Risk Engineering and Management

Assessing the Quality of Risk Transfer Continuity during handover from Tender to Execution in Offshore Energy Projects

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Assessing the Quality of Risk Transfer Continuity during handover from Tender to Execution in Offshore Energy Projects

In Collaboration with Royal Boskalis B.V.

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Abstract

Large offshore projects have been relying on effective risk management practices that are initiated during tender phases. These projects are characterized by high technical complexity, involve many project actors, and interface dependencies between them. As projects transition from tender to execution, the focus shifts to evolving operational risks, without seeing the contextual and underlying reasons behind it. Risk information and decision logic are often fragmented that contributes to reduced project performance. The financial influence is significant, as risk contingencies can account for 10-12% of total project value. While successfully exploited opportunities or omitted risks may not produce visible effects, insufficient risk treatment can result in adverse outcomes severe enough to reduce contractor profit margins. This thesis investigates how quality of project risk transfer and continuity can be improved during handover from tender to execution in offshore energy projects.

This study has adapted a qualitative research design that combines literature review, two in-depth case studies of offshore energy projects executed by major marine contractor, Boskalis. Additionally, this research presents semi structured interviews with key stakeholders involved in the case study projects as well as actors in general of similar expertise working at the company. This analysis is guided by theoretical perspectives from Knowledge Management and Transition Management, that frames risk knowledge as both strategic organisational asset, and dynamic construct shaped by feedback loops, time delays and organisational interfaces.

The findings indicate that risk transfer discontinuity is caused due to weakness in knowledge continuity and failure in bidirectional flow of information across project phases. The company demonstrates strong institutional capabilities and expertise in the field of risk engineering, tender and project management. So, it can also be said that continuity is not due to lack of tools, technical knowledge, or formal procedures. There are critical breakdowns during negotiation stages, planning handovers, and team transitions, where contextual reasoning, assumptions and tacit knowledge are not sufficiently transferred.

This thesis concludes that improving risk transfer quality needs a shift in focus from static documentation of risk registers, towards managing transition moments, strengthening feedback mechanisms, and preserving common knowledge across organizational boundaries. Practical recommendations are proposed in the end, including targeted negotiation feedback gates, operational involvement in tendering, and adaptive practices to capture lessons learned.

Keywords

Risk Register, Risk Transfer, Risk Continuity, Risk Knowledge, Tender Phase, Execution Phase, Handover, Engineering Procurement and Construction(EPC), Risk Assumptions, Knowledge Continuity, Knowledge Loss, Tacit Knowledge, Explicit Knowledge, Common Knowledge, Knowledge Integration, Knowledge Sharing, Knowledge Handover, Knowledge Hoarding, Information Fragmentation, Interface Management, Handover Quality, Lessons Learned, Feedback Loops, Feedback Delays, Transition Management (TM), Adaptive Capacity, Decision-Making Under Deep Uncertainty (DMDU), Adaptive Pathways, Tipping Points, Grey Zones in Tendering, Commercial Negotiation, Best and Final Offer (BAFO), Contractual Risk, Liquidated Damages (LD), Risk Ownership, Opportunity & Risk Register (ORR), Relatics System, Knowledge Graph, ,Opportunity for Improvement (OFI),Example of Good Practice(EGP),Systems Thinking, Interface Blind Spots, Project specific agreement(PSA), Negotiation checklist, Feedback Mechanisms

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1. Introduction

1.1 Research Background

In large-scale projects and infrastructure developments, risk management must begin even before physical work on the site commences. It usually starts during the tender phase, when risk engineers, tender team, and cost estimators, identify project risks, rank them, suggest mitigation strategies and then quantify to prepare price for competitive bids (Construction Industry Institute, 2023). Project decisions will be made based on assumptions, historical benchmarks, and tight deadlines (Flyvbjerg, 2023). However, when the project moves to the execution phase, different teams will be responsible for delivery. These project execution teams inherit a set of risks, budget, plans, and documents without fully being able to understand the context behind them, due to which this handover can result in unanticipated liabilities, misaligned priorities, or loss of institutional knowledge (Rodrigues, 2024). This directly affects project outcomes and project management success.

This handover can be complex given a company's multidisciplinary operations, which combine offshore infrastructure and involve multiple stakeholders to deal with. Risks originating from such projects are dynamic, multi-sourced (technical, environmental, contractual, and logistical), and are difficult to make a prediction precisely at the tender stage (WTW, 2024). Furthermore, there exists also a tangible knowledge gap between the written documentation of risks and the tacit knowledge, that is, experience-based knowledge held by each stakeholder participating in the project (Taylor, 2003). Most of the reasoning behind decisions taken on risk lies within interactions and experience than in documents. Hence, to know the effectiveness of early risks identification and continuity into execution is crucial (Martin Loosemore, 2006).

We can see existing literature focusing on risk identification tools or execution risk monitoring techniques but there is an extremely limited academic attention on qualitative studies on risk management (Aven, 2015), particularly in the context of offshore supply and project vessels. As we further discuss in literature reviews (see chapter 3), few of the qualitative studies show that the challenges lie with knowledge continuity. For example, Andresen's (2025) study on a Norwegian Offshore shipping company focusing on a qualitative case study of internal handover processes during tender to execution transition reveals that the success of handovers often depends on individual initiatives, informal communication and shared understanding rather than following a clearly defined process. It also shows the requirement for better tools and stronger collaboration and early involvement of key personnel across organisational boundaries. Hence, there is a need for an extensive investigation on how the assumptions of tender phase risk management is when assessed against project field realities, and most importantly, how to evaluate or improve the transfer and continuity of risk knowledge between tender and execution teams (Smith, 2014).

1.2 Problem Definition

Despite the growing technology, tools, and highly qualified skilled engineers, organizations continue to face persistent difficulties to capture risk completely in the tender stage (Chapman, 2011). Risks by nature are uncertain, which makes any approach of capturing and managing them not accurate. There is no 100% solution, the best that can be done is to optimize outcomes as closely as possible to the results and strive to achieve project success (Anthony, 2017). Over this risk capturing problems, develops another problem originating from it which is to ensure continuity of risk knowledge during the project transitions (Wald, 2011). The tender phase significantly concentrates on bid submission speed, and market competitiveness which might often lead to generic or simple risk register with not many details that need to be. These documents, being necessary for bid evaluation, will rarely capture contextual reasoning behind each identified risk (Smith, 2014).

During execution phase, again the contextual understanding of risk either is lost entirely or diluted, this causes confusion in risk ownership and rework on mitigation strategies (Agerberg, 2012). Risk transfer occurs through formal handover documents and internal risk sessions meetings. However, there are instances where project teams are not involved in them, or operation teams are not involved in tendering risk definition process (Lenderink, 2022). One example is, when operations are not involved during risk sessions in tender, a risk engineer might classify liquidated damages for export cable lay completion delay (for subsea cables work) as ‘medium’ because of tender team’s experience on other projects. However, the operation team who had the direct knowledge of unique challenging installation environment for this specific project could have reported that delay likelihood and impact were significantly higher during tender risk sessions. Secondly, for instance, during the tender stage, tender team identifies and treats a risk related to the space available at port for storing equipment (port marshalling and storage availability), based on early assumption that port will provide unrestricted laydown space. During the execution, project team discovered that port imposed strict stacking of height limits due to environmental permits, that will significantly reduce the area that can be used. Maybe the assumption of space being unrestricted was recorded but the permit additional regulation was not. This results in unnecessary cost increases (RE1).

The lack of structured continuity in risk knowledge also reflects broader barriers like fragmented digital systems, and fragmented information (TPM1). Therefore, the central problem this thesis addresses is the discontinuity and quality degradation of risk knowledge transfer between tender and execution phase.

1.2 Research Objectives

The overarching objectives of this study are as follows:

1. Examine how risk knowledge is created, transformed, or lost across tender, planning, and execution interfaces.
2. Evaluate how organisational, behavioral, and process factors influence the quality of risk transfer.
3. Develop empirically grounded insights that can support better risk continuity, decision-making, and learning across project phases.

These overarching objectives are supported by the following operational objectives:

1. To analyze the current risk identification, documentation, and handover practices used across distinct phases of the project.
2. To investigate how risks are being perceived, re-evaluated, or lost during transition to the execution team.
3. To investigate structural discontinuity, like negotiation changes, system interfaces losses that cause risk divergence between tender and operation team.
4. To compare contrasting project outcomes to identify organisational, behavioral and procedural factors that strengthen or weaken risk continuity.
5. To synthesize interview insights, case study evidence and determine the contextual reasoning behind the collected insights which can propose some practical suggestions to improve the quality of risk continuity.

1.3 Research Question

To address the problem by meeting the objectives, and to bridge the research gap previously discussed, the study highlights and revolves around one central question that guides this study, and is therefore as follows:

"How can the quality of project risk transfer be improved during the transition from tender phase to execution phase in offshore construction projects?"

1.3.1 Sub Research Questions

(i) What does the current scientific literature say about addressing risk management continuity between tender and execution phases in offshore projects?

(ii) What happens to the risks identified during the tender phase when projects move into execution?

(iii) What insights can be derived from stakeholders involved in both tender and execution phases, and how can these qualitative findings help improve the quality of risk transfer?

(iv) What are the main gaps in risk knowledge transfer between tender and execution teams, and how can we improve risk continuity between phases?

1.4 Relevance

This research contributes to expanding knowledge on project risk management with a focus on transition management and knowledge gaps. The transition between phases is an area that remains understudied in both theoretical and empirical studies (Aven, 2015). Existing literature has isolated risk management processes with fixed project stages, which is identification of risks during tender and mitigation of risks during project execution. The relevance of this study to project and process management, a domain that risk management originates from, is on how risk information is interpreted, transformed and acted upon key project phases. Projects depend on how effective phase transitions are, and the quality of risk transfers influences schedule, certainty, cost performance, contract management, and reliable operations (Morris, 2013). Hence, by analyzing how the assumptions, responsibilities, and context shift between phases, decision making process can be facilitated. These findings support project managers in improving coordination, communication, and knowledge continuity across complex organisational interfaces.

1.5 Research Scope

The scope of this thesis investigates internal risk transfer processes occurring during transition between tender to contract negotiation, followed by contract negotiation to planning and lastly, planning to execution phases of Heavy Marine transport, Subsea Cables, and offshore heavy lift projects. Although the empirical context of this research is based on observations and data obtained from the company, Boskalis, the study is not limited to the company itself. Boskalis serves as a representative case environment to understand how large offshore contractors handle phase transitions, handovers and what improvements are possible.

