the cycle of underutilisation of organisational memory.

The main objective of this research has been to answer the central research question, as outlined in section 1.4. Through a mixed-methods approach involving a literature review, interviews, and a problem-based learning workshop, key insights have been generated to help addressing the following main question:

'How can organisational memory be activated through social learning practices in project-based organisations?'

8.1. Research Question

To explore this question, several sub-questions have been formulated and addressed throughout the study. The findings from these sub-questions have been synthesised to offer an answer to the main research question in the final sections of this chapter.

8.1.1. RQ 1 - What is the current understanding of the organisational memory, social learning organisational learning and interpersonal behaviours according to literature?

Through a literature review, the current understanding of organisational memory, social learning and organisational learning, has been summarised. The literature has been providing insights into these concepts and highlighted their relevance to project-based organisations and has been aiding into understanding how the concepts are being interlinked.

Organisational memory has been defined in the literature in various ways, but a consistent theme is the accumulation and retention of knowledge, information, experiences, and practices within an organisation over time (Spender, 1996; Stein, 1995). This memory has been stored at different levels, including individual and collective memory, and has been playing a critical role in helping organisations making informed decisions based on past experiences. Spenders (1996) framework has been categorising organisational memory into four types: conscious (individual explicit), automatic (individual tacit), objectified (social explicit), and collective (social tacit) knowledge.

Over time, the understanding of organisational memory has been shifting from being a passive repository to a dynamic system that is requiring both individual and collective contributions for effective use. In project-based organisations (PBOs), however, the temporary nature of project work is often leading to knowledge fragmentation, as frequent team turnover and project disbandment is reducing opportunities for intra- and inter-project knowledge exchange (Ajmal & Koskinen, 2008). This fragmentation has not only been contributing to inefficiencies in applying organisational memory but has also been resulting in competing memories from

individuals or databases, where different, and sometimes outdated, recollections of past practices have been surfacing, complicating decision-making processes (Valle et al., 2019). Despite these risks, organisational forgetting has been seen as essential for fostering growth and adaptability, allowing organisations to discard obsolete information and making room for new insights and innovations (Klein et al., 2007).

Thus, organisational memory is both a valuable resource and a potential liability, depending on how well it has been managed and aligned with organisational practices. A balance between retaining useful knowledge and discarding outdated information is necessary to support continuous learning and adaptability, particularly in the dynamic environments of PBOs.

Social learning has commonly been defined in the literature as learning that is occurring in a social context through observation, modelling, internalisation, and interaction with others (Bandura, 1971). A consistent theme in the literature is the importance of social learning in facilitating the transfer of both tacit and explicit knowledge in PBOs. In the construction sector, social learning is especially critical during collaborative activities, where shared experiences are helping individuals to navigate the complex and unpredictable environments (Sunding & Ekholm, 2015; Warne et al., 2000). Within the construction sector, social learning can be taking place through a variety of practices, such as mentoring, coaching, storytelling, workshops, peer reviews, Communities of Practice (COPs), and brainstorming. These methods are facilitating social learning and enhancing problem-solving while fostering a culture of continuous learning (Koskinen & Pihlanto, 2008; Wenger et al., 2015; Yan et al., 2023). Social interactions in these practices can be triggering emotions, particularly through storytelling or shared experiences, which are deepening connections and reinforcing memories associated with specific knowledge (Barsade & Gibson, 2012). Additionally, social interactions can be activating pattern recognition, allowing individuals to identify recurring themes and structures from the organisational memory (Fortwengel & Keller, 2020). Such practices not only are bridging gaps in organisational memory but are also ensuring that knowledge is being applied effectively and shared across the organisation in the ever-evolving project environments (Bartsch et al., 2013; Brandi & Elkjaer, 2012; Ren et al., 2020). Social learning, therefore, is playing a role in embedding shared norms and practices that are improving collaboration and adaptability of the organisation.

Organisational learning has been seen in the literature as a continuous process through which organisations are acquiring, sharing, and applying both tacit and explicit knowledge among individuals and teams to improve routines, practices, behaviours, and decision-making (Levitt & March, 1988). In PBOs, this process has been crucial as knowledge from past projects must be informing future actions with single-loop, double-loop, and triple-loop learning reflecting the different levels of organisational learning, from correcting mistakes to challenging and transforming underlying assumptions (Dutton et al., 2014). However, the temporary nature of project teams is often leading to knowledge fragmentation, limiting opportunities for reflection and the integration of valuable insights into the organisation (Buttler, 2016; Carrillo et al., 2013). This fragmentation is not only hindering the effective transfer of lessons learned across projects, creating inefficiencies, but is also introducing competing memories, where differing recollections of past practices or outdated information is complicating decision-making processes (Valle et al., 2019). Learning should be viewed not merely as an individual process but as a social one, being rooted in collaboration and active participation within communities of practice and other social learning frameworks. This social foundation is requiring a

supportive organisational culture that is fostering engagement and is seamlessly integrating learning into daily interactions across the broader organisational environment. Such an approach will be ensuring that knowledge is continuously being co-created and applied throughout the organisation, driving long-term growth and adaptability in dynamic environments like PBOs (Brandi & Elkjaer, 2012).

8.1.2. RQ 2 - What is the interconnectedness between organisational memory, social learning and organisational learning in practice?

The interconnectedness between organisational memory, social learning, and organisational learning has been explored through a thematic analysis of interviews and workshops with tender professionals at Count & Cooper. These methods are revealing a dynamic and cyclical relationship where each element is relying on and is reinforcing the other elements. In project-based organisations, this relationship is being influenced by the challenges inherent in temporary team compositions, frequent staff turnover, and fragmented knowledge retention (Bakker et al., 2011; Kucharska & Bedford, 2020). Despite these challenges, PBOs will be remaining fertile environments for knowledge creation, providing effective mechanisms to activate and to use organisational memory (Swan et al., 2010).

Iterative Relationship Between Organisational Memory and Social Learning: The iterative relationship between organisational memory and social learning has been evident through practices such as mentoring, peer interactions, and informal discussions. These practices have not only been drawing on organisational memory but have also been contributing to its reinforcement. Argote & Guo (2016) have been arguing that knowledge transfer is occurring through both formal and informal channels, creating a feedback loop that is enhancing decision-making capabilities and adaptability. This feedback loop has been observed during the workshop and interviews, where social learning practices and informal group dynamics, have been strengthening both collective knowledge and organisational learning.

The alignment with Bandura's (1971) social learning theory where learning has been done through observation, modelling, and interaction is supporting this relationship. Social learning practices in the organisation have been leveraging organisational memory by drawing on tacit and explicit knowledge within group settings (Brandi & Elkjaer, 2012; Inkpen & Tsang, 2005). This process has been allowing knowledge to flow through social interactions, making it adaptable to the needs of PBOs, where rigid formal processes may be insufficient Yan et al. (2023).

The concept of Communities of Practice (COPs), as being outlined by Wenger et al. (2015), has also been highlighting the structured nature of social learning. Peer interactions and group discussions resemble COPs, enabling participants to bypass the challenges with formal repositories but still effectively acquiring conscious knowledge (Warne et al. 2000). The workshops have been demonstrating that participants could collectively be overcoming individual limitations by leveraging group knowledge, underscoring the role of interactive group learning environments in enhancing the application of organisational knowledge.

Social Learning as a Bridge for Organisational Learning: Social learning practices have been serving as a bridge for continuous organisational learning by facilitating the dissemination and integration of both tacit and explicit knowledge throughout the organisation. It has been seen that social learning has been mitigating the limitations of formal knowledge-sharing

systems, such as the underutilisation of objectified knowledge resources like the tender manual or lessons learned. Instead, participants have often been engaging in social learning to acquire conscious knowledge through collective knowledge reflecting Brandi and Elkjaer (2012) have been arguing on the value of shared practices in organisational learning.

Findings from Scenario 1B and Scenario 2 are showing that team-based learning has been leading to higher perceived learning outcomes and greater knowledge retention being compared to individual efforts in Scenario 1A. This is aligning with Salas et al. (2008), who have been emphasising the effectiveness of team-based learning, and Yan et al. (2023), who have been arguing that informal social learning is important in leveraging organisational memory in fast-moving environments like PBOs. Informal group discussions and peer interactions have been proven effective in facilitating knowledge transfer and refining decision-making strategies, suggesting that organisational learning is being most effective when being supported by dynamic, socially driven processes rather than by formal repositories

Dynamic Nature of PBOs on using Organisational Memory and Learning: The dynamic nature of PBOs, being marked by frequent team changes, high time pressures, and rapid project turnover, has been presenting distinct challenges for effectively utilising organisational memory and fostering continuous learning. Although formal processes like post-tender assessments have been in place, interviewees have been noting that uncertainty and time constraints have often been preventing these resources from fully integrating into the organisation's conscious knowledge. Consequently, objectified knowledge has been remaining siloed within databases, leading to a reliance on collective knowledge. This reliance has been causing teams to relearn the same lessons, reducing memory utilisation effectiveness and reinforcing single-loop learning.

Organisational memory in PBOs has been operating at multiple levels, with effective use contingent upon both codification and contextual understanding. To bridge these gaps, the organisation has been embracing social learning practices that have activating both objectified and collective knowledge. By drawing on collective knowledge, participants have been able to overcome individual limitations, fostering mutual pattern recognition and reinforcing the dynamic nature of organisational memory (Chiva and Alegre, 2005; Huber, 1991). This collaborative approach has been allowing them to gain conscious knowledge indirectly, bypassing formal codification. A supportive culture has been reinforcing this approach, with an open environment, mentorship programs, and knowledge-sharing events enabling employees to share unspoken rules and best practices.

While objectified knowledge has not always been directly converted into conscious knowledge, the exchange of related collective knowledge through social learning has been serving as an indirect means of distributing organisational memory across the organisation. This is underscoring the critical role of social learning in elevating group knowledge and learning by generating and activating organisational memory in the high-paced context of PBOs (Walsh & Ungson, 2009).

8.1.3. RQ 3 - How is organisational memory utilised during social learning practices?

The analysis of the workshop scenarios has been demonstrating that group dynamics are playing a significant role in the activation and utilisation of organisational memory during social learning practices, shaping both decision-making processes and learning outcomes. Through group interactions, participants have been drawing upon various forms of conscious, automatic, collective, and objectified knowledge from the organisational memory to refine their decision-making and to align individual insights with collective understanding. Social learning has been enabling pattern recognition within these practices and has been enabling participants to connect past experiences to current challenges effectively. However, the activation process has also been highlighting instances of conflicting memories, where AI-generated insights, occasionally have been presenting patterns that have not been aligning with the immediate context. This reinforces the importance of validation within social learning to ensure that both human and AI are contributing support to a cohesive and relevant organisational memory.

Training and Experience in Decision-Making: The findings from the workshops have been showing that both experienced and less experienced members have been contributing valuable, yet distinct, types of knowledge of the organisational memory. Less experienced members have been relying more on conscious knowledge being gained from the organisation's objectified knowledge, particularly through recent tender management training, offering updated perspectives grounded in codified processes. Conversely, experienced members have been drawing upon automatic and collective knowledge, sharing insights they have been accumulating through years of practice. This blend of perspectives has been facilitating pattern recognition, enabling team members to identify relevant themes from past experiences and applying them effectively to new situations.

The interview analysis has been highlighting the positive impact of both formal and informal mentorship practices, as well as the role of Communities of Practice (COP) within the organisation. The dynamic between participants has been underscoring the importance of balancing conscious, automatic, objectified and collective knowledge, which has been helping to bridge knowledge gaps between experienced and less experienced members. By enabling individuals to recognise useful patterns and avoid competing, outdated memories. This integration of various knowledge types in social learning practices has been fostering a continuous flow of knowledge within the organisational memory and will not be remaining siloed within individuals. It is instead being disseminated across the organisation, enhancing accessibility and encouraging cross-functional learning.

Consensus-Building: The consensus-building process has been highlighting the importance of group dynamics in effectively utilising organisational memory. Both groups have been benefitting from visually aligning their knowledge and insights, ensuring that each participant's contributions are being understood and are collectively being referenced. This visual alignment has been creating a unified reference point, reducing the risk of competing memories by clarifying and consolidating shared interpretations. By facilitating real-time feedback and understanding, this approach has been activating and strengthening the group's collective knowledge base. The process has been underscoring the critical role of group dynamics and shared visual tools in enabling organisational memory to support consensus and enhance decision-making.

The Role of Internal and External Objectified Knowledge: The workshops have been demonstrating that group discussions have been enabling participants to leverage each other's knowledge in ways that individual work is not permitting, both through shared examples and by recognising patterns in each other's insights. Participants unfamiliar with objectified knowledge, such as the P&I matrix, been gaining conscious understanding through collective knowledge shared in discussions. This dynamic has been highlighting the role of group learning in constructing individual knowledge, showing that collective insights are informing and shaping individual understanding without necessarily relying on formalised knowledge. Group dynamics have also been influencing the utilisation of both external and internal objectified knowledge. Both groups have been finding external objectified knowledge useful under time pressure or uncertainty, particularly when accessing information quickly through tools like AI.

The increasing use of AI tools has been presenting important practical considerations for organisations. While AI can be enhancing decision-making by rapidly recognising patterns within vast data sources, it can also be introducing competing memories that may not be relevant to the current context. This can be leading to further fragmentation if irrelevant insights are applied without validation. The findings have been indicating that human expertise will be remaining essential for evaluating AI outputs, ensuring that digital systems are complementing, rather than replacing, the nuanced understanding being provided by social learning.

Outcomes of the Workshops: The comparison between individual and group scenarios has been revealing that group dynamics have been enhancing learning outcomes. While individual work in Scenario 1A has been leading to divergent yet valid outcomes, the group-based scenarios have been resulting in higher perceived learning outcomes due to the refinement of stakeholder prioritisation through the exchange of insights and perspectives. The collaborative environment in Scenario 1B and Scenario 2 has been activating multiple forms of organisational memory, with participants collectively building on each other's conscious and collective knowledge. The results have been indicating that group dynamics are facilitating a deeper engagement with organisational memory, leading to outcomes that are closely aligning with key arguments in the original tender process. This finding is underscoring the value of social learning practices in activating and utilising organisational memory to support effective decision-making.