Beyond offshore sector, mechanisms and insights received in this thesis are common challenges in any project-based company operating in sequential phases. Therefore, it can be seen and applied for the view of engineering consultancies, EPC contractors, renewable energy developers, and large infrastructure initiatives, where tendering, contracting, and execution are similarly decoupled. The focus is mainly on transition dynamics rather than company specific procedures, so the findings contribute to wider understanding of how organizations can strengthen process in complex project environment by providing principles adaptable to any environment.

2. Research Methodology

This study adopts a qualitative research design to explore how project risks are identified, communicated, and transferred during the transition from the tender phase to the execution phase in projects. Rather than just developing a company-specific tool or framework, the research aims to generate deeper insights into the knowledge gaps, ownership challenges, and decision-making behaviors surrounding risk management from actors across project phases. One of the purposes of qualitative research is to provide a deeper understanding of the context and it focuses on the "how" and "why" of the phenomenon, with a bigger focus on the process. Qualitative research also does not fully depend on the literature review findings, as it aims to provide unique perceptions from people (Creswell, 2018). The methodology combines literature review, case studies, interviews, document review, and expert validation.

2.1 Research Outline

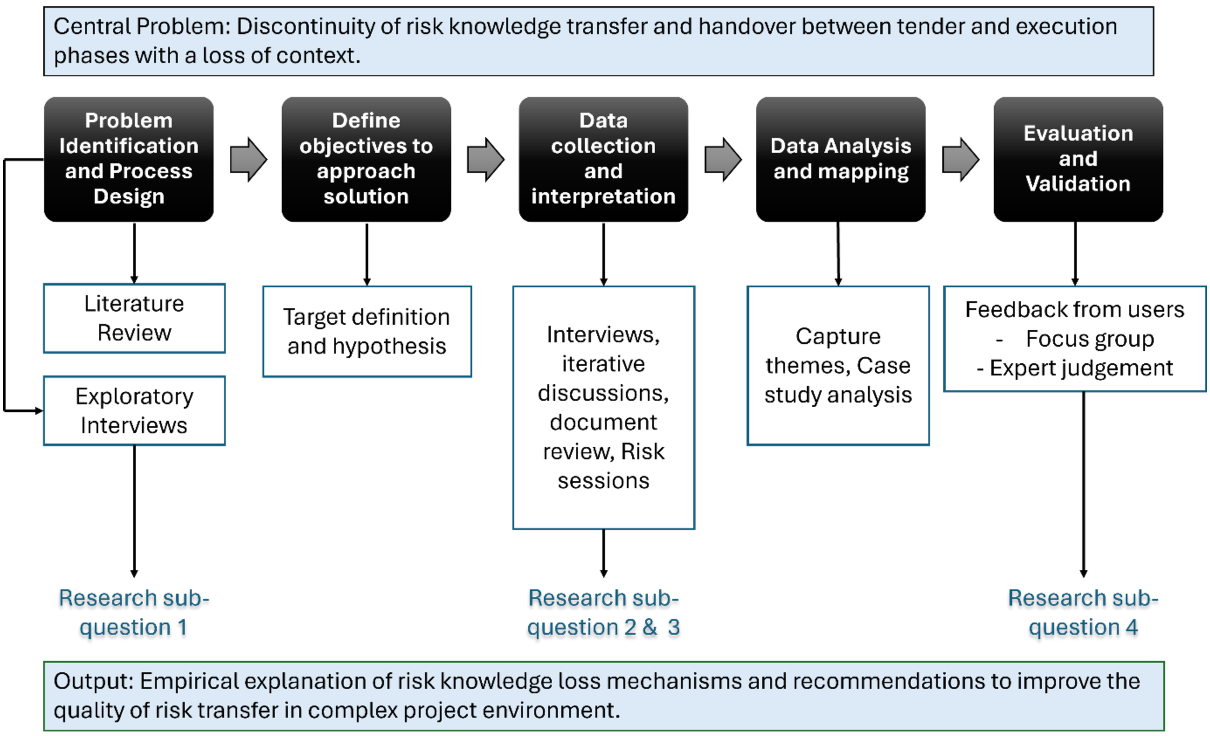

Figure 1:Research steps

Figure 1 shows the five-stage process in the research which we have used to investigate risk knowledge discontinuity across project phases. The study begins with problem identification through literature review and exploratory interviews, which establish conceptual basis and help to refine the research questions. Second stage defines the research objectives and approach. Next in data collection stage, we discuss two projects delivered by Boskalis as the contractor, gathering information from interviews with actors involved in the case study and from internal company documents.

Additionally, interviews and iterative discussions were also conducted with other actors in general who are working in the company, who participate in different stages of risk management process including tender preparation, contract negotiation, planning and execution. This provides broader insights beyond the selected cases for this research. In the analysis stage, a cross-case comparison is performed for two projects of the case study. Collected data from interviews of case studies and those in general are used to capture themes answering the reasons for risk continuity and discontinuity.

2.2 Research Approach

To answer sub research question one from section 1.3.1, we will draw insights from literature studies relevant to the process and use theoretical foundations that originate from them, which is explained in chapter 2 & 3, that later helps in deriving results and providing recommendations with a solid grounded theory in hand. For second sub question, case study analysis of two projects supported by collection of risk data extracted from risk registers, tender documents, and handover reports. To answer third question, participation in risk sessions and semi structured interviews provides insight into stakeholder perspectives and understand dynamics of knowledge transfer between tender and execution teams. For the sub research question four, we address it through cross perspective analysis of actors in the process and capture themes from interviews. Furthermore, building knowledge graphs synthesizes multiple viewpoints that reveal patterns, relations and points of continuity or discontinuity. Table 1 below summarizes the research methods and explains how each contributes to this study.

Table 1:Research approach and reasoning

Question	Method	Reasoning
Sub Question 1	Literature Reviews.	Studying literature serves as the basis, to know what has happened before and in similar cases. This will pose as a benchmark to conduct the research by identifying research gaps.
Sub Question 2	Case Study Analysis; Document Review	Case studies of projects completed help in understanding how risks have evolved through the phases. Additionally, taking an ongoing project can help in cross case comparisons and for future predictions.
Sub Question 3	I) Participation in process (risk sessions) II) Interviews	Participation in risk sessions and involvement in discussion during meetings helps to understand the knowledge transfer process between teams and To understand stakeholder perspectives
Sub Question 4	I)Themes identification II) Construction of knowledge graphs. III) Expert Validation	Identify recurring themes and patterns. Furthermore, relating them to theory helps in building grounded theoretical methods and processes that expand further studies and scope for future research purposes. Knowledge graphs help combine multiple perspectives in one coherent structure, reveal relationships, dependencies and identify points of continuity and discontinuity.

2.2.1 Interview method

This research was based partly on semi-structured interviews involving participants in both tendering and execution phases of offshore projects, with seventeen interviews and iterative discussions involving participants like tender managers, commercial managers, risk engineers, project engineers, and project managers. Communication is the main driver in deriving input and developing recommendations for this research.

The table below presents the interviewees key characteristics including role, years of experience, familiarity with risk management, and level of operational exposure. This overview provides the background that helps interpret perspectives used throughout the report and is cited in paragraphs as RE1, RE2, etc. (refer table 2). Interviews conducted were some in person and others on Microsoft teams, with the consent of the participants and were recorded for transcripts.

The conversations that are audio recorded using automatic transcription functionality of Microsoft teams and subsequently transcribed were systematically processed. This process involved cleaning the errors, removing irrelevant conversations, and then formatting using standardized words manually. All interview data was then anonymized and referenced using role-based identifiers (e.g., RE1). Following this, the cleaned transcripts were segmented into different units based on subject matter and their relevance to the research. The segments were also organized and interpreted across different functional perspectives. The qualitative insights presented in this report are drawn directly from these conversations, that collectively help in having a comprehensive understanding of risk continuity.

Table 2:Description of interviewees

Role	Risk Engineers					Commercial Managers		Tender Manager
In text cited as	LR (Lead)	RE1	RE2	RE3	RE4	CM1	CM2	TM1
Years of Experience	17	7	10	2	7	8.5	35	7
Years of working in the company	9	3	7	2	1.5	4.5	18	0
Familiar with risk management process (0-10)	10	10	7	10	10	6	9	6
Involved in risk management process	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
frequency of involvement in risk sessions	High	High	High	High	High	Low	Medium	Low
Field/operational exposure	Yes	Yes	Yes	No	No	No	Yes	Yes

Table 3:Description of interviewees

Role	**Project Managers**					**Project Engineer**	**Tender Engineer**	**General Managers**	
In text cited as	PM1	PM2	PM3	PM4	PM5	PE1	TE1	TPM 1	TPM 2
Years of Experience	25	10	25	17	20	6	12	37	25
Years of working in the company	6	10	18	17	8	4	6	34	10
Familiar with risk management process (0-10)	8	6	8	8	8	7	5	8	10
Involved in risk management process	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
frequency of involvement in risk sessions	Med	Med	Low	Med	Low	Medium	Medium	Low	Med
Field/operational exposure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Table 2 shows a mixture of different familiarities, experience, involvement and practical knowledge. The frequency of involvement is collected in three levels, i.e. low, medium and high, which relates to once in few months/only during milestones, monthly, and bi-weekly. This ensures covering a wide range of perspectives from different roles, where each one might have their own ability of knowledge captured, but collecting the insights from these minds together derives common knowledge and understanding among them, problems they face from other phase roles and in the process, and it also covers different phase points of a project.

2.2.2 Case study Method

Two projects executed by Boskalis are taken as case studies in this research. The cases are chosen because they represent two completely different stories and are unique projects executed in the offshore sector by Boskalis. We see different levels of team continuity, complexity, and transition behavior, that allows comparison between successful and problematic handovers. For each project, evidence is collected from actors involved directly in project lifecycle and company's documents. Detailed introduction and description of both projects are provided in Chapter 5. Later, we summarize the comparison between two projects as a comparative analysis to capture the themes for risk continuity and discontinuity in chapter 5.3.

The report is structured into seven chapters. Chapter one introduces research problems, background, and objectives to define a central research question. Chapter two outlines the research methodology and provides an overview of the approach used in this report. Chapter three presents a literature review relating to the research requirement and this helps to build theoretical foundations originating from risk management, I.e., knowledge continuity and phase transition processes which have been further explained in chapter four. Chapter five discusses case studies from data collected as discussion and interviews from stakeholders who were part of the project. Chapter six describes data collection of different perspectives taken from interviews in general. Furthermore, Chapter seven presents the results of the research study in the form of themes, discusses practical implications and recommendations. Lastly, Chapter eight synthesizes the conclusions, and further provides future scope of research.