8.2. Main Research Question

In the previous sections, the sub-research questions have been addressed, providing the foundation for answering the main research question on:

'How can organisational memory be activated through social learning practices in project-based organisations?'

In conclusion, this research has been demonstrating that organisational memory in project-based organisations (PBOs) is not a static repository but a dynamic construct, being continuously accessed and reshaped through social learning practices. These practices have been facilitating the transfer and application of both tacit and explicit knowledge by activating various forms of organisational memory, conscious, automatic, objectified, and collective,

where pattern recognition, emotional triggers, and competing memories have collectively been shaping this process.

The interconnectedness between organisational memory, social learning, and organisational learning has been creating a continuous, adaptive cycle. Organisational memory has been serving as a foundation for social learning practices, which, in turn, have been drawing on and enhancing memory through shared experiences and interpersonal exchanges. By fostering an environment where members have been sharing organisational memory in real time, social learning has been reducing the risk of insights becoming siloed within individuals or databases, ensuring that conscious and collective knowledge is actively being utilised across the organisation and will be equipping members to meet new challenges more effectively.

In fast-paced PBOs, where team compositions have been frequently changing and time pressures have been high, social learning has been helping to reduce "reinventing the wheel" and mitigating "corporate amnesia." It has been fostering awareness through shared insights that might otherwise have been overlooked, encouraging members to recognise patterns and to connect emotionally to past experiences and current challenges. Findings from workshops and interviews have been demonstrating how different types of knowledge within organisational memory are being activated and applied, challenging Spender’s linear model by revealing alternative learning and knowledge flows. Specifically, conscious knowledge has been emerging indirectly through social learning by tapping into the collective memory, bypassing formalisation and codification, thereby elevating organisational memory.

The roles of experienced and less experienced members have also been reflecting this dynamic: newer members have been relying more on conscious knowledge being gained from recent training, while experienced members have been contributing automatic and collective knowledge built over years. This combination of perspectives has been acting as a bridge, increasing awareness of various aspects of organisational memory through pattern recognition and shared insights, bridging knowledge gaps and reducing competing, outdated memories. This synergy has been creating a balanced, continuous flow of organisational memory for learning within the organisation.

Furthermore, external objectified knowledge, such as AI tools, has been proving valuable when organisational memory has been lacking immediacy, context, or has been difficult to locate under time constraints. Uncertainty around knowledge accessibility or context has sometimes been triggering emotional responses, deterring reliance on internal databases. As a result, organisational members have been activating alternative aspects of organisational memory, turning to quicker external resources or colleagues for context-rich insights. While AI has been recognising familiar patterns within extensive databases, its outputs have often been requiring human assessment to align with specific tasks, acting as competing memories that are underscoring the importance of balanced discussions to validate various organisational memory sources. This dynamic has been demonstrating that digital systems should be complementing, rather than replacing, the nuanced understanding being achieved through social learning.

Consensus-building within social learning has been essential for effectively using organisational memory in decision-making. Aligned interpretations and validations of shared knowledge have been preventing competing views, fostering a cohesive organisational

memory base. This finding is suggesting that Spender's theory may have been underestimating the role of external objectified knowledge and the impact of social learning in the generation and activation of knowledge.

The research has also been highlighting a shift towards structured approaches within social learning practices, ensuring that insights are systematically being shared across functional groups and within communities of practice. While unstructured social learning practices, such as spontaneous exchanges or informal mentorship, have been remaining vital for dynamic collaboration, the time pressure typical of PBOs has often been limiting the ability to revisit prior learnings and has not been fully been reaching across the organisation, leading to knowledge being siloed within teams and resulting in organisational forgetting. However, this process has also been seen as essential for growth, enabling organisations to discard outdated knowledge and making room for innovation. Consequently, organisational memory has been emerging as both a valuable resource and a potential liability, depending on how effectively it is being managed and aligned with current needs.

To conclude, a dual-path approach combining structured and unstructured social learning practices has been enabling social learning to reshape and disseminate the different levels of organisational memory, sustaining ongoing organisational learning and preventing it from becoming siloed within individuals or teams. By fostering a flexible, dynamic environment where knowledge has been consistently exchanged, validated, and applied, organisations have been drawing upon diverse memory forms, reducing knowledge fragmentation and forgetting, and ensuring memory accessibility. This approach has been supporting both junior and senior members in using organisational memory as a dynamic, vital resource, ultimately driving improved outcomes and fostering continuous organisational learning.

9. Recommendations

In this chapter practical recommendations to enhance social learning and organisational memory use in project-based organisations are being outlined, alongside suggestions for future research.

9.1. Practical Recommendations

Several practical recommendations can be made based on the findings of this research.

Firstly, of all, it is critical for organisations to identify specific project processes or phases where learning and knowledge activation should be occurring. Rather than focusing solely on knowledge storage, organisations should be prioritising the application of knowledge to enhance decision-making and learning outcomes. The emphasis should be on enabling teams to access and to apply relevant knowledge at the appropriate time, as knowledge is no longer being viewed as a limited resource but as something of which value is lying in its timely use.

A challenge in the construction sector is the limited time available for learning and reapplying knowledge because of the discontinuous nature of project-based work. The workshops and literature review have been revealing that objectified knowledge, such as documented procedures or guidelines, are often lacking sufficient context or fail to capture the deeper insights being needed for practical application. Additionally, while digital repositories are being useful tools for storing knowledge, they are being limited by the quality and detail of user input. However, although there has been no formal documentation on key drivers for stakeholder classification, the workshops have been showing that the organisation's collective knowledge is containing valuable insights on this issue.

To address these challenges, it is being recommended that organisations will be prioritising the most impactful processes or projects for double-loop learning, a method that is not only questioning results but also the underlying assumptions and processes. Workshops can be used as a platform for capturing and sharing collective knowledge. These sessions can be helping to identify and to refine critical insights, which can then be codified into organisational practices. It is essential to store this knowledge in digital repositories with sufficient context, together with regular updates for the organisation, as has been highlighted by the interview results being related to knowledge uncertainty. However, as the workshops demonstrated, regular knowledge-sharing sessions and training are important to ensure continuous dissemination and refinement. These practices are fostering ongoing learning and application across the organisation.

Secondly, the research has been revealing that learning is often being treated as a separate, post-tender activity, with insights typically being captured and shared at the end of the process. This is limiting the opportunity for parallel learning across tenders, as there are being no scheduled reflection points during the tender lifecycle. To address this, it is being recommended to incorporate structured reflection moments within tender workflows. Teams should be having scheduled opportunities to discuss lessons being learned and to document key insights throughout the process, rather than waiting until conclusion of the tender. Existing cross-departmental review sessions, such as those in the tender process or scrum sprints, can be utilised as reflection points to focus specifically on what is working, what is not, and how

the insights can be informing ongoing and future work. This can be achieved by using the existing framework for capturing lessons being learned.

Finally, it has been highlighted that fragmented knowledge-sharing practices and uncertainty about what is happening to knowledge after lessons learned sessions has been causing struggles to find or to apply captured insights, leading to inefficiencies in knowledge use. To address this, it is recommended to establish "knowledge champions" within the organisation. These individuals would be responsible for capturing and promoting knowledge, providing regular updates on where information is being stored in digital repositories, and identifying the right contacts for specific queries. By clarifying responsibilities, knowledge champions can be ensuring knowledge will be effectively used and be easily accessible, addressing the issues being identified in the interviews.

9.2. Future Research Recommendations

This subsection outlines suggestions for future research. Based on the study's findings and limitations, several potential research directions are being proposed.

Firstly, it has been observed that the activation of organisational memory through social learning has been triggering pattern recognition, competing memories and emotional cues. However, these elements warrant deeper investigation to fully understand their impact on organisational learning and memory use. Future research should be delving into how these triggers have been interacting over time and across diverse team dynamics, particularly examining how pattern recognition and competing memories have been shaping knowledge retention and decision-making by their biases in selection of the memory. Additionally, exploring the role of emotional triggers in influencing the use of positive or negative memory recall and knowledge sharing may be revealing ways to optimise social learning without compromising the relevance and accuracy of organisational memory. By addressing these areas, future studies can be offering a more comprehensive model that balances the dynamic, nuanced nature of social learning with the strategic needs of organisational memory.

Secondly, this research has not specifically examined the impact of different social learning practices and their forms on interpersonal interactions during the workshop. Although observation during the workshop of both groups, has been indicating that discussion, reflection, and brainstorming have been part of the decision-making moments. These practices have not been analysed due to their varied forms and the use by the groups. Future research should be focussing on systematically analysing the influence of different social learning practices and their specific forms during the group interactions. This would be providing valuable insights into how these practices are effecting the use of organisational memory and are influencing decision-making processes in team settings. A deeper understanding of these dynamics would be helping to optimise knowledge sharing and decision-making during group interactions, further enhancing organisational learning and memory.

Thirdly, the workshops have not been including a control group in which participants has not been given limitations on their decision-making processes. While scenario 2 has been allowing participants full freedom to use any tools or processes, they first have been completing scenario 1A or 1B, which may have influenced their actions and decisions in scenario 2. This has been raising the question of whether the sequence of scenarios are effecting how

participants are engaging with organisational memory and are behaving in interpersonal interactions. To improve the workshop's design and to better understand the influence of interpersonal dynamics on organisational memory, future research should be including a control group using the designed framework for the workshops. A control group starting without any constraints would be helping isolate the effects of scenario sequencing and would be providing a baseline for comparing how structured versus unstructured processes are influencing decision-making.

Furthermore, future studies should be ensuring that the organisation being used for the research will be having the capacity to recruit participants with similar tender experience, time being spent in the company, and no prior involvement in the workshop assessment. This is addressing the challenge of a limited sample pool and will be ensuring comparable competencies across groups. By taking these factors into consideration, the workshop set-up can be refined, enabling a more accurate assessment of how group dynamics and the absence of restrictions is effecting knowledge application. This would be leading to a more generalisable and valid understanding of group interactions and the use of organisational memory.

Fourthly, while this research has not been directly observing the effects of continuous social learning exposure, the literature on memory consolidation has been suggesting that effective organisational learning may be benefitting from structured rest periods and reoccurring engagement with it to support memory consolidation. Memory consolidation, or the transformation of short-term memories into stable long-term ones, has been shown to prevent cognitive overload and has been ensuring that knowledge of the organisational memory is being internalised rather than merely accessed. Research by Diekelmann and Born (2010) has been underscoring the need for periodic “knowledge disengagement” to transfer information effectively into long-term memory, indicating that constant exposure to information or social interactions may be disrupting this process. Future studies could be exploring the balance between social learning and necessary disengagement periods to understand if constant social engagement could be leading to a potential cognitive overload and will be having a negative impact on learning effectiveness.

Fifthly, the workshops have been indicating the importance of strategically integrating senior and junior members during the tender process to enhance organisational memory. Senior members have been contributing automatic and collective knowledge from experience, while junior members have been bringing more conscious knowledge from fresh insights of recent training. Recognising when the input of each group is being most impactful will be ensuring that organisational memory will be fully utilised. This approach is also raising an important question: at which project stages should senior and junior members be best integrated to maximise knowledge use and learning outcomes? Answering this could be helping to bridge knowledge gaps and to keep organisational memory dynamic and evolving.

Lastly, this research has only been investigating a small, specific part of the tender process, on the decision-making process of classifying stakeholders. Future research should be extending this analysis by conducting comparative workshops on more complex topics, such as risk identification and mitigation. This would be providing deeper insights into whether objectified knowledge is playing a more significant role in complex, unfamiliar decision-making moments. Such an investigation would be helping further understand the dynamics of knowledge utilisation in more challenging contexts, contributing to both theory and practice.

By addressing these areas, future research can be offering deeper insights into how organisational memory is being activated during social learning practices. This research has only begun to explore the connections between social learning, organisational learning, and interpersonal behaviours in relation to organisational memory. It is providing a foundation for understanding how organisational memory can be more effectively activated within tenders in project-based organisations, offering actionable strategies for improving knowledge retention and application.

9.3. Reflection

Reflecting on my thesis journey, I can be saying it has been an experience that has deeply been challenging my academic and personal growth. My research has begun with a desire to address a knowledge gap in the organisational memory use within project-based organisations. Throughout the thesis, I have been realising the importance of taking multiple steps back to gain a broader perspective on my research approach and my scope. Since I have been developing my own research topic, establishing clear boundaries on what to include has been challenging but essential. I have been learning that investing time, even days or weeks, to define a clear reference point has been far more effective than proceeding the 'marathon' without a focused aim. Initially, I have been eager to capture every idea and insight, but balancing the dual demands of qualitative depth and theoretical breadth has been one of my biggest challenges, especially with such complex topics as organisational memory and social learning.

Early on, I have not been making it a habit to record interesting points from papers during reading, but I have been discovering after each progress meeting how crucial it has been to track how these insights have been connected to my central research questions. This habit has been saving significant time and effort in later stages. Additionally, drafting first and editing later has also been an important insight as it has been allowing to develop thoughts without overthinking. This has been helping me to refine my ideas more naturally as I have been progressing and have not been stressed to make it perfectly right away. I have been realising that not having all the answers immediately is also okay. Embracing the idea that "not having a complete answer" have kept me open to unexpected insights with a sense of calmness. This approach has been underscoring the principle that simplicity and clarity are often more being effective than trying to cover too much ground.

Designing the workshop has been one of the most challenging yet rewarding aspects of the process that is still giving me a big smile when thinking about it how it has been going. It has been requiring balancing a theoretical foundation with practical relevance while creating a framework that would be facilitating meaningful discussions and insights has not been an easy task. However, observing how participants have been engaging deeply with my thesis and analysing their interactions have been affirming the value of this method in uncovering rich insights.

There have been times when I have been feeling pressured to go into "production mode" to complete the thesis on time, feeling the urge to run the thesis 'marathon' and to take shortcuts. However, I have been learning that the right path is the longest and the toughest one, but ultimately the most rewarding and the one you will be taking at the end after all. This thesis journey has been teaching me that research is being as much about the journey as it is about

the findings. Each step, from drafting and gathering insights to building my understanding of the process itself, has been teaching me the importance of carving my own path in research. Overall, I am grateful for the insights from my committee and supervisors and the time and space they have been providing me to explore the research and finding my way.

One personal piece of advice I would like to give to future thesis writers is to have a “mental thesis support group.” Being with friends “in the same trenches” and talking weekly about your ups and downs will be helping to pull through this feeling of a solitary process. These ‘social learning’ interactions will not only be providing emotional support but will also be offering fresh perspectives, constructive feedback, encouragement and also the insights of the support group by not having to in this case also ‘reinvent the wheel’ again. This will be making it easier to navigate the sometimes lonely and overwhelming roller coaster ride of the thesis life. It will be making a difference in transforming this experience into something both manageable, enjoyable and rewarding.

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Appendix A - Interview guide

For this study, the following questionnaire has been used for semi-structured interviews, serving as a guide during the interview process.

5 minutes Introduction per person

- Can you share a bit about your background?
- What is your role within the tender process, and what are your main responsibilities?
- How many years of experience do you have working with tenders?
- How did you get started in the tendering process at Count & Cooper?
- Which tenders have you worked on in the past?

10 minutes Learning Preferences and Processes

- How would you describe the current practices within Count & Cooper to facilitate learning during, between and after the tenders?
- Which process outside the tender facilitates learning from one another, can you name a few currently implemented or planned to be introduced?
- Are there within the company community of practices that shares and learns from each other?

10 minutes Organizational Culture and Environment

- How would you describe the culture within Count & Cooper and how would this affect or stimulate learning?
- How do you think the culture within Count & Cooper can be improved to promote learning and knowledge sharing?

10 minutes Tender Dynamics and Process

- Based on your experience what is the effect of the nature of the tender duration and process on learning, where lay opportunities to improve and what are barriers to overcome?
- How do you consult information sources during the different phases of a tender?

10 minutes Knowledge Sharing and Retention

- How do you make sure that the things you have learned as a team, are actually reintegrated in the whole organisation, or if a fixed routine is taken with it, are there current frame works for this and when does this happen?
- How is knowledge retained when team members leave the team or the organisation?
- What is Count & Cooper currently doing to ensure that tender knowledge remains relevant and up to date?

Appendix B - Workshop

B.1 - Pre-Workshop Survey

G1S - Pre-Workshop

* Vereist

* Dit formulier registreert uw naam, vul uw naam in.

Gegevens participanten

1. Voornaam *

2. Sinds wanneer ben je gestart bij Count en Cooper *

3. Hoeveel jaren ervaring heb je algemeen met tenders? *

4. In welke sector heb je meeste tender ervaring in? *

- ◯ Infrastructuur
- ◯ Waterbouw
- ◯ Energie
- ◯ Andere

5. § Met welke groepsleden heb je eerder op een tender samengewerkt? *

- ☐ G1
- ☐ G2
- ☐ G3
- ☐ G4
- ☐ Niet

6. Op welke tender was dit per persoon? *

7. Wat was de meeste recente functie rol die je in de tender bekleedde? *

- ◯ EMVI Coördinator
- ◯ Business Lead
- ◯ Delivery Manager
- ◯ Andere

8. In welk jaar heb je welke tendermanagement training(en) bij C&C gevolgd? *

B.2 - Workshop Survey Group 1 Scenario 1A

G1S - Evaluatie

* Vereist

* Dit formulier registreert uw naam, vul uw naam in.

Verloop

1. Voornaam *

2. Waarom heb je ervoor gekozen om de analyse op deze manier te maken en wat heb je hiervoor gebruikt? *

3. Zou je zonder externe bronnen de analyse kunnen uitvoeren en waarom? *

4. Waren er momenten dat je terug viel op eerdere ervaringen en wat waren deze? *

5. Welke bron(nen) heb je gebruikt en geraadpleegd tijdens de workshop? *

- [ ] SharePoint
- [ ] Outlook
- [ ] Teams
- [ ] Whatsapp
- [ ] Internet
- [ ] Andere

6. Waarom heb je ervoor gekozen om deze bron(nen) te gebruiken? En welke document(en) heb je opgezocht? *

7. Wat maakte de document(en) van de bron(nen) die je hebt gebruikt waardevol? En wat heb je hiervan gebruikt? *

8. Welke bron(nen) heb je gebruikt en geraadpleegd tijdens de workshop? *

- [ ] SharePoint
- [ ] Outlook
- [ ] Teams
- [ ] Whatsapp
- [ ] Internet
- [ ] Andere

9. Waarom heb je ervoor gekozen om deze bron(nen) te gebruiken? En welke document(en) heb je opgezocht? *

10. Wat maakte de document(en) van de bron(nen) die je hebt gebruikt waardevol? En wat heb je hiervan gebruikt? *

11. Hoe gemakkelijk kon je in de document(en) vinden wat je nodig had, en waarom geef je dit antwoord? *

12. In hoeverre heb je iets nieuws geleerd tijdens de workshop *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

13. Wat heb je geleerd tijdens de workshop, en van wie of wat heb je deze kennis gekregen? *

14. In hoeverre voel je de behoefte om de kennis door te geven aan ander? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

15. Waarom voel je je wel of niet de behoefte om deze kennis door te geven? *

16. Wat is volgens jou de beste manier om deze kennis te borgen, zodat andere die dit ook niet weten het te krijgen te weten? *

17. Heb je ooit een tender stakeholder analyse gedaan bij C&C? Wat was je onderdeel hierin en hoe vaak heb je dit gedaan? *

B.3 - Workshop Survey Group 1 Scenario 2

G1S2 - Evaluatie

* Vereist

* Dit formulier registreert uw naam, vul uw naam in.

Verloop

1. Voornaam

2. Hoe heeft het gesprek van vandaag tijdens de workshop je aanpak van de taak beïnvloed? *

3. Hoe hebben de groep discussies geholpen om zaken te verduidelijken en waarom? *

4. Waarom hebben jullie ervoor gekozen om de analyse op deze manier te maken en wat heb jullie hiervoor gebruikt? *

5. Welke bron(nen) heb je gebruikt en geraadpleegd tijdens deze fase van de workshop? *

- [ ] SharePoint
- [ ] Outlook
- [ ] Teams
- [ ] Whatsapp
- [ ] Internet
- [ ] Andere

6. Waarom heb je ervoor gekozen om deze bron(nen) te gebruiken? En welke document(en) heb je opgezocht? *

7. Wat maakte de document(en) van de bron(nen) die je hebt gebruikt waardevol? En wat heb je hiervan gebruikt? *

8. Hoe gemakkelijk kon je in de document(en) vinden wat je nodig had, en waarom geef je dit antwoord? *

9. In hoeverre heb je iets nieuws geleerd tijdens de workshop *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

10. Wat heb je geleerd tijdens de workshop, en van wie of wat heb je deze kennis gekregen? *

11. In hoeverre voel je de behoefte om de kennis door te geven aan ander? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

12. Waarom voel je je wel of niet de behoefte om deze kennis door te geven? *

13. Wat is volgens jou de beste manier om deze kennis te borgen, zodat andere die dit ook niet weten het te krijgen te weten? *

14. In welke maten denk je dat jullie de stakeholder analyse hebben uitgevoerd conforme het formele proces van Count en Cooper? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

15. Waarom geeft je dit cijfer? *

16. Als de volgorde van de workshop andersom was, denk je dat het eindresultaat anders zou zijn geweest en waarom? *

B.4 - Workshop Survey Group 2 Scenario 1B

G2S1 - Evaluatie

* Vereist

* Dit formulier registreert uw naam, vul uw naam in.

Verloop

1. Voornaam

2. Hoe heeft het gesprek van vandaag tijdens de workshop je aanpak van de taak beïnvloed? *

3. Hoe hebben de groep discussies geholpen om zaken te verduidelijken en waarom? *

4. Waarom hebben jullie ervoor gekozen om de analyse op deze manier te maken en wat heb jullie hiervoor gebruikt? *

5. Waren er momenten dat je terug viel op eerdere ervaringen en wat waren deze? *

6. In hoeverre heb je iets nieuws geleerd tijdens de workshop *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

7. Wat heb je geleerd tijdens de workshop, en van wie of wat heb je deze kennis gekregen? *

8. In hoeverre voel je de behoefte om de kennis door te geven aan ander? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

9. Waarom voel je je wel of niet de behoefte om deze kennis door te geven? *

10. Wat zou je de volgende groep adviseren met de kennis van nu? *

11. In welke maten denk je dat jullie de stakeholder analyse hebben uitgevoerd conforme het formele proces van Count en Cooper? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

12. Waarom geeft je dit cijfer? *

B.5 - Workshop Survey Group 2 Scenario 2

G2S2 - Evaluatie

* Vereist

* Dit formulier registreert uw naam, vul uw naam in.

Verloop

1. Voornaam

2. Waarom hebben jullie ervoor gekozen om de analyse op deze manier te maken en wat heb jullie hiervoor gebruikt? *

3. Zou je zonder externe bronnen de analyse kunnen uitvoeren en waarom? *

4. Welke bron(nen) heb je gebruikt en geraadpleegd tijdens deze fase van de workshop? *

- [ ] SharePoint
- [ ] Outlook
- [ ] Teams
- [ ] Whatsapp
- [ ] Internet
- [ ] Niet
- [ ] Andere

5. Waarom heb je ervoor gekozen om deze bron(nen) te gebruiken? En welke document(en) heb je opgezocht? *

6. Wat maakte de document(en) van de bron(nen) die je hebt gebruikt waardevol? En wat heb je hiervan gebruikt? *

7. Hoe gemakkelijk kon je in de bronnen die je raadpleegde vinden wat je nodig had, en waarom geef je dit antwoord? *

8. Hoe hebben de groep discussies geholpen om zaken te verduidelijken en waarom? *

9. In hoeverre heb je iets nieuws geleerd tijdens deze scenario van de workshop *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

10. Heb je iets nieuws geleerd tijdens deze scenario van de workshop, en van wie of wat heb je deze kennis gekregen? *

11. In hoeverre voel je de behoefte om de kennis door te geven aan ander? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

12. Wat zou je de volgende groep adviseren met de kennis van nu? *

13. In welke maten denk je dat jullie de stakeholder analyse hebben uitgevoerd conforme het formele proces van Count en Cooper? *

0	1	2	3	4	5	6	7	8	9	10

Helemaal niet waarschijnlijk — Zeer waarschijnlijk

14. Waarom geeft je dit cijfer? *

15. Als de volgorde van de workshop andersom was, eerst als groep met externe bronnen en dan alleen als groep zonder externe bronnen, denk je dat het eindresultaat anders zou zijn geweest en waarom? *

B.6 - Workshop Case N34

Aanbestedingsleidraad - "N34 Schakel Drenthe-Oost"

Groep X

Zaaknummer: 202421051998

Datum: X

Colofon

Uitgegeven door Opdrachtgever (DUAH) aan Count & Cooper.

Stationsplein 45 unit A7.194 (Entree A, zijde Stationsplein),

3013 AK, Rotterdam

Datum X

Status Definitief

Versienummer 1.0

Inhoud

1. Opdrachtomschrijving

De provincie Drenthe, als opdrachtgever van "N34 Schakel Drenthe-Oost", wil inzichtelijke hebben welke stakeholders belang hebben bij dit project en mogelijk obstakels kunnen vormen. Daarom heeft zij het ISO 9001:2015 gerenommeerde Count & Cooper gevraagd om de stakeholders van dit project te identificeren. Count & Cooper heeft in samenwerking met een grote aannemer ingeschreven voor deze tender en jullie als team geselecteerd om aan deze opdracht te werken.

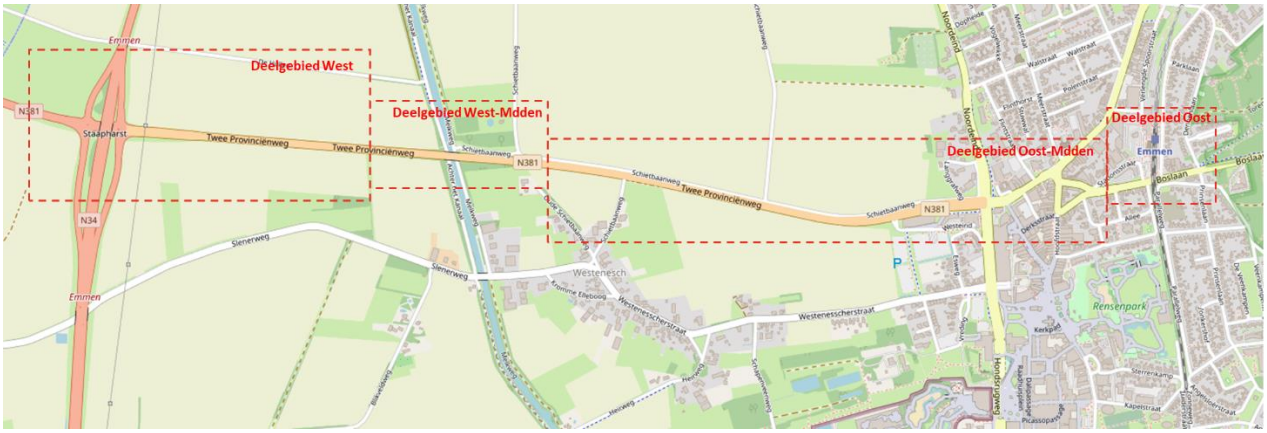
Het legioen van hardwerkende werkstudenten heeft tijdens de brons fase van de tender al een eerste inventarisatie van de stakeholders gemaakt. Ze hebben de nota van inlichtingen uit de dialooggesprekken en de input uit de specialistengesprekken samengevat, waarbij alle benodigde punten zijn opgenomen in Bijlage A – Stakeholder Inventarisatie. Er zijn geen andere relevante stakeholders voor dit project (ze hebben hun best gedaan). De opdrachtgever wil van de ervaren professionals bij Count & Cooper een top 6 van de belangrijkste stakeholders, inclusief een toelichting waarom.