3. Literature Review

The aim of this chapter is to distinguish between existing risk management literature and empirically observed problems of risk knowledge discontinuity, and to define the research hypothesis. The following sections give a literature overview of front-end risk identification, the continuity of risk knowledge between tender and execution, and the risk management processes that are used to shape decision making across project phases. This chapter synthesizes findings from project management and transition management research to establish theoretical foundation for this study (see chapter four) with which we can further build on results. This highlights what is currently known, from which we can figure out where the gap lies and how it can relate to empirical phenomena observed in case studies in chapter five and six.

3.1 Phase one- Risk Identification and the Front End

Risk identification in the tender phase determines project success, as decisions taken at this stage will influence cost, timelines, and overall feasibility directly. The tendering phase exposes contractors to the highest levels of risk due to uncertainties in pricing, resource availability, regulatory compliance, and project complexity (Jiang, 2023). In construction and offshore projects, failing to anticipate potential contractual, technical, financial, and operational risks can lead to delays, financial losses, or even tender cancellations. Understanding the interdependencies between project specifications, client requirements, and market conditions helps to develop realistic risk pricing strategies and maintaining competitiveness. As competitive bidding increases, early and structured identification of risks helps companies evaluate obligations accurately and reduce unexpected liabilities later in the execution phase (Pereira de Lima, 2020).

Companies are placing their bets on routine-based procedures, partial evaluations, or generic checklists that ignore dynamic threats such as supply chain volatility, regulatory changes, and external economic pressures. The literature tells us that most companies underestimate indirect and emergent risks, which means there is poor contingency planning and misalignment between tender assumptions and execution realities (Pereira de Lima, 2020). Similarly, Jiang and Holubava (2023) note that comprehensive risk assessment entails interdependent consideration of technical, financial, and managerial factors rather than isolating them and addressing them individually. The deficit will determine how systematic risk identification can bring about change, one that considers multidimensional risks of projects and promotes continuity along the tender to execution interface.

The front-end stage of offshore projects is very influential in shaping the outcomes, but the current practices in the industry do not ensure that whatever knowledge is generated during tendering is transferred into execution consistently. Instead of relying completely on tools, researchers are asserting the importance of stakeholder collaboration, early involvement of execution teams, and structured knowledge continuity frameworks to improve decision-making and project success (Andresen, 2025).

The literature on front end risk identification shows how assumptions, heuristics, experience influenced decisions, time pressure and incomplete information shape initial risk picture. For SQ1 and SQ2, this can explain why early misclassifications and optimistic assessments emerge, and why many tender risks appear unrealistic later during execution. These insights determine the need to evaluate how risks evolve between phases and on where discontinuities originate in tender stage.

Why must new risks be identified at tender?

In the Offshore wind and marine market,2023-24, we see aborted tenders and cancellations driven by inflation, interest rates, and rigid offtake terms (NREL., 2024) Contractors are trying to absorb more risk, so early risk identification and pricing matter more. Implication of which in fixed price tender, contractors absorb larger proportions of unallocated risks, whereas in flexible contracts, it leads to reduced profit margins, administrative complexity, target cost, and performance pressures (flexible contract is equitably distributed risk but still a risk). ((BCLP., 2024); (Reuters, 2025)).

The trend of the EU and Dutch tender framework has oriented towards passing increased technical and delivery risk to EPC (Engineering, procurement and construction) contractors. Dutch offshore frameworks are exerting more pressure and importance on competitive bidding with tight tender schedules, which lessens the possibility of broad due thoroughness ((Reuters, 2025); (RVO, 2024)). Cross-border variations (e.g., Danish vs. UK auction regulations) influence the exposure profile of the contractor, so Boskalis must foresee which tier-level risks fall on the bidder before committing. A focus for implementation should be to build comparative models for risk transfer scenarios so that contingencies can be priced better. Insurers are now driving contractors to codify emerging-risk scans at tendering, specifying weaknesses including supply chain vulnerability, cybersecurity threats, and weather-induced schedule disruption ((WTW), 2024 April 16). Qualification of these risks and their incorporation into baseline possibilities are becoming more demanded of tender teams, especially for offshore campaigns utilizing specialist assets.

3.2 Phase two- Risk knowledge continuity & handover (tender to execution)

This phase involves Interface Management, Document control, and collaboration. Effective transfer of information from the tendering to the execution phase is evermore recognized as a critical parameter impacting project performance in offshore construction and marine infrastructure. (Chang, 2024), by conducting semi-structured interviews with 94 asset management professionals, provides empirical evidence showing that the quality of handover information is impacted not by the amount of data transferred, but by the comprehensiveness of specific attributes, such as ownership, context of assumptions, triggers, interfaces, and related mitigations. Execution teams need contextual information so that they can determine risk ratings and the underlying justification for tender decisions. However, we can still witness many projects being delivered with missing justification and undocumented assumptions that are leading to misaligned priorities. This gap is influenced by tight deadlines and organizationally isolated information, and knowledge loss occurs during the transition period.

At the handover to operations stage, only a limited number of risks captured during the tender and execution stages influence downstream performance results (Rodrigues, 2024). Based on offshore case studies, the research illustrates that environmental, logistical, and contractual risks predominate post-handover events. Nonetheless, numerous risks highlighted early are deprioritized or abandoned without revalidation, producing blind spots. Likewise, recent (Laido, 2024) interviews on offshore wind tendering redesign demonstrate that changing procurement models propelled by forceful auction pricing and modifying liability frameworks have altered supply-chain risk profiles. With developers transferring greater performance risk to EPC contractors, it has become essential to maintain continuity of high-impact risks between stages to prevent cost overruns and claims escalation.

Standards and frameworks offer structured methodologies for risk continuity and knowledge handover. ISO 31000 sets foundational risk-management principles, while ISO 21502 prescribes project lifecycle practices with specific guidance for transition and handover planning. PMI's PMBOK Guide adds on to these by framing technical hand-off readiness, with all key assumptions, dependencies, and residual risks documented completely. For projects that are managed under standard EPC or design-build contracts, FIDIC guidelines clarify risk allocation schemes during tenders, defining which obligations need to carry over into execution. Together, these observations show that good handover is more about quality, traceability, and relevance rather than volume of data, with structured frameworks allowing contractors like Boskalis to systematically capture, verify, and convey high-value risk knowledge. My research serves the purpose of consolidating or integrating risk-related information into a unified framework by tracking, evaluating, and improving risk continuity between phases. Furthermore, an Integrated perspective from Industrial and Offshore case studies builds on discussion of front-end risk identification and phase continuity.

Case study literature: From Offshore and Infrastructure Transitions

Island Offshore (Andresen, 2025) is one relevant example that examines handover processes between chartering and operation in a Norwegian offshore shipping company. The company has established procedures and digital systems, despite which the research reveals that success of projects depends heavily on informal communication, individual initiative, and early involvement of operational staff. This study also concludes that while all the available digital tools and formal templates improve traceability, they cannot interpret or substitute tacit understanding and interpersonal trust that is built over time across teams. We can see the importance of combining formal handover documentation with relational and experiential learning to achieve genuine knowledge continuity through this example.

Similarly, the Association for Project Management ((APM), 2017) study on "how can we handover projects better?" has given an analysis on handover practices across multiple UK infrastructure projects that focused on project transitions. It says that the transition needs to be understood as processes rather than discrete events, requiring early planning, ownership clarity, and meaningful engagement of end users. Handovers are seen successful with phased data transfer, customized documentation, and retention of project team members for post-handover support. These findings directly are relevant to offshore project transitions. While in the construction domain, (Agerberg, 2012) shows how tender phase risk assessment in infrastructure projects remain dominated by deterministic approaches and a lack of structured mechanism for feedback to later phases.

Organisational behavior and cultural barriers prevent complete implementation of digital tools that are expected to be leading to expert and experience-based judgements. The phase two literature study highlights the structural causes, interface gaps, and fragmented systems and weak collaboration that can be linked with discontinuity patterns that need to be observed to address our research problem.

To conclude, this research assumes that the quality of project risk transfer between tender and project phases is influenced by the continuity of organizational knowledge rather than the availability of information itself. While companies do have sufficient data, fragmentation across systems and interfaces prevents effective integration and interpretation. This hypothesis is based on literatures on knowledge integration (Grant, 1996), uncertainty and risk interpretation (Aven, 2015), and also from preliminary discussions with project management team of the company. Hence the central hypothesis that originates from this is, the loss of knowledge caused due to fragmented information systems, weak feedback mechanisms, and lack of shared understanding between tender and execution teams, will reduce the quality of risk transfer during phase transitions of a project.

4. Theoretical Foundations for Data Analysis

The aim of this chapter is to establish the grounded theory that is relevant for analyzing the data collected in this research so that we can further build on implications for science (see chapter 7). This chapter acts as a conceptual lens through which case and interview findings are later interpreted in chapter five and six. The two main domains under the field of project management that originate from this research are Knowledge Management (KM) (see chapter 4.1) and Transition Management (TM) (see chapter 4.2). This is used to explain how risk related information is interpreted across project phases. KM conceptualizes risk knowledge as a strategic organisational asset, distinguishing between tacit and explicit knowledge and examining mechanisms of knowledge conversion, sharing and retention. TM supports this perspective by framing project phase changes as dynamic system transitions characterized by feedback loops, delays and adaptive behavior under uncertainty.

4.1 Knowledge Management in Project Environment

A project success for an organization depends on how well they can utilize the specialized knowledge available within. In offshore projects, organizational success depends on how effectively knowledge is captured, shared, and reused across departments involved in a project and in distinct phases of the project (Liebowitz, 2004). Knowledge, in simple terms, is seen more as an asset to an individual but is also a form of risk control. When valuable insights from the tender phase fail to reach the execution teams, or from execution teams back to tender as feedback for other projects, then critical assumptions, design rationales and contextual decisions are lost. This transfer gap increases uncertainty, leading to repeated mistakes, inefficient interfaces, and lack of organisational learning (Liebowitz, 2004).

4.1.1 Introduction to Knowledge as a Strategic Risk Asset

Knowledge Management (KM) is the process through which organizations create value from intangible assets such as experience, expertise, and lesson learned. It is an embedded domain that comprises a mechanism for transforming information into actionable knowledge and using the same knowledge with a cluster of influencing factors into project processes and culture. In the project environment, teams are temporary, geographies are changing, and interfaces are constantly updated, the ability to manage knowledge becomes a determinant of both technical and financial performance of the contracting company. In this section, we discuss how KM is a key player as a foundation for managing risk knowledge within the project-based organizations. The discussion is built on key concepts adapted by Liebowitz (1999,2004), (Sveiby, 2001), (Grant, 1996), and (Hall, 2005) and updated in the context of offshore energy projects. Lessons learned or feedback, cross phases communication in the process and knowledge integration mainly shapes organization to transfer risk understanding more qualitatively between tender and execution.

4.1.2 Information to Knowledge: Conversion

Information perceived from interdisciplinary teams working in the organization is multi sourced. Moreover, it does not alone generate learning. It must be interpreted, contextualized, and applied to create or develop knowledge. Creating is in initial and newly originating concepts whereas developing is from existing or later/continued aspects of the project. Transformation of data to knowledge follows a cyclical process of collection, interpretation, application, and reflection (Liebowitz, 2004). This cycle is observed while working on projects, when data is collected during tender and every time the risk session progresses, reviewed, and updated which are analyzed to reveal patterns, transformed into actionable insights, and shared to facilitate planning for execution after winning tender.

For instance, when working on a risk register during the tender, the risk engineer identifies the potential for delay in suction pile installation that might originate due to several reasons. One could possibly be due to design not being finalized yet, due to vessel readiness, environmental constraints, soil deviations, or procedural issues. This information is either received by the project manager from his knowledge of vessel operative performance or engineers who know about the design delays due to lack of schedule preparation with limited information. This varied information becomes knowledge when it is contextualized through prior project experience of risk engineers themself or from other actors in the project and is then translated into a mitigation plan during execution. Later, this insight is recorded into lessons learned systems closing the feedback loop between projects which is necessary for building organizations collective memory to handle future projects better (RE1).

The knowledge conversion cycle is a loop of learning, data capture, information processing, knowledge creation, knowledge application, and learning. This shows how operational and project data are transformed into actionable learning. Information is processed to identify risks, trends, occurrence, deviation, costs, schedule, probabilities and then further formed into new knowledge through collaboration and reflection. This knowledge is applied during planning as well as execution and outcomes are captured in lessons learned and operational and risk management databases making it a closed loop. This cycle also ensures that useful insights can be retained between projects, where in each loop strengthen accuracy of future assumptions and reduced repeated mistakes. Quality of both planning and execution when it’s ongoing, improves, as more data is captured and processed for the organization (Boskalis-ORM, 2022).

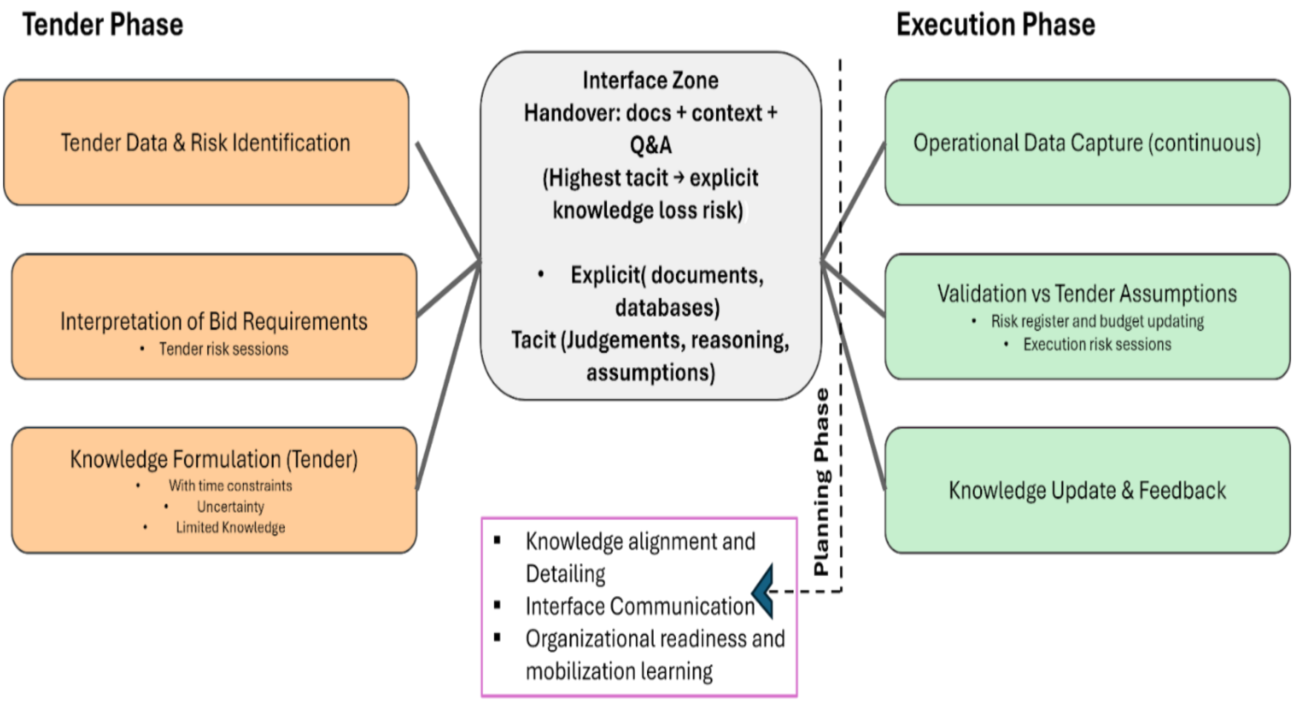

Figure 2: Knowledge conversion across phases

Figure 2 shows how risk and operational knowledge from tender engineering & management to project execution actors evolve. The tender loop depicts knowledge through identification and formulation, which is transferred at interface to execution teams. The execution loop validates, updates, and performs on this knowledge through real data. This interface zone is a more critical point of knowledge continuity, where assumptions and rationale are effectively communicated. Equally important comes the planning phase, that functions as a bridge between tender and execution, ensuring to align the knowledge during the multi-year gap between contract being awarded and project mobilization. This phase serves the revalidation purpose, constantly rebuilding and improving the levels of risk budget capture, helping to prepare for readiness activities (PM1).

During the tender phase, knowledge originates under intense time pressure, sometimes within a window of a few weeks. As commercial and tender managers believe, risk identification relies more on heuristics and experience, producing registers based on thumb rules and different motives (TE1). Decisions on why a likelihood or consequence value was chosen to remain tacit. Risk engineers experience the contextual reasoning behind numbers formed after contract winning which is quite different from what was devised in the initial phases, even if Monte Carlo analysis and planned sessions provide traceability. Consequently, as one senior project manager pointed out, “a risk written by one person cannot always be interpreted by another.” (PM1)

After the contract has been awarded after several negotiations, the organization enters a prolonged planning phase waiting for client's final update and requirements often spanning two or three years before execution commences (PM4). Interviewers describe this period as a fragile bridge where assumptions are revisited, teams change (like project manager takes over, project controller comes in and cost estimator is out of the process), and knowledge continuity depends on interpersonal communication rather than system's memory like construction management software, for example, Relatics or collaboration & document management like Microsoft SharePoint.

Marine Engineer highlight that this stage offers a unique opportunity for conceptualizing and translating tender deliverables and procurement strategies (TE1). Yet, it is also acknowledged that without the presence and structured re-engagement from the initial tender team, contextual understanding fades. One more significant part to consider is the focus on time factors for all aspects of risks (like expected arrival, delay time, estimated time to install, latest available vessel date) and proper monitoring of it during execution to reinterpret tender logic for next projects, revalidate risks with updated time factors best fit for respective project context (RE1). In overview, planning functions as a knowledge stabilizer phase, maintaining continuity during temporal gaps between bid and mobilization.

The project planning phase converts the stabilized knowledge back into operational work. Project managers and project engineers describe their role as verifying, reinterpreting, and re-contextualizing tender and planning risk data under real world conditions (PM4) (PM3). The frequently observed problem found out was the risks lacking explanatory depth that come from initial phases that might create a need to reconstruct reasoning through informal discussion with risk engineers. Moreover, some new risks come up in later stages which were not identified before. It is not a blame as a whole or a failure for the part of Risk engineers but the absence of knowledge sharing and building collectively during the initial stages that leads to Unidentified Occurred Risks (PM2).

Furthermore, Execution risk sessions are areas of re-learning whereas assumptions are actually tested against processes like vessel reliance, weather conditions, or equipment performance. It is here that tacit knowledge dominates again, where operational decision is refined through dialogue and proximity, and what the manager call it as "learning over coffee" (TM1). These experimental insights are inserted into new entries of Opportunity and Risk Register (ORR), producing both Opportunities for Improvement (OFIs) and Example of Good Practice (EGPs), which are archived systematically to form base for future project tenders. However, Interface zones between these phases between tender and planning emerging from interviews and practice, emerges as the highest point of potential knowledge loss but also the richest point of focus for organisational learning (CM1).

4.1.3 Knowledge Management Strategy and Implementation

An effective KM system relies on three interdependent elements: people, processes, and technology (Sveiby, 2001). Technology does provide infrastructure (database, integrated system, collaborative software, management software), but the human and cultural aspects determine if knowledge is shared or remains hidden and disappears within. In companies taking up offshore projects, engineers and managers change their roles, ownership, and communication means, which makes tacit knowledge often reside within individuals and disappear if not repeated or applied for a while. Thus, the strategy is to focus on embedding knowledge sharing into organizational routines, which is not an obligation rather indulge in the process itself, because an engineer can just have their own way of approaching a problem which he or she might be reluctant to share. This can be done by placing greater emphasis on developing "Common Knowledge". Common knowledge is built when actors are brought on a shared platform and provided sufficient space for discussion, reflection and exchange of knowledge (for example: through informative sessions) (Sveiby, 2001).

Figure 3 below on Knowledge Strategy Triangle has been applied to Offshore Energy divisions that align people, process, and technology to manage knowledge across tender, planning, and execution phases in the order of top to bottom, with people having more power in influencing knowledge across the organization and project since they carry the tacit know-how that define project culture.