1.1 Projectdoelstellingen

De provincie Drenthe heeft als doel een nieuwe provinciale weg te realiseren onder de projectnaam "N34 Schakel Drenthe-Oost", zoals weergegeven in Figuur 1. Dit project is gericht op het verbeteren van de regionale bereikbaarheid, het verhogen van de verkeersveiligheid, en het versterken van de ruimtelijke kwaliteit in de regio. In samenwerking met diverse stakeholders heeft het projectteam de planologische inpassing van de nieuwe verbinding voorbereid en de aanbestedingsstukken opgesteld, inclusief de Overeenkomst voor het ontwerp, de realisatie en het onderhoud van de N34 Schakel Drenthe-Oost.

De provincie wil de deskundige opdrachtnemer binnen de gestelde kaders verantwoordelijk maken voor het realiseren van de volgende projectdoelstellingen:

- Verbetering van de regionale bereikbaarheid
- Verbetering van de verkeersveiligheid
- Versterking van de ruimtelijke kwaliteit



Figuur 1 Projectgebied N34

COUNT & COOPER
BUILDING NEW WAYS

1.2 Contractvorm

Voor het N34 project is gekozen voor de contractvorm Design, Build & Maintain (DBM), gebaseerd op de UAV-GC 2005. Dit houdt in dat de opdrachtnemer verantwoordelijk is voor zowel het ontwerp, de bouw als het meerjarig onderhoud van de weg, met een onderhoudsperiode van 15 jaar. De provincie past systeemgerichte contractbeheersing (SCB) toe, waarbij zij op afstand blijft en via het kwaliteitssysteem van de opdrachtnemer inzicht krijgt in de kwaliteitsborging en uitvoering van het werk.

2. Uitsluitingsgronden

De aan te leveren stukken voor deze tender moeten op **X voor X** (GMT+2) worden ingediend bij de opdrachtgever. De stukken moeten in **pdf-formaat** worden aangeleverd via de QR-code op de PowerPoint. Bij het te laat indienen zou Count en Cooper de tender de plank misslaan bij de andere onderdelen van in de volgende fases. Bij het te laat indienen zou Count en Cooper in de volgende fases van de tender de plank totaal mis kunnen slaan en een verplichte afwijking moeten openstellen volgens de kwaliteit proces van ISO9001:2015, wil jij dat op je geweten?

Bijlage A – Stakeholder Inventarisatie

A.1 ProRail

ProRail is verantwoordelijk voor de bouw en het onderhoud van het spoor en de stations, maar niet voor de openbare ruimte rondom de stationsomgeving. Een verbeterde stationsomgeving en een betere bereikbaarheid maken het gebruik van het spoor aantrekkelijker voor reizigers. ProRail stelt kaders voor spoorwegovergangen, zoals die bij de Rengersweg, en fungeert als vergunningverlener voor vergunningen volgens de Spoorwegwet. Daarnaast zijn ze eigenaar van richtlijnen vanuit VSE (Veiligheid, Spoor en Eisen) waaraan bij het project voldaan moet worden. ProRail heeft ook meegedacht in de visie op de stationsomgeving in 2020 en in het bepalen van het voorkeurstracé.

A.2 Waterschap Drents Overijsselse Delta (WDODelta)

Het Waterschap Drents Overijsselse Delta (WDODelta) vervult een centrale rol in het N34 Schakel Drenthe-Oost project als beheerder van het oppervlaktewater. Ze zijn verantwoordelijk voor zowel het waterbeheer als voor het verleggen van een persleiding binnen het projectgebied. WDODelta stelt een waterplan op dat dient als basis voor de projectuitvraag, waarin ze hun eisen voor waterberging en -afvoer verankeren in het contract. Daarnaast verleent het waterschap de noodzakelijke watervergunningen en behandelt BLBI-meldingen om ervoor te zorgen dat de werkzaamheden volgens de geldende regelgeving verlopen. Samen met de provincie Drenthe leggen ze afspraken vast in een Samenwerkingsovereenkomst (SOK), die specifiek gericht is op de verlegging van de persleiding en de uitvoering van water gerelateerde werkzaamheden binnen het project. Hierdoor wordt de integratie van waterbeheer in de infrastructuurontwikkeling zorgvuldig geborgd.

A.3 Rijkswaterstaat

Rijkswaterstaat speelt een specifieke rol in het N34 Schakel Drenthe-Oost project als beheerder van de vaarweg en damwandconstructie onder de brug over het Kanaal in Emmen. Ze zijn bevoegd gezag voor alle werkzaamheden die in en boven het kanaal plaatsvinden vanuit nautisch oogpunt (VWM). In het project zijn de eisen voor de brug en de PVR (Project Verkeersvoorzieningen Rijkswaterstaat) over het Kanaal opgenomen in het contract, wat borgt dat deze aspecten volgens de gestelde richtlijnen worden uitgevoerd.

Afspraken met betrekking tot de Kanaalverruiming, die invloed hebben op het project, zijn vastgelegd in een Samenwerkingsovereenkomst (SOK) tussen de provincie Drenthe en Rijkswaterstaat. Deze afspraken zorgen ervoor dat de werkzaamheden aan het kanaal en de brug nauwkeurig en volgens plan verlopen.

Rijkswaterstaat heeft geen direct belang in het project buiten de werkzaamheden aan de brug over het Kanaal, maar ze hebben wel zienswijzen ingediend voor het Provinciaal Inpassingsplan (PIP) om hun belangen te waarborgen. Daarnaast zijn zij verantwoordelijk voor het verlenen van de watervergunning voor de realisatie van de brug, waarbij mogelijk een uitgebreide procedure wordt gevolgd.

A.4 Gemeente Emmen

De gemeente Emmen is, samen met de provincie Drenthe, de initiator van het N34 Schakel Drenthe-Oost project. De gemeente maakt deel uit van het RKT (landschapsarchitect) en de welstandscommissie in Emmen. Als beheerder van het lokale wegennet, exclusief de N-wegen, draagt de gemeente verantwoordelijkheid voor het onderhoud en de toegankelijkheid van deze wegen. Daarnaast fungeert de gemeente als bevoegd gezag voor (omgevings)vergunningen en is het eerste aanspreekpunt voor stakeholders in de omgeving, zoals omwonenden en bedrijven.

In de tenderfase treedt de gemeente op als beoordelaar binnen het RKT en neemt zij de rol van vergunningverlener op zich in de uitvoeringsfase. De gemeente Emmen is een gezamenlijke initiatiefnemer en beoordelaar samen met de provincie Drenthe, waarmee een samenwerkingsovereenkomst is afgesloten om het project succesvol te realiseren**.**

De gemeente Emmen beheert een groot deel van het areaal in het projectgebied en investeert 4 van de 98 miljoen euro in het project. Ze stelt daarnaast gemeentelijke gronden beschikbaar voor de realisatie van de nieuwe infrastructuur. Het project biedt de mogelijkheid om de openbare ruimte in Emmen te verbeteren, onder meer door een betere doorgaande verbinding tussen de A37 en Emmen, een verbeterde bereikbaarheid van bedrijventerreinen, en een vermindering van verkeersoverlast in het centrum van Emmen. Na de voltooiing van het project Schakel Drenthe-Oost kan het centrum van Emmen verder worden heringericht.

A.5 NS

NS is eigenaar en beheerder van het stationsgebied in Emmen en draagt de verantwoordelijkheid voor het bieden van een kwalitatief goede transfer voor treinreizigers van en naar het perron. Een verbeterde stationsomgeving en een betere bereikbaarheid vergroten de aantrekkelijkheid voor reizigers om gebruik te maken van de diensten van NS. In de planfase wordt NS betrokken bij het ontwerp en het inpassingsplan, hoewel ze in de tenderfase geen actieve rol spelen bij de gunning. Tijdens de uitvoeringsfase fungeert NS als een belangrijke stakeholder in de omgeving die op de hoogte moet worden gehouden van de voortgang. Ze hebben zienswijzen ingediend voor het Provinciaal Inpassingsplan (PIP) en hebben meegedacht in de visie voor de stationsomgeving in 2020. Bovendien is er een samenwerkingsovereenkomst afgesloten met de provincie Drenthe, die de samenwerking tussen beide partijen regel

A.6 Provincie Drenthe

De provincie richt zich op het verbeteren van de doorstroming en veiligheid op de doorgaande verbinding, evenals op de verbetering van de ruimtelijke kwaliteit van de omgeving rondom de N34. Daarnaast heeft de provincie de taak om de kwaliteit van de leefomgeving en de natuur te borgen en te verbeteren. Met een investering van 94 van de 98 miljoen euro draagt de provincie aanzienlijk bij aan het project en is verantwoordelijk voor het behalen van een succesvolle uitkomst. In de tenderfase treedt de provincie ook op als beoordelaar voor de BPP-procedures.

De provincie Drenthe is samen met de gemeente Emmen de initiator van het N34 Schakel Drenthe-Oost project en fungeert als opdrachtgever voor de uitvoering ervan. De beoordelingscommissie voor BPP (Best Value Procurement) bestaat grotendeels uit medewerkers van de provincie. Hoewel de provincie geen actief onderdeel uitmaakt van het RKT, is zij beheerder van de N34 en de aansluitende N-wegen, inclusief verkeersregelinstallaties (VRI's) en andere infrastructuur. Als bevoegd gezag is de provincie verantwoordelijk voor het verlenen van vergunningen, evenals voor het opstellen van het Provinciaal Inpassingsplan (PIP) en het afhandelen van langlopende vergunningen, zoals die onder de Natuurbeschermingswet.

B.7 - Workshop Case N34 Presentation

WORKSHOP N34

DRENTHE-OOST

Zaaknummer: 202421051998

Partij: Groep X

Datum: X

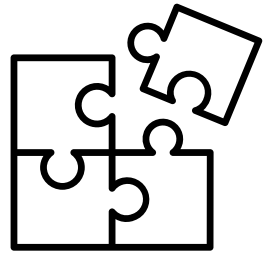
TU Delft

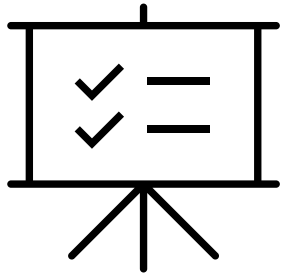
COUNT & COOPER
BUILDING NEW WAYS

Wat is het doel van de workshop

Onderzoeksdoel

Hoe en welke aspecten van het organisatiegeheugen worden geactiveerd door kleine interpersoonlijke groepsinteracties binnen sociale leerpraktijken.





Onderzoeks vraag

'How can organisational memory be activated through social learning practices in project-based organisations?'

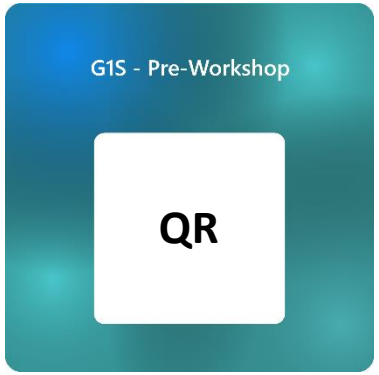
01

HREC

Verwerking deelname-informatie

Pre-workshop

Algemene info



TEAMASSESSMENT

N34 SCHAKEL DRENTHE-OOST

Zaaknummer: 202421051998

Partij: X

Datum: X

COUNT & COOPER
BUILDING NEW WAYS

Agenda

Verloop Team assessment

Start Team assessment

Einde Team assessment

Deadline - X

Deadline - X

01	02	03	04	05	06
Introductie	**Scenario 1**	**Evaluatie**	**Pauze**	**Scenario 2**	**Evaluatie**
10 mins	**30 mins**	**10 mins**	**5 mins**	**20 mins**	**10 mins**

Tender

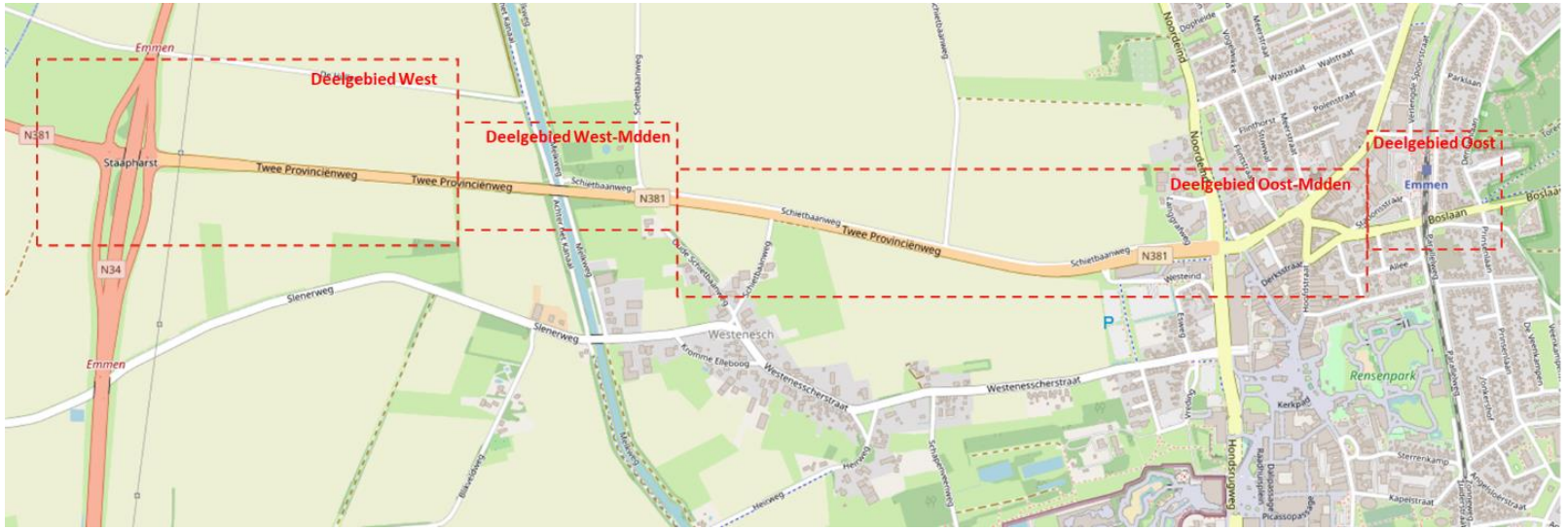
N34 Schakel Drenthe-OosT

Projectdoelstellingen

- **Doel**: Realisatie van de provinciale weg "N34 Schakel Drenthe-Oost" om regionale bereikbaarheid en verkeersveiligheid te verbeteren.
- **Samenwerking**: Planologische inpassing en aanbestedingsstukken voorbereid in samenwerking met diverse stakeholders.
- **Uitvoering**: Ontwerp, realisatie en onderhoud van de N34 vastgelegd in de overeenkomst.

Team Assessment

- **Doel**: Provincie Drenthe wil inzicht in stakeholders met belangen en die mogelijk een obstakel kunnen vormen voor "N34 Schakel Drenthe-Oost"
- **Informatie**: Het werkstudentenlegioen heeft een stakeholder inventarisatie uitgevoerd, samengevat in Bijlage A.
- **Opdracht**: Top 6 van belangrijkste stakeholders met een toelichting.



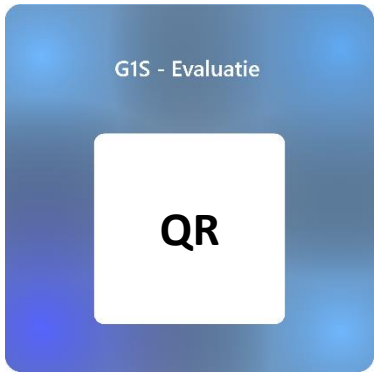
02

TeamAssessment

N34 Schakel Drenthe-OosT

Scenario 1

Deadline X



Limitaties

Individueel

PAUZE

N34 SCHAKEL DRENTHE-OOST

Zaaknummer: 202421051998

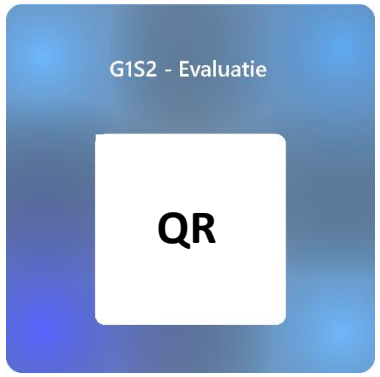
Partij: Groep X

Datum: X

TU Delft

COUNT & COOPER
BUILDING NEW WAYS

05



TeamAssessment

N34 Schakel Drenthe-OosT

Scenario 2

Deadline X

Limitaties

Geen contact buiten de groep

EINDE TEAMASSESSMENT

N34 SCHAKEL DRENTHE-OOST

Zaaknummer: 202421051998

Partij: Groep X

Datum: X

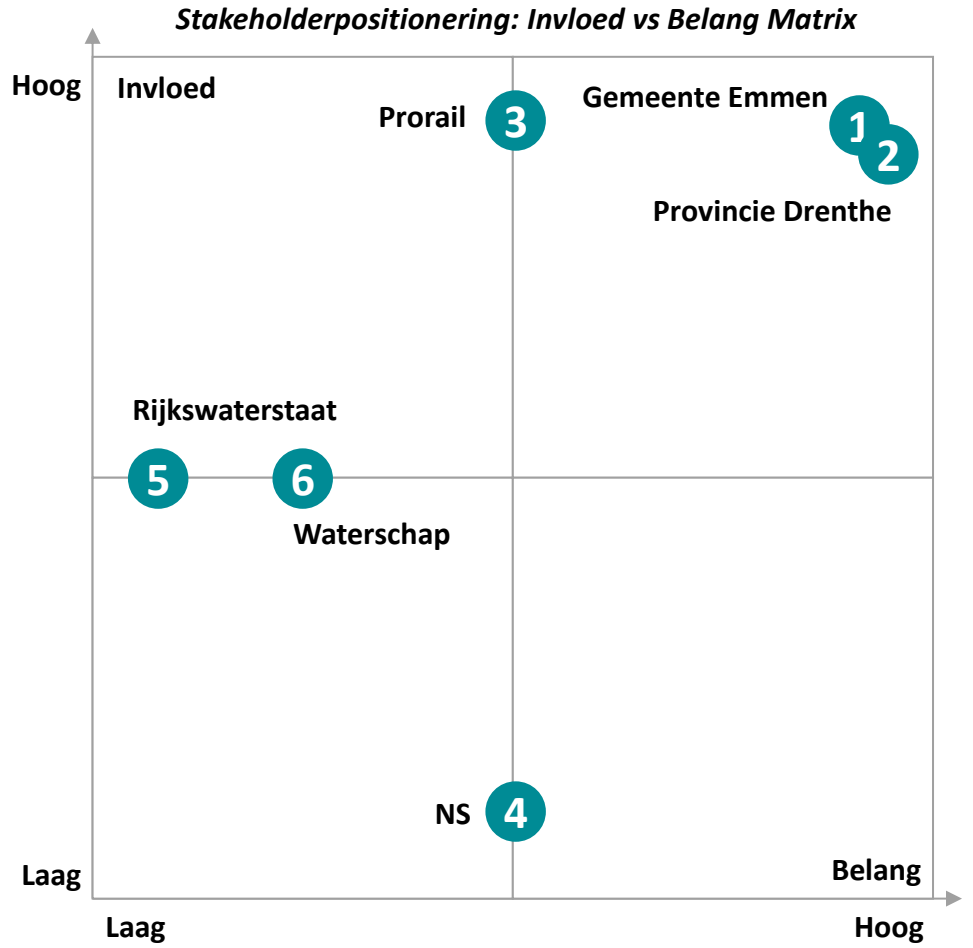
COUNT & COOPER
BUILDING NEW WAYS

Uitkomst Stakeholderanalyse (N34)

Opdrachtgever (provincie Gelderland) en de gemeente Lochem hebben beiden een hoog belang en hoge invloed op het project

Overige stakeholders zijn als bevoegd gezag invloedrijk in het project

Nr.	Stakeholder	Invloed	Belang
1	Gemeente Emmen	Hoog	Hoog
2	Provincie Drenthe	Hoog	Hoog
3	Prorail	Midden	Hoog
4	NS	Midden	Midden
5	Rijkswaterstaat	Laag	Midden
6	Waterschap	Laag/Midden	Midden



Uitkomst Stakeholderanalyse

De Gemeente Emmen en de provincie Drenthe hebben een hoog belang en een hoge invloed op het project N346 Schakel Achterhoek-A1

Actorenkaarten stakeholders

Gemeente Emmen	
Rol	• Gezamenlijk met de provincie initiator van N346 Schakel Achterhoek-A1 • Onderdeel van RKT (landschapsarchitect) / welstandscommissie Lochem • Beheerder van het lokale wegennet (alle wegen excl. N-wegen) • Bevoegd gezag (omgevings) vergunningen • Eerste aanspreekpunt voor stakeholders in de omgeving (omwonenden, bedrijven, etc.) • Beheerder groot deel areaal projectgebied • Gemeente Lochem investeert 2 (v.d. 85) miljoen euro • Stelt gemeentelijke gronden beschikbaar voor realisatie
Belang	**Hoog** Verbetering van de openbare ruimte in gemeente Lochem: • Betere doorgaande verbinding tussen A1 en de Achterhoek • Verbetering bereikbaarheid bedrijventerreinen • Vermindering overlast verkeer in centrum Lochem Na project Schakel A1 Achterhoek kan het centrum worden heringericht.
Invloed	**Hoog** • Beoordelaar RKT in tenderfase • Vergunningverlener in uitvoeringsfase
Relatie met OG	**Goed** • Gezamenlijk initiatiefnemer en beoordelaar met de provincie Gelderland • Provincie Gelderland en gemeente Lochem hebben een onderlinge samenwerkingsovereenkomst

Provincie Drenthe	
Rol	• Gezamelijk met de provincie initiator van N346 Schakel Achterhoek-A1 • Opdrachtgever voor het project N346 Schakel Achterhoek-A1 • Beoordelingscommissie BPP grootendeels medewerkers provincie • Geen actief onderdeel van RKT • Beheerder van N346 en aansluitende N-wegen (incl. VRI's en overige installaties) • Bevoegd gezag vergunningen • Verantwoordelijk voor PIP en langlopende vergunningen (o.a. NB)
Belang	**Hoog** • Verbetering van de doorstroming en de veiligheid op de doorgaande verbinding • Verbetering van de ruimtelijke kwaliteit van de omgeving rondom de verbinding • Borgen en verbeteren van de kwaliteit van de leefomgeving en de natuur • De provincie investeert 83 (v.d. 85) miljoen euro • Verantwoordelijk voor behalen van een positieve uitkomst van het project
Invloed	**Hoog** • Opdrachtgever van N346 Schakel Achterhoek-A1 • Beoordelaar BPP in tenderfase

Uitkomst Stakeholderanalyse

Prorail en de NS zijn belangrijke stakeholders in de ontwikkeling van het stationsgebied

Actorenkaarten stakeholders

Prorail	
Rol	Verantwoordelijk voor bouw/onderhoud station en rail, niet voor de openbare ruimte van de stationsomgeving
Belang	**Midden** • Verbeterde stationsomgeving en een betere bereikbaarheid hiervan maakt het aantrekkelijker voor een reiziger om gebruik te maken van het spoor
Invloed	**Hoog** • Kaderstellend in eisen voor spoorwegovergang Rengersweg • Vergunningverlener voor vergunningen spoorwegwet • Eigenaar van richtlijnen vanuit VSE waar we aan moeten voldoen • Meegedacht in visie stationsomgeving (2015) en voorkeurstracé
Relatie met OG	-

NS (NS Stations)	
Rol	Eigenaar en beheer stationsgebied Lochem, verantwoordelijk voor het bieden van kwalitatief voldoende transfer voor treinreizigers van en naar het perron
Belang	**Midden** • Verbeterde stationsomgeving en een betere bereikbaarheid hiervan maakt het aantrekkelijker voor een reiziger om gebruik te maken van de services van de NS
Invloed	**Laag** • In planfase meegenomen in ontwerp en inpassingsplan • In tenderfase geen actieve deelname voor gunning • In uitvoeringsfase belangrijke stakeholder in de omgeving om te informeren • Heeft zienswijzen ingediend voor het PIP • Meegedacht in visie stationsomgeving (2015)
Relatie met OG	Samenwerkingsovereenkomst met de provincie Gelderland

Uitkomst Stakeholderanalyse

Rijkswaterstaat en het Waterschap Drents Overijsselse Delta zijn vergunningverleners voor het project N346 Schakel Achterhoek A1, hebben echter geen groot belang in het project

Actorenkaarten stakeholders

Rijkswaterstaat	
Rol	Beheer vaarweg Twentekanaal en damwandconstructie onder brug Twentekanaal en hiermee bevoegd gezag werkzaamheden in (en boven) kanaal vanuit nautisch oogpunt (VWM)
Belang	**Laag** • Eisen voor brug en PVR Twentekanaal in contract opgenomen • Buiten brug Twentekanaal geen belang voor Rijkswaterstaat in het project N346 Schakel Achterhoek-A1 • Heeft zienswijzen ingediend voor het PIP
Invloed	**Midden** • Vergunningverlener voor watervergunning realiseren brug Twentekanaal met mogelijk een uitgebreide procedure.
Relatie met OG	Afspraken m.b.t. project Verruiming Twentekanaal zijn vastgelegd in een SOK tussen de provincie en Rijkswaterstaat

Waterschap Drents Overijsselse Delta	
Rol	Waterbeheerder oppervlaktewater en verantwoordelijk voor uitvoering nevenproject verleggen persleiding
Belang	**Laag/Midden** • Opgesteld waterplan voor inpassing N346 Schakel Achterhoek-A1 geldt als basis voor uitvraag van het project, belangen Waterschap Rijn en IJssel worden hiermee geborgd • Eisen voor waterberging en –afvoer in contract opgenomen • Belang in uitvoering nevenprojecten o.b.v. ontwerp en planning van project
Invloed	**Midden** • Vergunningverlener voor watervergunningen en BLBI meldingen
Relatie met OG	Afspraken m.b.t. de verlegging van de persleiding zijn vastgelegd in een SOK tussen de provincie en Waterschap Rijn en Ijssel

BEDANKT

N34 SCHAKEL DRENTHE-OOST

Zaaknummer: 202421051998

Partij: Groep X

Datum: X

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B.8 - Workshop Variables and Indicators

In the tables 8, 9, 10, 11, 12 and 13 the six observation points have been outlined, the methods that will be used to capture the data, and the specific questions or observations that will be addressed during the workshop.

Q1 - Types of Organisational Memory Accessed: The specific forms of organisational memory being used during the workshop, such as explicit individual knowledge, tacit individual knowledge, social explicit knowledge, or social tacit knowledge. This will be providing insights into the length and depth of memory utilisation.

Table 8 Variable 1 - Types of Organisational Memory Accessed

Variable	Q1 - Types of Organisational Memory Accessed
Phase	During workshop
Method	**Audio and Video Recordings / Observation Notes / Survey**
Observations	Did the participant seek or share knowledge during group discussions?
	Were there group norms or shared knowledge that influenced decisions?
	Were there moments when the participant made decisions based on informal knowledge or past experiences?
	Did the participant refer to documents, manuals, or formal guidelines?
	Were standardized tools or processes used?
Questions	Survey questions of Q3 and Q4

Q2 - Impact of Team Experience and Relationships: The effect of the experience of participants on tenders and the tenure within the company on group interactions and the use of knowledge.

Table 9 Variable 2 - Impact of Team Experience and Relationships

Variable	Q2 - Impact of Team Experience and Relationships
Phase	Pre-workshop
Method	**Survey**
Questions	How long have you been working at the organization?
	How many years of experience do you have with tenders in general?
	In which sector do you have the most experience (infrastructure, water construction, energy sector)?
	What was your most recent role in a tender (e.g., environmental coordinator, delivery manager, or business lead)?