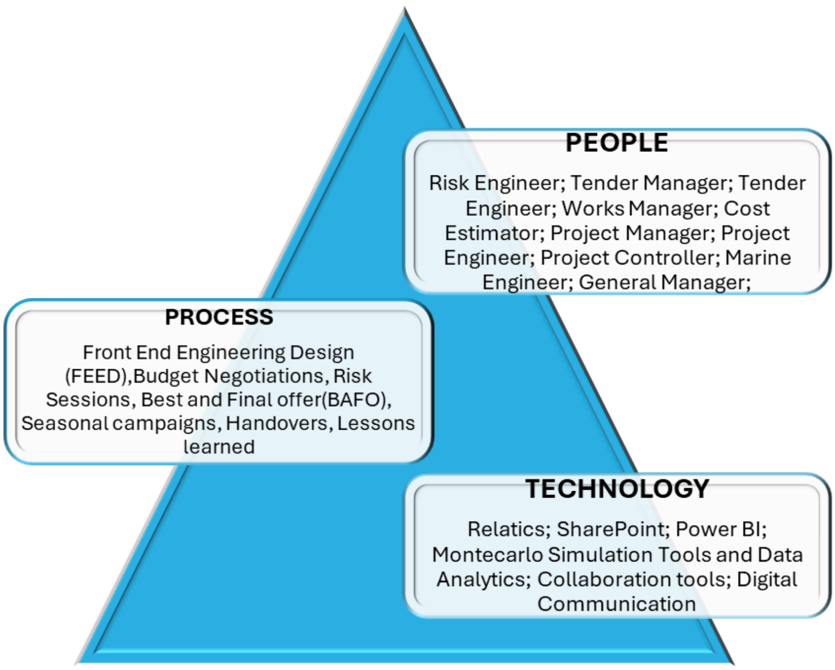

Figure 3: Knowledge strategy triangle

Sveiby's (2001) knowledge-based theory of a firm poses nine questions out of which four of them can be linked to our context:

1. How can competence be transferred between people within the organization?
   -By rotating experienced offshore personnel back into tender teams and using mentorship during planning.
2. How can individually held knowledge be converted into systems and templates?
   -By codifying good practices and mentioning underlying assumptions/reasoning in the Opportunity & Risk Register (ORR).
3. How can conversations among internal and external stakeholders improve competence?
   -Through integrated risk sessions where tender, project, and operational staff discuss likelihood and consequences together.
4. How can systems and tools improve stakeholder competence?
   -By making risk dashboards and lessons-learned databases accessible to both technical and commercial users, promoting them to use it frequently making it a regular practice.

Applying principles in knowledge management must go beyond information. It is equally important to share the knowledge created by creating a network system. For a company, the implication is that it is more cultural rather than technical knowledge. People share lessons when they feel that their input matters, and not when it is just merely required. So, the recognition of contributors must be prioritized. (Liebowitz, Knowledge management handbook., 1999) rule says that around 80 percent of KM success lies in people and process, and only 20 percent in technology. Furthermore, the implication arising from lessons learned is that most actors working on entries tend to describe what went wrong rather than what went right. This pessimistic human nature towards avoidance means that organizations focus on preventing mistakes rather than about repeating success. Success and failures are two equally important branches that need attention to balance the learning portfolio and focus on economic improvement, and not just risk reduction. If the portfolio is noticeably big, then it can be divided into two to comprehend data sets for an understanding that is just sufficient.

4.2 Transitional Management

4.2.1 Transition as a condition within Project Systems

Transitions in projects show deliberate shifts in structures, routines, and understandings between distinct phases of project in the way of working. This movement is a repetitive process in large contractor firms to which risk engineering department is a part of, each time a tender becomes a project or when operational control moves from one project team to another. These are the organisational transitions that mirror systemic change as described by (Loorbach, 2009), where temporary configurations of actors and rulers have been evolved into new arrangements in response to changing goals and environment.

In offshore projects, be it building a wind farm or for an oil and gas facilitation, shifts are visible when commercial assumptions made during the tender evolve into operational realities. Actors describe this as a period when knowledge travels faster than people, producing discontinuities in understanding (CM1). It is the moment when the project resets itself with new actors and forgotten logic. Transition Management (TM) explains how such resets are though inevitable but are manageable reconfigurations. The challenge is to guide it through structured interaction and reflection rather than to prevent change (CM2).

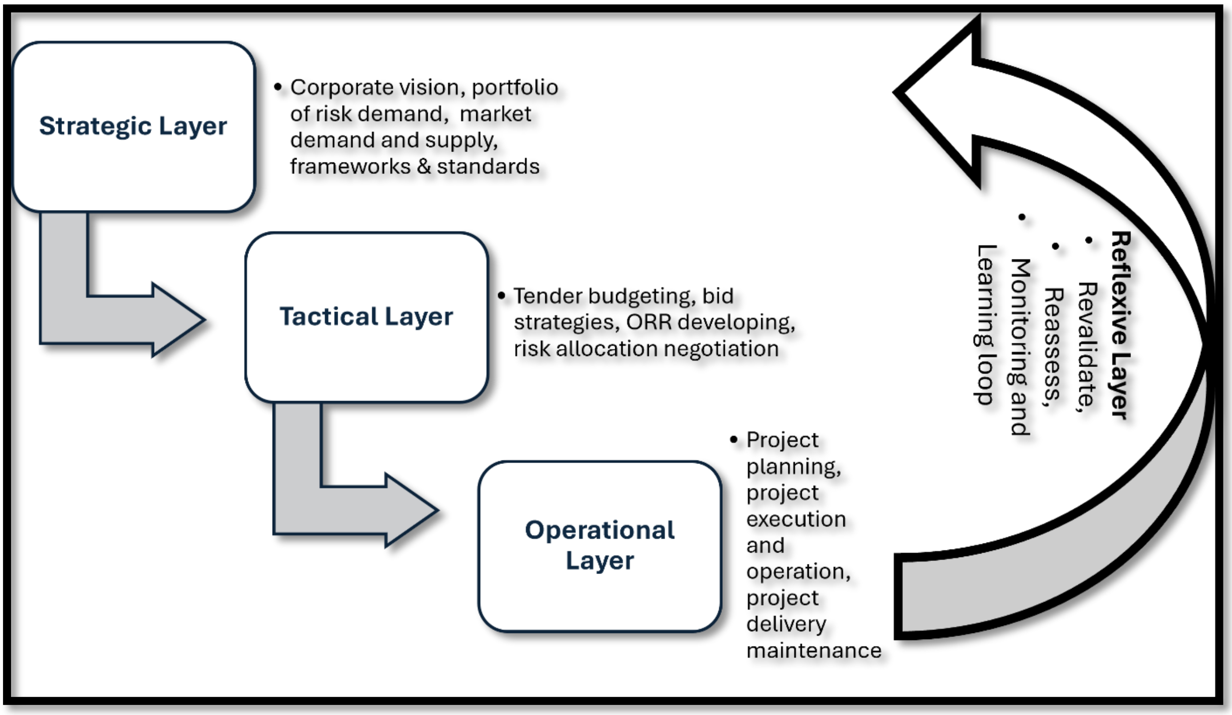

Figure 4: Transition layer across project phases (concept adapted from Loorbach, 2009)

TM conceptualizes transitions as multi-level and iterative which operate simultaneously at strategic, tactical, and operational levels. At strategic levels, corporate priorities and risk identification demand define direction. At tactical level, tender teams interpret those priorities into competitive bids, and at operational level, project team plan and execute with practical constraints. If reflection and feedback between any of these levels are weak, it affects the entire system.

4.2.2 Feedback, Delays, and Dynamic Coupling

According to (Yücel, 2008)), transition behavior is not linear, but it is shaped by feedback loops and time delays between fast and slow processes. Fast loops in projects consist of bid decisions, schedule revisions, and day-to-day coordination, while slow loops involve institutional learning, tool development, process definition, and growth capability. These loops are complex enough to be misaligned, where short term decisions undermine long term adaptation (Yücel, 2008).

This dynamic accurately describes what one can witness in company's risk processes. Tender phase operates on time constraints, often weeks, while lessons from execution emerge years later (PE1). The delay between identification and feedback makes an organization structurally reactive. An effective transition management depends on recognizing these multi speed dynamics and intentionally shortening feedback delays through design of communication channels and indicators. The detail has been revalidated that comes from the actor stating "execution feedback comes too late to influence the next tender" whereas from execution side explains that wrong decisions were corrected only after several losses had already occurred since it was difficult to stop at a point even if there was a clear picture on what was happening (PM5). In transition management terms, this shows a kind of lock in, when old ways of working continue even though they no longer fit the situation, mainly because the organization learns or reacts slowly. Looking at it through a feedback perspective and history means that we see this not as one person's mistake, but as something that was induced in entire system at a point where the process itself had a chance of preventing the occurrences (PM5).

4.2.3 Adaption and Reflexive Learning in Project Transitions

Risks in projects come under elevated levels of uncertainty, especially during the phase transitions. At tender stage, there are assumptions such as vessel readiness, weather delays or permits. This does not state poor planning but is natural in complex projects. (Malekpour, 2020) links Transition Management and Decision Making under Deep Uncertainty (DMDU) together which suggests that organizations should not try to predict everything in advance but rather prepare to adapt whenever the signals of change appear.

Adaptive pathways are to be developed by planning several possibilities and switching between them when certain signs or tipping points occur. In practice, this means to define what the indicators are suggesting and to be monitored continuously, like approval status of vessels, weather windows, or operational readiness and agreeing on what actions will follow if the indicators turn negative. It is a way of accepting uncertainty and keeping flexibility without losing control. The need for adaptive thinking can be seen from project two case scenario which used a wrong support vessel, that can still be a positive one for company as a portfolio decision but even after a signal of what is coming, a smart adaption could have triggered a formal decision (PM5).

The situation of project case study two shows how old decisions continue because of no mechanism that exists to challenge them or reverse them. This will be rare but will cost companies quite a sum. If the organization had agreed on specific signals or tipping points, then the loss could have been reduced, which cannot be always avoided. In this sense, contract negotiations and risk ownership rules become crucial transition moments. The focus in the process should not only know what is agreed, but also when and how it can change (PM5).

Usually at the company, risk engineers or managers are not involved in contract negotiations. As a result, crucial clauses like liquidated damages or vessel availability dates are altered (RE1). The problem that is created from the transition is not that they are altered, but that the risk profile does not reflect those alterations. Transition Management offers an explanation at the tactical level (where contracts are finalized) often move faster than operational level (where information flows back to risk engineer, and where consequences appear), creating a feedback gap. Adaptive capacity is meant to close the gap by ensuring technical, commercial and risk perspectives stay connected when decision is made.

Learning from past projects depends on reflexivity, a core central concept of TM. It is the organization’s ability to look back, question own routines, and understand why certain outcomes occur. According to (Loorbach, 2009), this process can turn short term experiences into long term institutional memory. There could be informal learning which is real but unstable. It disappears when people change roles or projects. Reflexivity also explains why the phases or rounds in the process matter so much. These are in essence, the transition arenas where multiple viewpoints meet like technical, commercial, and operational. Within these arenas, people are supposed to debate assumptions, assess their reasoning, and adjust priorities before they investigate contract obligations. For example, commercial teams may focus on price and delivery promises, while risk engineers understand the technical exposure those promises create (RE3). TM theory highlights the balance which is achieved not through hierarchy, but through dialogue and progress depends on the quality of conversation between these perspectives (Loorbach, 2009).