	Which team members have you previously worked with on a tender, and on which tenders?

Q3 - Evaluation of Knowledge Sources: How the group has been assessing the relevance of knowledge retrieved from databases or personal experiences, determining the effectiveness of selected organisational memory sources. This is including noting the availability of knowledge and whether the group or individuals have been finding related documents or experiences applicable to the current context.

Table 10 Variable 3 - Evaluation of Knowledge Sources

Variable	Q3 - Evaluation of Knowledge Sources
Phase	During workshop
Method	**Survey**
Questions	Why did you choose to conduct the analysis in this manner, and what resources did you use?
	Could you have performed the analysis without relying on external sources, and why?
	Were there moments when you relied on past experiences, and which? they?
	Which sources did you use?
	Why did you choose to use these sources?
	What made the source you used valuable?
	How easy was it to find what you needed in the source, and why?

Q4 - Decision-Making Processes: Whether decisions are being based on standardised organisational processes or unwritten norms, and the task-oriented and socio-emotional behaviours influencing these choices. This is involving examining the balance between formal guidelines and informal, culturally embedded practices.

Table 11 Variable 4 - Decision-Making Processes

Variable	Q4 - Decision-Making Processes
Phase	During workshop
Method	**Audio Recordings / Observation Notes / Survey**
Observations	Was there evidence of groupthink or dominant voices influencing the decision-making process?
	Were there key individuals within the group who exerted influence?

	When asking for suggestions, information, and opinions with negative outcomes.
	Were there positive outcomes when making certain decisions or sharing knowledge?
Questions	How has today's discussion during the workshop influenced your approach to the task?
	How did the group discussions help to clarify matters, and why was that effective?
	Why did you choose to conduct the analysis in this way, and what resources did you use?

Q5 - Comparison of End Product: Whether or not the final product being created during the workshop is similar to the product being produced in the related tender, providing a measure of consistency and alignment with past practices.

Table 12 Variable 5 - Comparison of End Product

Variable	**Q5 - Comparison of End Product**
Phase	During workshop
Method	**Artifacts Analysis / Observation Notes**
Observations	How did the group utilize tools such as note-taking, whiteboards, and other resources to create the final product?
	Uploading end product in Survey Link
	What are the differences between the outcome of the workshop and the original tender stakeholder analysis? (after the workshop)

Q6 - Learning Outcomes: The extent of individual learning being achieved during the workshop and the potential for integrating the newly acquired knowledge into the organisation.

Table 13 Variable 6 - Learning Outcomes

Variable	**Q6 - Learning Outcomes**
Phase	During workshop
Method	**Survey**
Questions	To what extent did you learn something new on a scale of 1 to 10? What did you learn, and how (from whom or what) did you learn it?
	KPS (Knowledge Promoter Score): To what extent do you feel the need to pass this knowledge on to others?

	In your opinion, what is the best way to retain this knowledge so that others who are not yet familiar with it can learn it?
	To what extent do you think your stakeholder analysis was conducted in accordance with Count & Cooper's formal process?
	If the order of the workshop had been reversed, do you think the final outcome would have been different, and why?

B.9 - Workshop Results

Group 1 - Scenario 1A: Decision-Making Strategy and Organisational Memory use

Participants have been exhibiting diverse decision-making strategies during the stakeholder analysis in Scenario 1A. [G1A3], [G1A2], and [G1A1] have been employing the Power and Interest Matrix (P&I) to categorise stakeholders into quadrants, prioritising them being based on influence and interest, using primarily conscious knowledge. In contrast, [G1A4] has been adopting a more analytical approach, defining specific criteria for stakeholder importance without relying on the matrix, reflecting a reliance on automatic or collective knowledge being based on past experiences.

Despite time constraints, none of the participants have been consulting objectified knowledge in external sources. [G1A2] has been leveraging conscious and collective knowledge from previous tenders to navigate the task, mentioning the use of past experiences and therefore not needing external sources. [G1A3] has been acknowledging the value of objectified knowledge but has not been pursuing it due to limited time. [G1A4] has been expressing a desire to refer to guidelines in objectified knowledge but has similarly not been used it due to time constraints. [G1A1] has been relying on both conscious and collective knowledge from prior experience.

Both [G1A3] and [G1A1] have been incorporating prior tender experiences into their stakeholder classification. However, [G1A1] has explicitly been referencing objectified knowledge from previous tenders documented on SharePoint but has not been using it. [G1A2] and [G1A4] have similarly been drawing on collective knowledge, demonstrating reliance on past academic or work-related experiences to guide their analyses. Interestingly, formal references to the company's tender training or guidebook have been limited, with only [G1A1] acknowledging the structured approach available on SharePoint. This points to a potential disconnect between objectified knowledge embedded in formal organisational memory and its active being used in decision-making processes.

Group 1 - Scenario 1A: Learning and Knowledge Retention Approaches

The learning outcomes have been varying among participants, with an overall average score of 3.75/10 for the extent to which participants have been learning something new, as outlined Table 14. [G1A1], [G1A2], and [G1A3] have been reporting minimal new learning, as they have already been familiar with the stakeholder analysis methodology. [G1A4] has been the only participant who has been mentioning gaining new insights, specifically regarding the setting of criteria for stakeholder classification.

The perceived need of the participants to share the knowledge being gained from the workshop has been averaging 6.5/10. [G1A4], [G1A3], and [G1A1] have been feeling no urge to share their knowledge, citing the lack of novel insights from the assignment. [G1A2], however, has been expressing a desire to share their experience, particularly at the start of a tender, to ensure clarity regarding objectives and stakeholders, especially for newcomers.

When discussing the best ways to secure this knowledge for future use, participants have been agreeing on the importance of making it be accessible. [G1A1] and [G1A2] have been emphasising formal documentation, such as uploading their approach to SharePoint. [G1A3]

and [G1A4] have been suggesting a combination of formal documentation (e.g., tender guidebook) and verbal communication via platforms like Yammer or stand-up meetings to provide context and to enhance understanding.

Table 14 Learning Outcomes and Knowledge Sharing of Group 1 Scenario 1A

Participant	New Knowledge Gained (Scale 1-10)	Necessity to Share Knowledge (Scale 1-10)	Method to Secure Knowledge
G1PA	6	6	SharePoint
G1C	2	10	SharePoint and brief lectures
G1SPL1	4	3	Tender guidebook, verbal communication
G1SPL2	3	7	Tender guidebook, stand-up meetings

Group 1 - Scenario 1A: Approaches to Stakeholder Positioning

The quality of the stakeholder analysis being produced by participants has been varying. [G1A2] has been providing a top six stakeholder analysis being based on the Power and Interest (P&I) matrix, including a visual representation within the matrix as can be seen in Figure 17 on the left side. While this has been reflecting a methodical approach, the explanation accompanying each stakeholder's ranking has been relatively brief. [G1A1] has also been presenting a top six ranking within the P&I matrix, as can be seen in Figure 17 on the right side; however, they have not been offering further explanation of how the position of each stakeholder has been determined.

In contrast, [G1A3] has been delivering a detailed explanation of each stakeholder's ranking, partially utilising the criteria from the P&I matrix. However, the analysis has not been including a visual overview of the stakeholders within the matrix. Interestingly, [G1A4], despite having been less familiar with the P&I matrix, has been producing a structured analysis with a detailed explanation being focused on criteria being considered essential for classification of the stakeholder. These criteria have been serving as key drivers for placing stakeholders within the matrix. Although [G1A4] has not been providing a visual overview due to unfamiliarity with the P&I matrix, the analysis itself has been thorough and well-reasoned.

Both [G1A3] and [G1A4] have been presenting comparable explanations for stakeholder rankings, using similar drivers such as the role of environmental and water permit providers, financial influence, and project initiators. Meanwhile, [G1A2] and [G1A1] have not been providing a clear reason for the ranking of each stakeholder but have been showing close similarities in their positioning of the stakeholder within the P&I matrix. However, notable differences have been observed in the placement of stakeholders A1, A2, and A3, with slight variations in A6 and A4, as can be seen in Figure 17.

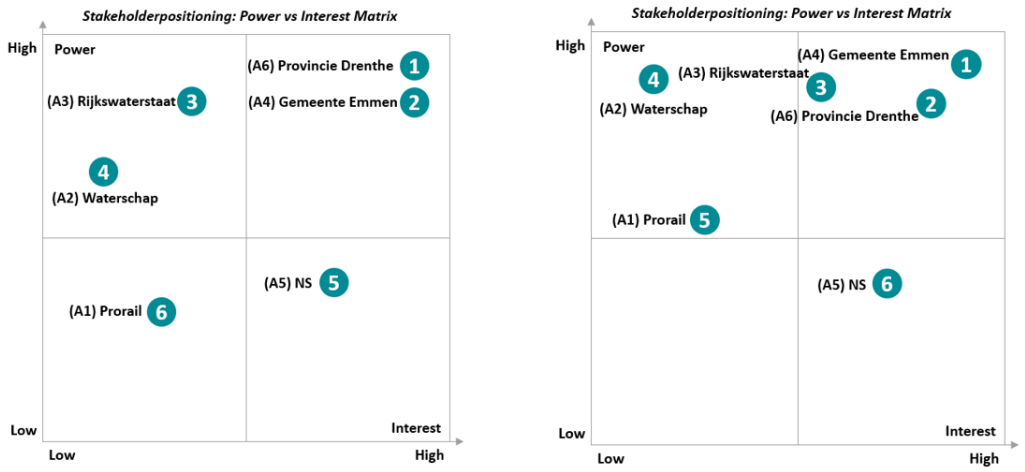

Figure 17 Power vs Interest Matrix [G1C] on left and [G1PA] on the right

Group 1 - Scenario 2: Decision-Making Strategy and Organisational Memory use

During Scenario 2, participants have been indicating that group discussions have been enhancing their understanding of the task, particularly in relation to stakeholder analysis and power dynamics. The group has been using a flip chart as a central reference point, facilitating the alignment of their conscious and collective knowledge in the discussion. [G1A4] has been remarking that these discussions have been clarifying the necessity of using the Power and Interest (P&I) matrix and how to plot stakeholders within it, which has been previously unfamiliar to [G1A4]. This is illustrating a shift from [G1A4]'s automatic knowledge to the collective knowledge of the group, as [G1A4] has been gaining understanding through group interaction. Interestingly, the automatic and collective knowledge of [G1A4] has been contributing significantly during the discussions of the ranking of the stakeholder. [G1A2] has been observing that the collaborative nature of the group has been contributing to a collective ranking of stakeholders, reflecting the activation of conscious and collective knowledge, being shared and being refined through the discussion. [G1A1] and [G1A3] have both been noting that input from the group's multiple perspectives has been deepening the group's insights into stakeholder prioritisation. [G1A1] has been specifically highlighting that the discussions have been sharpening the decision-making process of the group, while [G1A3] has been remarking that the structure provided by the P&I matrix has been helping to align their analysis with project objectives.

Some participants have been turning to external resources. [G1A4], [G1A3], and [G1A1] have been using the internet to clarify specific terminology related to the P&I matrix, particularly regarding the four quadrants. The targeted online searches have been highlighting the use of easily accessible objectified knowledge to supplement the group's understanding of the P&I matrix. [G1A2] has been choosing to focus on managing the flip chart and facilitating the group discussions, contributing to the decision-making process of the group. Notably, none of the participants has been consulting internal objectified knowledge.

Group 1 - Scenario 2: Learning and Knowledge Retention Approaches

The learning outcomes for Scenario 2 have been averaging a score of 6.5/10 for participants' ability to learn something new, as being outlined in Table 15. [G1A4] has been mentioning familiarity with the Power and Interest (P&I) matrix but has been noting that the workshop

discussions have been helping to apply the tool effectively. Both [G1A2] and [G1A3] have been acknowledging the value of exchanging insights and collaborating to rank stakeholders, recognising the benefits of collective reasoning. [G1A1] has been focusing on the collective knowledge being gained from the experience of a peer, which has been enriching the understanding of the individual and has been nuancing the perspective on the prioritisation of the stakeholder.

When being asked about their perceived need to pass on the knowledge being gained from the workshop, the average score has been remaining at 6.5/10. [G1A3] has been feeling that the understanding being shared being developed during the workshop has been enhancing the confidence in the results of the analysis, suggesting this collaborative learning process has been solidifying the approach. [G1A1] and [G1A2] have been emphasising the value of verbally passing on insights to colleagues, especially in future tender processes to streamline decision-making. In contrast, [G1A4] has been suggesting that much of the knowledge being gained has already been part of the objectified knowledge in the tender guidebook, potentially reducing the need for further dissemination.

In terms of securing knowledge for future use, [G1A4] and [G1A1] have been highlighting the importance of documenting key insights in the tender handbook and uploading them to SharePoint to ensure long-term accessibility. [G1A2] and [G1A3] have been suggesting that mini-lectures or discussions would effectively be conveying the insights being gained from the workshop, advocating for a blend of formal documentation and verbal knowledge-sharing practices. Overall, the participants have been reflecting a consensus on the value of integrating both written documentation and verbal communication to secure knowledge for future tenders.

Table 15 Learning Outcomes and Knowledge Sharing of Group 1 Scenario 2

Participant	New Knowledge Gained (Scale 1-10)	Necessity to Share Knowledge (Scale 1-10)	Method to Secure Knowledge
G1PA	7	7	SharePoint
G1C	8	8	SharePoint and brief lectures
G1SPL1	6	7	Verbal knowledge-sharing and lectures
G1SPL2	5	7	Tender guidebook

Group 1 - Scenario 2: Approaches to Stakeholder Positioning

The group has been producing a stakeholder analysis using the Power and Interest (P&I) matrix, being facilitated by discussions and visual tools such as the flip chart. The collective outcome of the workshop, as can be seen in figure 18 on the left versus the original on the right, has been a structured and well-prioritised stakeholder analysis, reflecting the combined knowledge and input of all participants, as shown in table 16.