To conclude, transition management and knowledge management literature helps us to understand risk as a combination of documents, tacit knowledge, and shared understanding distributed across project actors. The dynamic transition moments of the phases considered in this research study are characterized by feedback delays, changing actors and evolving assumptions. In subsequent chapters, this theoretical literature review is used as analytical lens rather than prescriptive model. KM aspects like informal judgement, partial information availability, hesitation to give inputs, heuristic decision making, etc. together with TM concepts that provide a way to trace where and why risk reasoning shift (like feedback delays, transition blindness, etc.) will support the examination of risk continuity information derived through interviews and case analysis. Insight from this theory is used to identify where risk reasoning breaks during handovers and determines which organisational mechanisms contribute to that breakdown. The focus is on transition moments, and this chapter linkage will form the basis for synthesis and recommendations presented in the final chapters. Hence, the recommendations are further developed by indicating where processes, roles, and decision points should be adjusted to improve risk continuity in future projects (see chapter 8).

5.Case Studies

5.1 Project-A (Offshore Heavy lift)

In this chapter, we shall discuss project A as first case study, which shows how continuation of information, stability in the team and continuously evolved project context interact in the risk transfer process. Project A was a combination of two sequential projects together executed by largely the same team and was treated internally as sequential phases of one operational learning cycle (PM1). First one served as a scaled pilot study, a reference for the other one to expand the scope under new political and logistical conditions in the United States. This continuity used in the projects creates unique opportunity to observe how risk knowledge base is reused, adapted, and distorted with reference projects.

Project A consists of two sequential foundation installation campaigns executed using a heavy lift installation vessel in U.S offshore wind farms, covering project A1 with 12 wind turbine generator (WTG) foundations and 1 offshore substation (OSS), and project A2 with 65 WTG foundations and 2 OSS. Both wind farms are situated on the U.S Outer continental shelf, which imposed strict geodetic, environmental operating constraints. Installation was performed using a heavy lift vessel from Boskalis (BOSKALIS, 2023). The project A2 risk register shows several foundation parameters being uncertain when project was in planning, like pile drivability and refusal behavior, center of gravity changes after lifting configurations, and vessel selection constraints tied to evolving weight and geometry data (ORR-A2, 2025). Project A2 risks show discontinuities which shape project risk environment. This includes absence of design freeze date (resulting in repeated engineering revisions), client driven schedule shifts (which altered installation sequencing), and late fabrication changes, which affected lifting plans, and transport assumptions (ORR-A2, 2025).

Table 4: Scope of projects A1 and A2

Project	Scope
A1	The wind farm will cover an area of approximately 69km2 and will consist of 12 turbines and 1 offshore substation (OSS). The water depths in the field range from 33 to 40m below the Mean Lower Low Water (MLLW).
A2	The capacity of the wind farm will be around 715MW and will consist of 65 turbines and 2 offshore substations. The water depths in the field range from 31 to 47m below the MLLW.

Both A1 and A2 were built for the same client, where first consisted of fourteen monopiles and small foundation package, while second was over four times larger and included additional offshore structures making it “the biggest monopiles” organization ever installed (PM1). These projects were performed using an installation vessel supported by other vessels (LR). Planning data shows a cumulative project duration of 633 and 1092 days for each, with elapsed progress exceeding planned baselines by 225% and 131% respectively, which is clear indication of scheduling expansion and design iteration (Internal Project Planning Data for Heavy Lift Project A, 2025). This was concluded as a “controlled campaign in the end even with substantiable variance,” which dealt with “cumulative effects of scope growth, permitting delays, and political uncertainty due to shift in U.S administration. There were also big issues from client supply of big monopiles” (LR). Progression can be seen as a continuity mechanism than a technical scale up from managerial point of view. “As viewed as a whole, it was a good performance by the engineering management team, especially given that it was their first experience in U.S. waters and their first time working with such large monopiles.” (PM1; PM3)

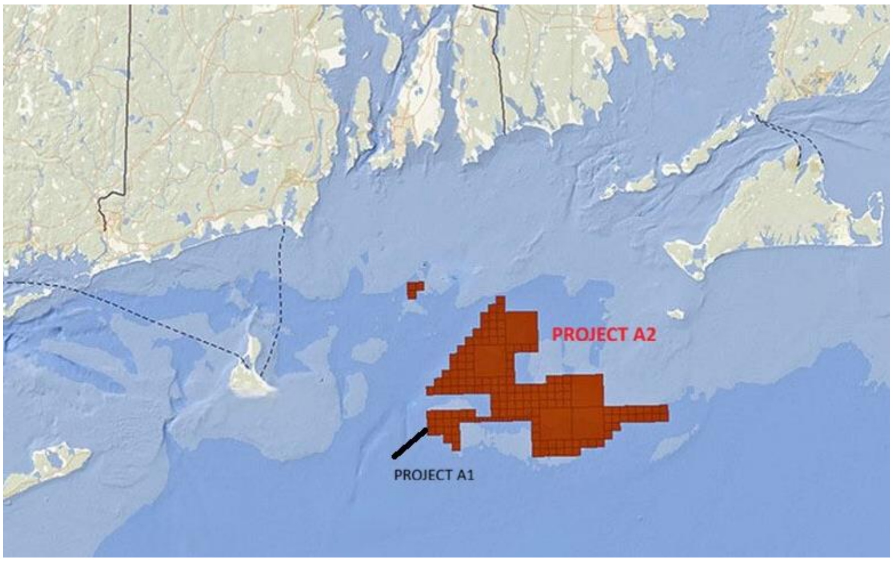

Figure 5: Map of Project A area (Graziadei, 2024)

Transition and Adaption

Based on interviews with actors in the project, risk registers of two combined projects were linked explicitly, where same titles are adapted to project specific context (LR). The process involved transferring the full register from one to another, then reviewing each entry package by package with the package manager so that applicability can be verified. Risks were not copied blindly and had to be reworked for the bigger project conditions: larger monopiles, different port logistics, expanded subcontractor interfaces requiring new engineering tools and special quick connect systems due to size and weight constraints (LR). Continuity was also strengthened by making the team stable. Most engineers, discipline leads transitioned directly into second project that allowed tacit knowledge retention that could be typically lost between handovers (PM3). Furthermore, during extended planning period between contract being awarded and mobilized, assumptions from tender had to be revisited repeatedly. The technical context and political shift influenced timeline, risk logic needed reinterpretation. (PM3)

However, the transition between tender, negotiation, and execution was not linear. A substantial portion of risk knowledge passes through a grey zone, or a blind-sided point in the process (RE1). The BAFO (Best and Final Offer) rounds where Contractual clarifications, and commercial negotiations happen are zones where assumptions like liquidated damages clauses, responsibilities, and grace periods are renegotiated at a higher speed sometimes. Risk engineers are absent from these, meaning, the contract that execution inherits is often not same as risk analysis was based on (RE2). This cannot be termed as failure in process but a structural reality for a business field (SM2).

The planning phase that followed which spanned more than 2 years for second project became a stabilized domain where reconstruction occurred. Risk Engineer shifted from group discussion to individual technical interrogation of each package. This approach proved far more effective than general session. Also, according to project engineer, these one-to-one reviews allow risks to be alive and relevant across long planning cycle, compensating for misalignments after tender or after grey zones (LR). Additionally, role continuity helped solve knowledge transfer issues and reasoning since the tender manager and project manager were same. So, the project scope was supported on people-based continuity along with document-based continuity. (PM1)

Discussion with project engineer showed that several key tender phase risks were known but not to the full extent they could occur, because engineering maturity at tender was limited (PE1). Adding on, project manager states with his observation that, “a risk written by one person is not always interpreted the same way by another,” (PM3) which shows how meaning changes across project phases even if there is added value or team continuation.

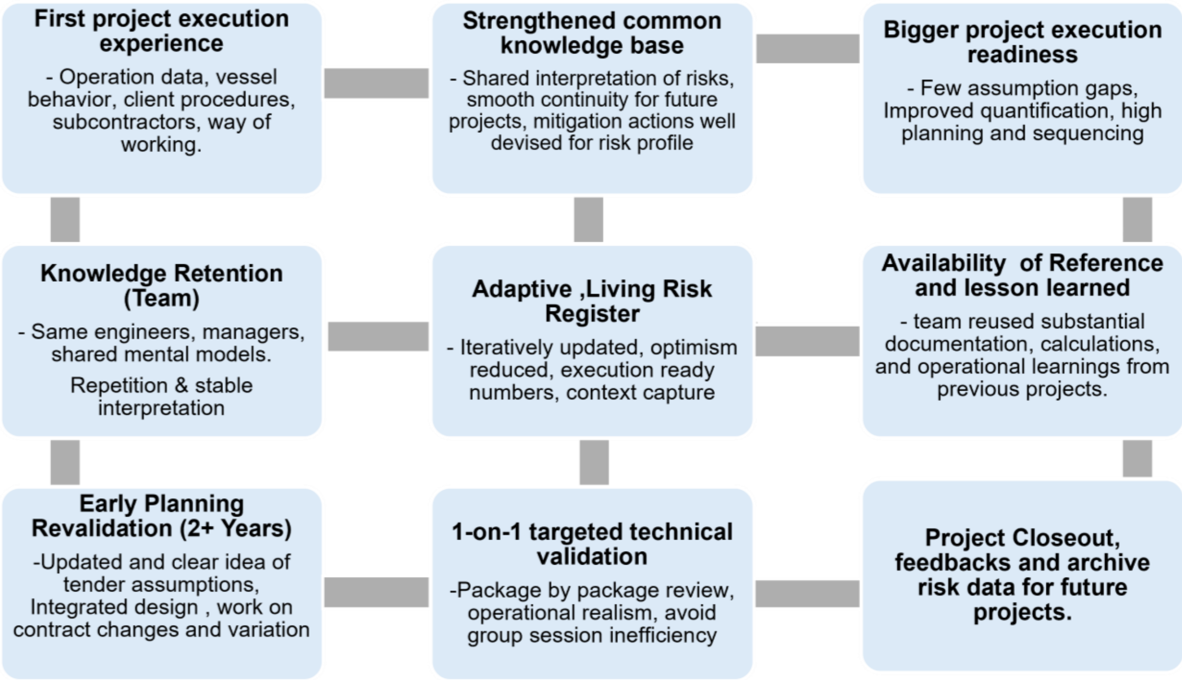

Figure 6: Optimistic process continuity aspects (Project A)

Figure 6 above illustrates a set of interdependent conditions. According to interview findings of this project and case study analysis, these conditions improve the quality of risk knowledge transfer between tender and execution. This is not a sequential process, but rather an interconnected system in which multiple elements evolve together sometimes. The elements include project teams gaining first execution experience, the retention of shared team knowledge, early revalidation of tender assumptions, a targeted technical review, and continuous updating(adaptive) risk register. All these together has helped to expand organization knowledge base.