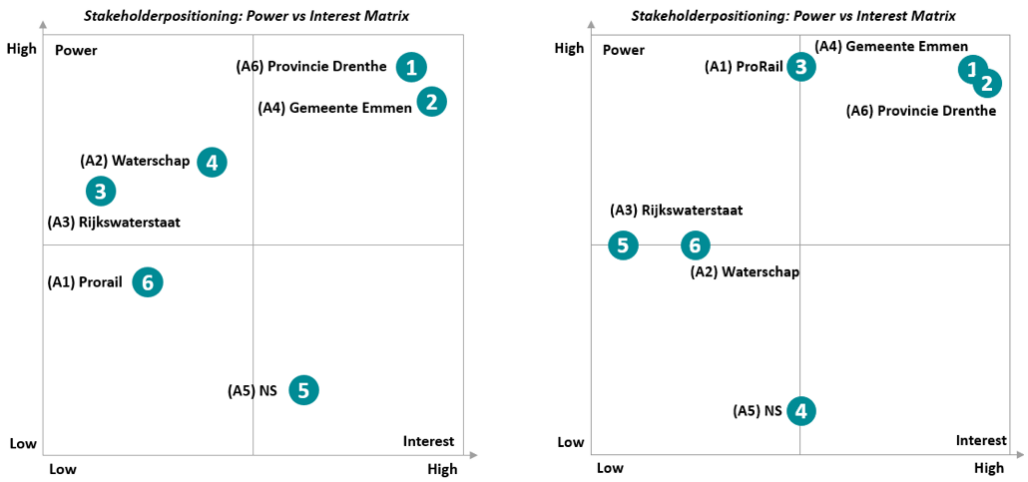

Figure 18 Power vs Interest Matrix Group 1 Scenario 2 on the left vs original on the right

Although additional arguments could have been made for classifying some stakeholders, the rationale having been provided by the participants has been accurate and relevant. Key indicators being used in the analysis have been including the role of the stakeholders in financing, issuing environmental and water permits, and have been addressing obstacles being posed by conflicting structural properties. Additionally, stakeholders who have been having interests in the project scope but not conflicting with project objectives have been noted and ranked accordingly. The results have been aligning closely with the original analysis, with only slight variations in how participants have been ranking and explaining the positions of certain stakeholders.

Table 16 Assessment of the End Product of Group 1 Scenario 2

Participant	Role in End Product
G1PA	Contribution in using P&I matrix terminology regarding the four quadrants
G1C	Use of prior experience and group input
G1SPL1	Led visualisation and ensured group alignment and discussion
G1SPL2	Use of prior experience and group input

Group 2 - Scenario 1B: Decision-Making Strategy and Organisational Memory use

In Scenario 1B, participants have been emphasising the value of group discussions in shaping their understanding of the task and the applying of the Power and Interest (P&I) matrix. The group has been choosing the P&I matrix because of its familiarity and practicality in ranking stakeholders, with [G2A4] and [G2A3] have been noting that time constraints have been making exploring alternative methods infeasible. [G2A3] has also been acknowledging that the conscious knowledge of [G2A1] of the matrix has been aiding the decision-making process of the group.

[G2A2] and [G2A3] have been highlighting the importance of team insights and open communication in reaching a consensus on stakeholder positioning. [G2A4] has been appreciating the collaborative approach to brainstorming ideas, especially being given the absence of predetermined roles. Group discussions have been clarifying aspects of the stakeholder analysis, with [G2A4] having been pointing out that periodically revisiting the main

objectives has been helping the group to stay focused. [G2A2] has been managing the flip chart as a central reference point for the discussion, aligning the application of the consciousness of the group and the collective knowledge from prior experiences and trainings. [G2A3] has been noting how the structured interactions have been helping to resolve complex decisions efficiently, while [G2A1] and [G2A2] have been observing that the unique insights of each member have been enriching the analysis.

Throughout the stakeholder analysis, participants have been relying on both their conscious and collective knowledge from previous experiences. [G2A4] and [G2A3] have been drawing from their past tender experiences for the ranking process, while [G2A2] has been emphasising the relevance of the P&I matrix, which they have been using in previous projects as part of automatic and collective knowledge. [G2A1] has also been sharing that they have been studying and applying the P&I matrix in various contexts, including during training at the company, indicating conscious knowledge.

Group 2 - Scenario 1B: Learning and Knowledge Retention Approaches

Participants in Scenario 1B have been reporting a relatively high learning outcome, averaging 7/10 as being outlined in table 17 [G2A4] and [G2A3] have been noting that the workshop has been reinforcing their understanding of how to use the Power-Interest (P&I) matrix, while [G2A2] has been emphasising the importance of careful analysis and comprehension during the task. [G2A1] has been highlighting the value of the collaborative elements, explaining that engaging in discussions and distributing tasks within the group has been leading to new insights. Overall, the combination of individual methods and group collaboration has been enhancing the learning experience of the participants.

The willingness of the participants to share the knowledge being gained has been similarly high, averaging 7.25/10. [G2A4] has been stressing the importance of integrating the approach of the stakeholder analysis into future projects. Both [G2A1] and [G2A2] have been seeing value in teaching others to improve results, while [G2A3] has been mentioning they would be sharing insights if the opportunity should be arising. This is reflecting an eagerness to share a pragmatic approach when knowledge-sharing is appropriate.

To secure this knowledge for future use, participants have been emphasising early collaboration and preparation. [G2A4], [G2A2], and [G2A1] have been advocating for selecting a stakeholder analysis method at the start to ensure coherence throughout the task. [G2A3] has been suggesting leveraging the strengths of the group members by discussing the prior knowledge of the ranking of the stakeholder of each person before beginning the analysis.

Table 17 Learning Outcomes and Knowledge Sharing of Group 2 Scenario 1B

Participant	New Knowledge Gained (Scale 1-10)	Necessity to Share Knowledge (Scale 1-10)	Method to Secure Knowledge
G2PA	7	7	Verbal knowledge-sharing
G2TL	4	9	Verbal knowledge-sharing
G2SPL1	7	5	Verbal knowledge-sharing
G2SPL2	10	8	Sharing insights verbally in future projects

Group 2 - Scenario 1B: Approaches to Stakeholder Positioning

The final product in Scenario 1B has been become a collaborative stakeholder analysis using the Power and Interest (P&I) grid, as shown in Figure 19 on the left side. [G2A1] and [G2A2] have been drawing from their prior knowledge of the grid, providing structure to the analysis. Meanwhile, [G2A3] and [G2A4] have been emphasising the importance of group alignment in reaching a consensus, which has been allowing the team to produce a well-structured stakeholder ranking. The final analysis has been reflecting the collective knowledge of the group, benefitting from their diverse experiences and contributions.

Key indicators in the analysis have been including the roles of the stakeholders in financing, issuing environmental and water permits, assessing the tender, and their connection to the project area, such as ownership of property or land. Additionally, stakeholders with interests in the project scope, but not conflicting with objectives of the project, have been noting and ranking accordingly. The results have been largely in line with the original analysis, with only slight variations in how certain stakeholders have been ranked and have been explained.

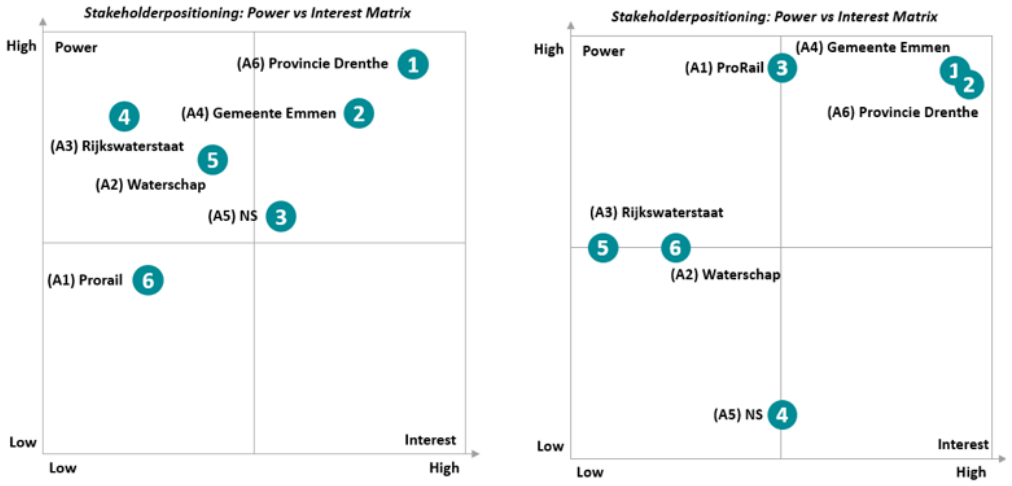

Figure 19 Power vs Interest Matrix Group 2 Scenario 1B on the left vs original on the right

The collective outcome of the workshop has been a well-organised and comprehensive stakeholder analysis, reflecting the combined insights and expertise of all participants, as detailed in table 18.

Table 18 Assessment of the End Product of Group 1 Scenario 2

Participant	Role in End Product
G2PA	Contributed prior knowledge of the P&I matrix, particularly in using the grid terminology regarding the four quadrants.
G2TL	Applied prior experience and helped structure the analysis, managing the flip chart and facilitating discussions.
G2SPL1	Used prior experience which helped with group alignment and team consensus.
G2SPL2	Used prior experience and contributed unique insights, helping to refine the final ranking of stakeholders.

Group 2 - Scenario 2: Decision-Making Strategy and Organisational Memory use

In Scenario 2, participants have been highlighting the use of AI as a resource due to limited time, helping to enhance the analysis within a short timeframe. [G2A4], [G2A2], and [G2A1] have been noting that incorporating AI's input has been providing new insights, prompting them to revise their initial ranking of ProRail, RWS, and NS in the (P&I) quadrants. [G2A3] and [G2A1] having been adding that the open environment for raising questions has been encouraging a productive dialogue, enabling the group to collectively reflect on and to refine their initial ideas.

Participants have been generally recognising the value of objectified knowledge from external organisational resources, particularly AI, in improving the analysis. [G2A4] and [G2A3] have been emphasising that the combination of the consciousness of the group and collective knowledge being reflected against the external objectified knowledge has been madding the task both easier and faster being compared to working individually. [G2A2] has been acknowledging that while it has been possible to conduct the analysis without objectified knowledge from internal and external organisational sources, AI has been offering valuable insights that have been enriching the approach of the group. [G2A1] has been remarking that both objectified knowledge from AI and from the internet have been essential tools for refining the stakeholder analysis.

Overall, the group has been agreeing that discussions with the objectified knowledge have been leading to a more thoughtful approach to the raking of the stakeholder, with the inclusion of AI enhancing their decision-making process, despite occasional inaccuracies. While AI has been providing efficient and quick responses, participants have been recognising its limitations, especially when it has been given contextually inaccurate advice on certain rankings. This has been highlighting the importance of balancing AI inputs with critical group reflection and leveraging objectified knowledge to reflect on the conscious and collective knowledge in the decision-making process.

Group 2 - Scenario 2: Learning and Knowledge Retention Approaches

Participants have been reporting an average learning outcome score of 6.5/10, reflecting moderate gains in learning from the workshop as being outlined in Table 19. [G2A4] has been identifying two alternative methods being suggested by AI but has not have had the time to explore them further. [G2A3] has been feeling the session has been offering few new insights being compared to previous experiences, while [G2A1] has been appreciating the collaborative use of AI, as it has been introducing a new approach in the organisation. [G2A2] has been observing that keeping an open mind, as demonstrated by [G2A3], has been helping them approach the assignment from a fresh perspective.

When asked about the likelihood of passing on the knowledge being gained, participants have also been given an average score of 6.5/10. [G2A4] and [G2A2] have been emphasising the value of integrating AI earlier in future analyses to enhance decision-making. [G2A1] has been stressing the importance of remaining critical of the information being provided by tools like AI and by the internet, ensuring that external inputs will be thoughtfully evaluated. Although [G2A3] has not been offering specific recommendations but has been acknowledging the potential benefits of knowledge sharing in the right context.

To secure the knowledge for future use, participants have been agreeing on the importance of applying AI earlier in the process. [G2A1] and [G2A2] have been reiterating the need for a critical approach when using such tools, while [G2A3] and [G2A4] have been focussing on using external inputs to challenge assumptions and improve decision-making outcomes.

Table 19 Learning Outcomes and Knowledge Sharing of Group 2 Scenario 2

Participant	New Knowledge Gained (Scale 1-10)	Necessity to Share Knowledge (Scale 1-10)	Method to Secure Knowledge
G2PA	6	7	Emphasized critical use of AI and Internet
G2TL	7	7	Early use of AI in future analyses
G2SPL1	6	6	No specific recommendation
G2SPL2	7	6	Apply AI earlier to improve understanding

Group 2 - Scenario 2: Approaches to Stakeholder Positioning

The final product of Scenario 2 is a revised stakeholder ranking of NS, being shaped by group discussions and external input from AI as can be seen in Figure 20. [G2A3] has been leading the integration of AI's suggestions into the ranking, while [G2A1] and [G2A2] have been contributing additional perspectives being based on their internet research. Although the group has been identifying some errors in the advice of AI, they have collaboratively been adjusting their initial rankings, leading to a more refined and thoughtful analysis as displayed in Table 20.

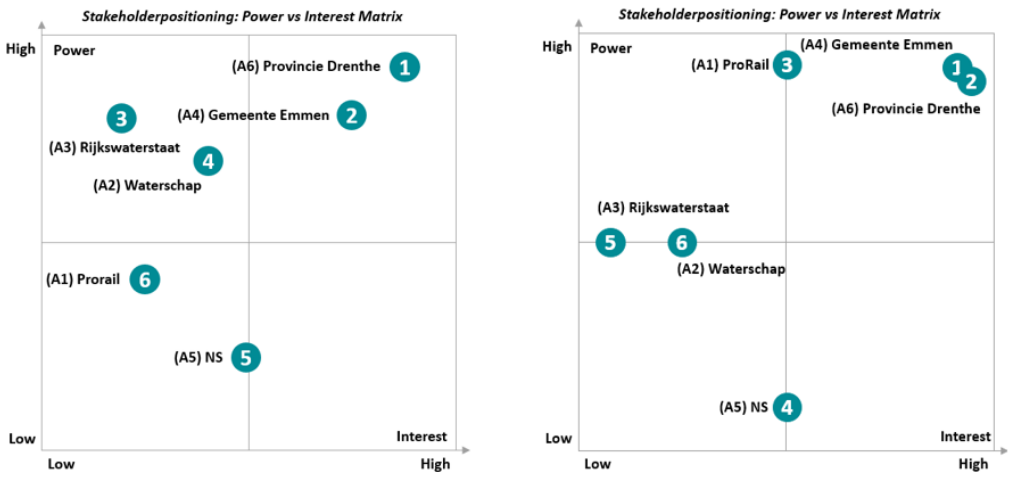

Figure 20 Power vs Interest Matrix Group 2 Scenario 2 on the left vs original on the right

The use of the group of AI has been streamlining the process; however, the information will still be needing to be validated. [G2A2] and [G2A3] have been noting that the external input has been allowing them to explore alternative approaches, expanding beyond their initial thinking. [G2A1] and [G2A4] have been acknowledging that time constraints have been

necessitating the use of quick, efficient sources like AI, but they have also been emphasising the importance of balancing external inputs with their conscious and collective knowledge from previous experiences.

The approach of the group has been combining conscious knowledge and collective knowledge, along with objectified knowledge from external sources such as AI and the internet research, to refine the raking of the stakeholder. The integration of different forms of organisational memory has been ensuring a refined final product, even when working under time pressure.

Table 20 Assessment of the End Product of Group 2 Scenario 2

Participant	Role in End Product
G2PA	Helped refine rankings using AI and Internet
G2TL	Used AI for additional perspectives
G2SPL1	Led incorporation of AI insights and reflection
G2SPL2	Used AI to compare initial vs revised ranking

Appendix C - Data Management

C.1 - Data Management Plan

Plan Overview

A Data Management Plan created using DMPonline

Title: Activating Organisational Memory

Creator: Alex Hazebroek

Affiliation: Delft University of Technology

Template: TU Delft Data Management Plan template (2021)

Project abstract:

This proposal explores the challenge of effectively capturing, disseminating, retaining, and using knowledge within project-based organisations in the construction industry, or stated otherwise: the challenge with realising the full potential for knowledge creation and accumulation. This research aims to address the gap in understanding why project-based organisations in the construction sector are not fully capitalising on their organisational memory, with focus on which behaviours have an impact on organisational memory utilization and organisational learning.

This thesis proposes to explore the social practices that can aid the utilization of organisational memory in the tender phase of an infrastructure project by incorporating behaviours into the analysis, aiming to uncover insights into why organisational members are not fully aware of or able to utilize the knowledge accumulated in organisational memory. The research will investigate behaviours that hinder the activation of organisational memory and propose actionable insights to break the cycle of underutilization by activation. Providing an answer on:

'To what extend can social learning practices trigger the activation of organisational memory and contribute to advance organisational learning within project-based organisations in the construction sector?'

A mixed-methods approach are used. First, an in-depth literature review about the interconnectedness between social learning, organisational learning and organisational memory, understanding the theory. Preliminary interviews with Count and Cooper are conducted to gain insight into the current practices in the construction industry. Based on the results, action-based research in the form of a 'knowledge hackathon' will be conducted to assess the impact of social practices on organisational memory. The research seeks to contribute to the existing body of knowledge by providing an understanding to what extend social learning theories in the context of project-based organisations, offering insights for trigger the utilisation of organisational memory and enhancing organisational learning in the construction industry.

ID: 153270

Start date: 08-02-2024

End date: 01-10-2024

Last modified: 13-08-2024

Activating Organisational Memory

0. Administrative questions

1. Name of data management support staff consulted during the preparation of this plan.

My faculty data steward, Xinyan, has reviewed this DMP on 18-6-24.

2. Date of consultation with support staff.

2024-06-04

I. Data description and collection or re-use of existing data

3. Provide a general description of the type of data you will be working with, including any re-used data:

Type of data	File format(s)	How will data be collected (for re-used data: source and terms of use)?	Purpose of processing	Storage location	Who will have access to the data
Qualitative interview recordings	mp3/mp4	Recording the interview sessions	To understand how organisations use social learning to trigger organisational memory	Personal OneDrive TuDelft	Me
Interview transcripts	pdf	Transcript of the interview recordings, the participants will be selected from the graduation company	To understand how organisations use social learning to trigger organisational memory	Personal OneDrive TuDelft	Me, per transcription the interviewee to agree with the copy
Informed consent forms	pdf	The forms will be collected on site right before the email and scanned to make a digitalized form in order to store on the personal drive of TU Delft. After the digitalisation of the paper forms, it will be shredded.	To collect informed consent	Personal OneDrive TuDelft	Me and the Marian Bosch-Rekveldt who will be responsible for the data I left TU Delft (See Q34)
Anonymized interview transcriptions	pdf	Anonymized transcription on the interview recordings	To understand how organisations use social learning to trigger organisational memory	Personal OneDrive TuDelft	Me, my thesis committee and company supervisor
Personally identifiable information for contacting participants	pdf	Data as name, email address, and phone number.	In order to request if participants wants to paricipate in the research	E-mail account of the graduation company	Me
Personally identifiable research data intended for the research itself	pdf	Data as such as job title, years of experience, name of projects involved. However the participants name will be anonymized.	To understand how organisations use social learning to trigger organisational memory	Personal OneDrive TuDelft	Me, my thesis committee and company supervisor

4. How much data storage will you require during the project lifetime?

- < 250 GB

The biggest part of data will be the recordings of the session. According to microsoft, 1 hour of a teams recording is 400 MB. I don't expect to be doing more than 10 interviews, which equals 4 GB. Preferably, the interviews are done in person, then the recording of only the sound will result in a lower data storage.

II. Documentation and data quality

5. What documentation will accompany data?

- Other - explain below

Date will be shared in appendix of the MSc Thesis

III. Storage and backup during research process

6. Where will the data (and code, if applicable) be stored and backed-up during the project lifetime?

- OneDrive

OneDrive/Teams of the TU Delft

IV. Legal and ethical requirements, codes of conduct

7. Does your research involve human subjects or 3rd party datasets collected from human participants?

- Yes

Interviews

8A. Will you work with personal data? (information about an identified or identifiable natural person)

If you are not sure which option to select, first ask your Faculty Data Steward for advice. You can also check with the privacy website . If you would like to contact the privacy team: privacy-tud@tudelft.nl, please bring your DMP.

- Yes

Participants will be interviewed, for administrative reasons personal data will be stored (on the informed consent forms for example). The interviews will be recorded (depending on the setting in audio or video format), and thereafter they will be transcribed. The transcription will be anonymized before they're shared with others.

8B. Will you work with any other types of confidential or classified data or code as listed below? (tick all that apply)

If you are not sure which option to select, ask your Faculty Data Steward for advice.

- No, I will not work with any confidential or classified data/code

The content of the interviews is qualitative, meaning that no quantitative company data will be shared by participants.

9. How will ownership of the data and intellectual property rights to the data be managed?

For projects involving commercially-sensitive research or research involving third parties, seek advice of your Faculty Contract Manager when answering this question. If this is not the case, you can use the example below.

I will be the owner of the data and it will be restricted to me during the research. Data will be anonymously shared in my report as well as with my supervisors.

10. Which personal data will you process? Tick all that apply

- Email addresses and/or other addresses for digital communication
- Photographs, video materials, performance appraisals or student results
- Names and addresses
- Signed consent forms
- Data collected in Informed Consent form (names and email addresses)

Job occupation or experience of different project conducted at the organisation

11. Please list the categories of data subjects

I will interview professionals working in Dutch construction with experience in tenders, project management

12. Will you be sharing personal data with individuals/organisations outside of the EEA (European Economic Area)?

- No

15. What is the legal ground for personal data processing?

- Informed consent

16. Please describe the informed consent procedure you will follow:

The informed consent forms will be sent to the participants before the interviews. They will be asked to sign the form and send it back to me (digitally). I will go through the agreements again before each interview.

17. Where will you store the signed consent forms?

- Same storage solutions as explained in question 6

18. Does the processing of the personal data result in a high risk to the data subjects?

If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data Protection Impact Assessment (DPIA). In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data during your research (check all that apply).
If two or more of the options listed below apply, you will have to complete the DPIA. Please get in touch with the privacy team: privacy-tud@tudelft.nl to receive support with DPIA.
If only one of the options listed below applies, your project might need a DPIA. Please get in touch with the privacy team: privacy-tud@tudelft.nl to get advice as to whether DPIA is necessary.

If you have any additional comments, please add them in the box below.

- None of the above applies

22. What will happen with personal research data after the end of the research project?

- Personal research data will be destroyed after the end of the research project

V. Data sharing and long-term preservation

27. Apart from personal data mentioned in question 22, will any other data be publicly shared?

- No other data can be publicly shared - please explain below why data cannot be publicly shared

As a master student I am not required to share my interview transcripts publicly. Hence, I choose the option to not do so. I would only make use of the option to use anonymized quotes

29. How will you share research data (and code), including the one mentioned in question 22?

- My data will be shared in a different way - please explain below

Data will be shared in MSc. thesis

30. How much of your data will be shared in a research data repository?

- < 100 GB

31. When will the data (or code) be shared?

- As soon as corresponding results (papers, theses, reports) are published

My interview transcripts will not be published, however I could use anonymized quotes, that would only be referred to with the profession. Mentioned as *'Respond A mentioned ...'*

32. Under what licence will be the data/code released?

- Other - Please explain

Data will be shared in my Msc Thesis

VI. Data management responsibilities and resources

33. Is TU Delft the lead institution for this project?

- Yes, leading the collaboration - please provide details of the type of collaboration and the involved parties below

In collaboration with Count and Cooper, graduation agreement with them is signed. In accordance with the HREC requirements, the graduation agreement with the Count and Cooper, HREC concent form and checklist will be submitted.

34. If you leave TU Delft (or are unavailable), who is going to be responsible for the data resulting from this project?

Second supervisor:
Associate Professor of Project Management in the section Infrastructure Design and Management, **Marian Bosch-Rekveldt**,

35. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

I will do the data-management myself and therefore no other resources are necessary

C.2 - Consent Form Interviews and Workshop

Delft University of Technology
HUMAN RESEARCH ETHICS
INFORMED CONSENT

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICPANT TASKS AND VOLUNTARY PARTICIPATION		
1. I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	☐	☐
2. I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	☐	☐
3. I understand that taking part in the study involves: recordings of the interviews and notes that will be used as text input. Both the transcript and notes will be destroyed right after the conclusion of this study.	☐	☐
4. I understand that I won't be compensated for my participation.	☐	☐
5. I understand that the study will end by October 2024. Exact date will be determined at the green light meeting	☐	☐
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
6. I understand that taking part in the study involves collecting specific personally identifiable information (PII), such as name, designation, and location. It also involves the collection of personally identifiable research data (PIRD), with the potential risk of my identity being revealed public. I understand that I can ask for the interview to stop at any point if I feel the need to do so.	☐	☐
7. I understand that some of this PIRD is considered as sensitive data within GDPR legislation, specifically data related to my specific role and responsibilities	☐	☐
8. I understand that the following steps will be taken to minimise the threat of a data breach, and protect my identity in the event of such a breach: all the data will be safely stored on TU Delft One Drive, and the access to this data will be limited. I am also aware that this data will be destroyed once the study is completed.	☐	☐
9. I understand that (identifiable) personal information collected about me that can identify me, such as name, job designation and experiences will not be shared beyond the study team.	☐	☐
10. I understand that the (identifiable) personal data I provide will be destroyed right after the conclusion of this study.	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		
11. I understand that after the research study the de-identified information I provide will be used for the Master's thesis report developed by the researcher and that it will be publicly available in TU Delft's repository.	☐	☐
12. I agree that my responses, views or other input can be quoted anonymously in research outputs	☐	☐
13. I agree that my real name can be used for quotes in research outputs.	☐	☐
D: (LONGTERM) DATA STORAGE, ACCESS AND REUSE		

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
14. I give permission for the de-identified the transcripts that I provide to be archived in TU Delft repository so it can be used for future research and learning.	☐	☐
15. I understand that access to this repository is open, but it can be restricted on my request.	☐	☐

Signatures

_____ _____ _____

Name of participant Signature Date

I, as researcher, have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

_____ _____ _____

Researcher name Signature Date

Researcher contact details for further information:

Alex Hazebroek

+31 6 24269498

E-mail: A.A.Hazebroek@student.tudelft.nl

C.3 - HREC Approval

Date 29-Aug-2024
Correspondence hrec@tudelft.nl

Human Research Ethics Committee TU Delft
(http://hrec.tudelft.nl)

Visiting address
Jaffalaan 5 (building 31)
2628 BX Delft

Postal address
P.O. Box 5015 2600 GA Delft
The Netherlands

Ethics Approval Application: Activating Organisational Memory
Applicant: Hazebroek, Alex

Dear Alex Hazebroek,

It is a pleasure to inform you that your application mentioned above has been approved.

Thanks very much for your submission to the HREC which has been approved.

In addition to any specific conditions or notes, the HREC provides the following standard advice to all applicants:
• In light of recent tax changes, we advise that you confirm any proposed remuneration of research subjects with your faculty contract manager before going ahead.
• Please make sure when you carry out your research that you confirm contemporary covid protocols with your faculty HSE advisor, and that ongoing covid risks and precautions are flagged in the informed consent - with particular attention to this where there are physically vulnerable (eg: elderly or with underlying conditions) participants involved.
• Our default advice is not to publish transcripts or transcript summaries, but to retain these privately for specific purposes/checking; and if they are to be made public then only if fully anonymised and the transcript/summary itself approved by participants for specific purpose.
• Where there are collaborating (including funding) partners, appropriate formal agreements including clarity on responsibilities, including data ownership, responsibilities and access, should be in place and that relevant aspects of such agreements (such as access to raw or other data) are clear in the Informed Consent.

Good luck with your research!

Sincerely,

Dr. Ir. U. Pesch
Chair HREC
Faculty of Technology, Policy and Management