Drivers and Interrelation

Interview data with the tender manager (PM3), risk engineer (LR) of this project showed that the tender stage risk assessment reflects cost, competitiveness, and contractual qualification, whereas execution requires realizing operational, geotechnical and equipment specificity. This shift led to predictable constraints. The project engineer (PE1) highlighted the fact that risk registers often do not show true top risks, because of quantification being shaped to fit commercial expectations. The project and tender Manager (PM3) linked this to power dynamics in the tender, where cost pressure leads to distorted risk classification. Hence, the structural divergence between two frames is evident: commercial logic and operational logic.

Secondly, Grey zones discussed previously in Transition and Adaption emerge as most significant mechanism across other projects as well. Terms change faster than they can be updated or processed for risk database and its variation prediction for future use. Risk engineers lose visibility; consequence ranges shift, and responsibilities might have to be reassigned. In this project, early planning involvement partially mitigates it.

Last driver is the sustained team continuity, unlike project 2 discussed in section 6.2, this project preserved tacit understanding of how risks originated and evolved in offshore operation and gave the opportunity to work on likelihood and impact values based on lived experiences rather than abstract reasoning.

5.2 Project-B (Decommissioning)

This chapter discusses a decommissioning project study, which shows how information discontinuity between various levels both vertically and horizontally, competitive pressure, and operational decision making come together to form a systematic loss for the organization. This remains as the best example in negative numbers for the organization (Boskalis, Internal Project Planning Data for Heavy Lift Project A, 2025), in which commercial optimism and weak communication loops are directly a synonym of cost overruns (PM5).

Boskalis, in a Joint venture with another contractor, was awarded project B from Client in 2015. The scope of the project consisted of engineering, preparation, removal, transportation and disposal services for decommissioning of in total 20 platforms in the southern North Sea (ProjectSheet, 2020). In period 2015-2018, several preparations were carried out on all satellite, processing and accommodation platforms. In 2019, Boskalis was awarded the removal of 7 platforms and 4 platforms in 2020 that carried out by a 3000 tons heavy lift vessel (ProjectSheet, 2020). The platforms and structures after removal, were transported to Great Yarmouth for further dismantling and disposal. The project scope was challenging combination of lifts with each lift being unique. The provided information consisted partly of old documentation, which left quite a few unknowns such as potential obstructions in the piles, condition of steel structures, structural integrity of platforms, uncertain soil conditions and/or stiff clays (ProjectSheet, 2020).

The project involved sequential topside and jacket removals, jacket separation, abrasive and diamond-wire cutting, rigging design, sea fastening, and controlled inshore offloading operations, supported by a complex set of engineering documents including Platform-Specific Preparation for Lifting Manuals, Offshore Lifting Manuals, Transport Manuals, and Inshore Lifting Manuals (Boskalis-execution_plan, 2020, pp. section4-7)These technical dependencies made the project highly sensitive to assumptions around vessel availability, asset condition, allowable weather limits, cutting tool reliability, and marine warranty constraint factors that carried direct risk implications for safety, schedule, and cost (Boskalis, 2019).

Transition and Adaption

The project entered execution without a stable chain of reasoning from the initial phase. There existed no continuity between the team who prepared the bid and those who were responsible for later phases of the project. When engineering team begin their part, the cost basis, tender logics, and assumptions are largely unknown to new teams. This results in first months of preparation to repeat analysis on earlier works, risk assessments, vessel assumptions, and scope clarifications which consumes time and budget which may or may not be priced in tender. While the absence of contextual detail does exist, it's imperative that these must be processed upon from the point where actors receive information and start working on it. Sometimes, Handovers just become a transaction of files and not of understanding (PM5).

The original offer might have been made under highly competitive market conditions, with a limited decommissioning demand in 2015-16. To secure the work, pricing sometimes relies optimistically on productivity rates, and minimal vessel standby allowance. The project seems to have been effectively underfunded where the stakeholder ascertains that "they knew it coming even from beginning or just after the start. It was no surprise. The issue here was not on a misidentified risk but underestimated scope and underestimation of risks, and more than the volume of engineering required, verification and preparation required was far beyond the bid assumption" (PM5). Boskalis has shown itself to be a competent removal contractor to the industry. However, it also showed internally that the budget required to do so is significantly higher than foreseen upfront (Boskalis, Project close out report- Vessel 1 2019 campaign, 2019).

The commercial pressure usually comes with commitments, and to work on the ability to correct mistakes. Once awarded, or when a contract is signed, these commitments constrain the ability to correct. Engineering deliverables multiply as client and regulatory requirements expand but sometimes compensation does not, without a sufficed variation order. Contractually, these additions were interpreted as within the agreed scope (PM5). This is a direct example of how risk re-interpretation during execution can turn assumptions into liabilities.

Drivers and Interrelation

As a first driver, Internally, the project suffered from staff turnover and fragmented authority. Key managerial and engineering roles changed repeatedly, with no room for an overlapping period to transfer knowledge. Each transition that starts was definite to a blurred understanding. This restart is also classified as a major knowledge loss mechanism for this project. Operationally, mobilization and intermediate port calls lacked dedicated coordination resulting in lost materials and uncontrolled revisions. The uncontrollable number in turn leads to engineering deliverables that delay approvals with client and marine warranty surveyors.

Client feedback in project documentation also indicates uncertainty during engineering and preparation phase, by frequent changes in key Boskalis personnel leading to repeated loss of contextual knowledge and inconsistent communication of assumptions (Project close out report- Vessel 1 2019 campaign, p. 14). The client side's perception of "had to educate Boskalis on certain subjects" shows discontinuity in internal information transfer, as well as perception of indecisiveness at key decision moments due to misalignment between project level and business unit management

(Boskalis, 2019). Additionally, significant scope additions were accepted without formal variation order despite of contractual provision for compensation, this led to unbudgeted engineering effort and extra deliverable than what was initially priced.

Technical faults cannot be narrowed down to the domain knowledge. Behind the technical symptoms lie structural causes. Tenders could have been priced to win work, with an expectation that execution team would make it work. Once committed, hierarchical and cultural factors discourage escalation which is pressure and time bound. The senior levels focus on reputation and contractual completion led to persistent failing path rather than early termination (PM5).

Figure 7: Decision logic sequence (Project B)

From a handover point of view, this project exposes the interface where tactical(commercial) and operational(project) levels move at different speeds. These are times that underline the evolving speeds of contract negotiations and vessel charters than engineering validation, which could leave risk information obsolete. The project also highly exemplifies a feedback delay locked in, where earlier decisions remain unchallenged despite the contracting evidence (PM5).

Decision Process and Operation

Two decisions define the trajectory, namely the delayed vessel commitment and the selection of support assets (PM5). The support vessel could possibly be fixed at the start of the project or may not be, multiple changes of intended vessels forces engineering to be redone several times, which can go up to eight months of duplicated work or more. Each change triggers new calculation, rework, review extending over half a year. Secondly, a support vessel fails that comes with many directions of failure, sometimes fails client approval, or assigning it to other project, due to limited availability or working conditions which can effectively cancel and alter entire campaign. The lost season represents millions of idle vessel cost. The wrong call persisted because of contractual commitment, and social reluctance to admit errors that make reversal difficult. Once the vessel was on hire, termination in between meant additional legal and logistical exposure, so the project was “waited it out” until delay became irreversible (PM5). The challenge to stop a wrong workflow after decision is taken even if it is evident that a huge loss is bound to happen, sometimes becomes irreversible and impossible.

Other equipment related delays, like wire cutting systems that failed in operation, interferences from diving setups and motion compensated gangways that underperformed compounded the disruption. Each of them originated from procurement decisions when price and availability outweigh reliability and track record (PM5).

5.3 Case study Comparison

Table 5: Cross case comparison table

Dimension	**1.Tender rationale traceability**	**2.Risk Register Quality**	**3.Team Continuity**
Project:1 (A1; A2) (Heavy Lift)	Medium	Structured: inherited & reinterpreted	High
Project:2 (B) (Decommissioning)	Extremely poor, assumptions and basis unclear	Fragmented: missing risk logic and several Unidentified Occurred Risks	Very low
Explanation	P1 had partial traceability	P1: systematically reviewed reference risks.; P2 received unclear or incomplete content	P1: maintained same key actors across tender, planning, and execution. whereas P2: had different actors changing within team
Interview phrases	P1: "planning phase helped track and revalidate" P2: "Cost basis and tender logic was largely unknown to	P1: "Risks were not copied blindly, each entry reviewed with package manager" P2: "we had information from tender, but commercial decisions demanded reinterpretation of risk logic"	P1: "Most engineers transitioned directly into second project." P2: "Some managers didn't know who prepared the tender".

Dimension	4.Time pressure on tender	5.Tacit Knowledge availability	6.Discontinuity Points	7.Risk Evolution	8.Commercial vs operational alignment	9.Rework Volume
Project:1 (A1; A2) (Heavy Lift)	medium	Preserved through staff personnel	BAFO changes, tender assumptions, political addition	Risks adapted, refined, and validated	Medium conflict	Moderate
Project:2 (B) (Decommissioning)	high	Lost at every handover	Staff turnover, vessel change, scope underestimation	Risks re-interpreted, corrected, and often occurred	High conflict	Extremely high
Explanation	P1 had manageable time pressure; P2 operated under extreme pressure, relying heavily	P1 continuity preserved tacit knowledge; P2 lost tacit knowledge at every handover	P1 experienced BAFO drift but later corrected; P2 suffered deep structural discontinuities.	P1 risk logic stabilized over planning; P2 repeatedly reconstructed.	P1 had a mismatch but mitigated in planning, P2 could not be mitigated	P1: Controlled rework; P2: massive rework due to mistakes
Interview phrases	P1: “Entire tender took 2 years; it was a long development” P2: “Sometimes as short as a week… we work on thumb rules.”	P1: “Same tender and project manager ensured continuity of reasoning.” P2: “Key roles changed repeatedly… no overlap to transfer knowledge.”	P1: “Engineers discover changes only after contract award.” P2: “Each transition began with a blurred understanding.”	P1: “Risk logic needed reinterpretation, but planning stabilized it.” P2: “Assumptions had to be reconstructed.	P2: “Commercial optimism later becomes operational liability”	P1: “Had to be reviewed and updated for case context specific” P2: “Multiple changes forced engineering to be redone… up to eight months of

Dimension	**10.Planning phase utilization**	**11.Contractual impact**	**12.Tools, systems, lesson learned utilization**	**13.Early warning/tipping points response**	**14.Outcome**
Project:1 (A1; A2) (Heavy Lift)	Effective, strong stabilizer	Moderate	Good and continuous	Adaptive Management	Delay with controlled boundaries, overall project success
Project:2 (B) (Decommissioning)	Weak or ineffective	Very high	Fragmented	Reactive and delayed	Severe cost overrun
Explanation	P1 used planning to reinterpret and stabilize risk logic; P2 had to reconstruct because initial assumptions were unclear	P1 BAFO impacts were absorbed via reinterpretation; P2 contractual commitments locked in bad decisions	P1 had consistent documentation; P2 lacked continuity in tool use during rapid transitions.	P1 responded to early signals; P2 ignored or could not act on early red flags	P1 maintained control despite complexity; P2 collapsed due to systemic discontinuities.
Interview phrases	P1: “Planning became the stabilized domain where reconstruction occurred.” P2: “We knew it coming from day one, but could not help it”	P1: “There was no change in the risk budget” P2: “Once committed, reversal became impossible.”	P1: “Systems work, but how people use them varies.” P2: “Systems and tools cannot solve everything. We did not have feedback updated so well back then”	P1: “Planning involvement partially mitigated issues.” P2: “We waited it out until delay became irreversible.”	P1: “Controlled campaign with minor variance.” And P2: “One of the worst negative numbers… no surprise.”

Table 4 above compares two case studies by highlighting how risk knowledge can behave when subjected to different project conditions. Comparing the projects of two different stories has made it possible to distinguish project specific issues from structural patterns in risk continuity. This comparison highlights which mechanisms consistently support or undermine transfer of risk knowledge by contrasting the different organisational setup and transition practices. The core insight determined is that technical complexity alone does not determine risk continuity. While project A1 and A2 benefited from continuity mechanisms like personnel continuity and iterative revalidation, project B shows how fragmented handovers, contractual ambiguity and organizational misalignment on different levels of transition layers (see figure 4) led to loss of context despite a good technical competence. Therefore, this table is an illustration of two different ends showing that risk continuity is primarily an organisational and transitional challenge rather than just technical.

The comparison clearly shows the theoretical distinction (refer chapter 4) between risk as codified information and risk as situated reasoning by showing how same formal tools produce different outcomes under different transition conditions. So, the key takeaway in risk assessment is that the same risk description can lead to different decisions depending on who is reasoning, when they are reasoning, and under what conditions.

6. Perspectives of Stakeholders on Risk Continuity across phases

6.1 Interviews

Additional data were obtained through semi-structured interviews with stakeholders engaged in projects beyond the selected case studies within the company. The roles were many, and it can be difficult to bring all the minds together of any project. Moreover, some of them will be involved in operation phase who do not really concentrate on backward integration that can be derived from their work. Interview consisted of open questions about understanding the role, flow of information, interfaces, transitions, challenges, work allocation, requirements, meetings, registers, documents, and routines. Some of the interviews were recorded and transcribed manually.

Open questions were combined with project specific questions and the reasoning for their part of the work. This will ensure people in the organization express their experience, knowledge, and opinions with confidence especially when they have worked on it to gain relevance rather than just thoughts or theoretical knowledge about the research. The process also gave insights into formal procedures and practices that could show how improvisation and professional judgement were adapted.

The Rumsfeld Matrix below in figure 8 is a qualitative input to frame how stakeholders in projects perceive risk information across different phases. In the interviews, it is the movement across these four knowledge categories. Known known represents documented risks and assumptions captured in registers, while known unknowns reflect uncertainties that are openly acknowledged during tendering. More critical to this research comes the unknown knowns, which are the tacit insights held by individual stakeholders but are not communicated, and the unknown unknowns, which emerge only during execution and often drive unexpected reworks and delays. By using this matrix, clarification on why risk continuity breaks, transitions dependent on actor's interpretation, sharing and surface knowledge that is hidden or assumed or difficult to share, can be explained.

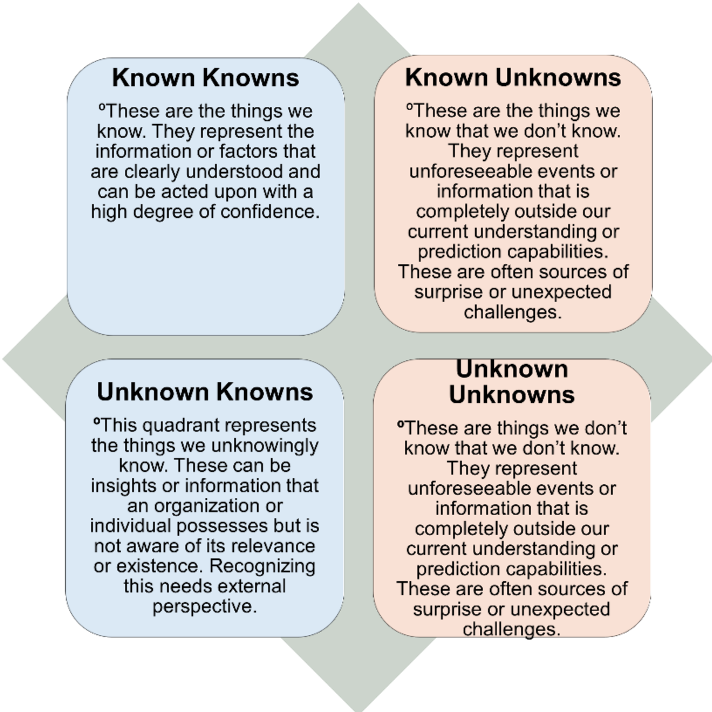

Figure 8: Rumsfeld Matrix: Adapted from Rumsfeld (2002)

6.1.1 Risk Engineers Perspective

Risk Engineer's function within the organization is described as facilitative rather than decisional. They support decision making in the company, so they are the "Risk Facilitators" more than "Risk Owners" themselves. Their responsibility lies in maintaining the Opportunity and Risk Register, coordinating multidisciplinary sessions, and that can ensure both teams involved in tender and project operate under a consistent framework (Boskalis-ORM, 2022). Although company procedures are well established, risk engineers agree on continuity challenges emerging at interfaces between functions rather than process itself that demands input from lot others for improvisation than risk engineer alone (LR).

Documentation discipline weakens when projects move rapidly. The registers and methods work, but the issue would be more on “how people use it between departments” (RE2). As an actor involved, the view sees continuity loss arising not from methodological gaps but from human and organisational ones. Perceived discontinuity often arises when “people are busy and not when system fails” (RE1).

There has been an introduction to qualification list, recently adapted structured annex to tenders that record each assumption, its rationale, clarity for the client on what is being offered on any agreed limitations. This serves as reasoning behind inclusion and exclusion of risks so execution teams can trace the estimates (LR).

Human dynamics within risk sessions is a point of attention. The operational staff are not often available during tender reviews. When they do attend, conflicting perspectives on probability and impact often prolong or derail discussions for “2.5hrs” from a scheduled “1hr” (RE1). Such tensions expose how risk perception differs by function. Operation or project team can tend to normalize lower likelihoods that risk engineers would classify as moderate or high with "unlikely for them is 30% but for us its less than 10%" and this could be based on tacit knowledge rather than technical one. The process requires “risk engineers to actively challenge the optimistic behavior” acknowledging that this “arrogance to challenge optimism”, is a trait that cannot be programmed into tools (RE1).

Management attention is also a decisive factor in maintaining continuity. While frameworks and tools do record data, cross departmental collaboration depends on leadership (RE3). If management prioritize deadlines or portfolio level decisions over review and formalities of just one project, then the procedural discipline declines. The resulting inconsistency is not by absence of process, but it can be due to its application. There exists discontinuity around final negotiation stages of contract (LR). The changes that come from them are evident in almost all projects taken for any contractor. Additionally, commercial teams are “very busy people”, for whom even extended(2hrs) risk sessions are perceived as burdensome (RE4). A lightweight and structured feedback mechanism has been proposed for this cause, centered on the top 15 risks currently used in board appendices (see chapter 8.1).

During the negotiation rounds, commercial teams adjust contractual terms such as grace periods, liquidated damages, and delivery deadlines to improve competitiveness or anything that could result in ultimate success for the company. However, risk engineers cannot have a picture of the resulting changes, the “how” and “what’s” to capture and devise risks better for future projects. A risk engineer characterizes this process as “a war before ceasefire,” where conditions shift rapidly and technical terms only discover the differences after contract award (RE1). These produce “surprises” during handover, as project team encounter exposures that were priced different initially or were different in terms and scope and the technical team is "blindsided" by surprises during handover (RE1). This encourages a demand for feedback steps after each negotiation round to ensure revised terms and reasoning are captured for next projects if possible (LR).

Another good measure currently under implementation is a centralized risk database. The system archives occurred, non-occurred, identified, and unidentified risks from previous projects into structured Relatics environment. By integrating the historical outcomes, database shows comparison of forecasted and actual results, validation of mitigation effectiveness, and an improved quantification for future tenders. It is an effort to close the loop between risk identification, execution, lesson learned that transforms scattered project experience into organisational knowledge. This adds value to system by preventing repetitive occurrence and evaluates precision of earlier risk forecasts. This aim is also to “move from expert opinions to data driven decisions” (RE4). However, the information and initiative is heavily dependent on data availability, system integration and resource capacity.

6.1.2 Project Managers Perspectives

Project Managers who were responsible for different projects share a consistent view of risk continuity dependence less on system and more on actors involved. The actors are both the recipients and interpreters of information that comes from tender and face immediate realities of execution where written estimations meet physical constraints. A focus on time bound nature of project risks has been described by a manager emphasizing long lead times and schedule delays. “A project delayed by a year enters execution under entirely different technical and market conditions, which needs re-evaluation” (PM1). His approach suggested a system engineering mindset of treating each identified risk as a requirement, asking whether it applies and questioning whether its compliance is achievable. He supported the adaption and current update in digital systems and tools to add value of transferring certain risks smartly to clients through contractual design (PM1).

A common theme that is heard from the handovers from tender to negotiation, and negotiation to project is it lacks interpretive context. At times, project teams inherit situation where a predetermined budget is made and is expected to be managed, where “the exercise demands to cope rather than control” (PM5). Some projects have project managers who did not know who prepared the tender, and was not part of the tender, whereas “some were not part of the organization at that time” (PM5). This creates instances to reconstruct the basis of earlier assessments. In contrast, there are also projects where the same individual served both as tender and project manager that demonstrates stronger continuity. In such cases, knowledge and intent is followed across transitions making it easier to convey teams (PM3).

There is also an emphasis on reflections from managers that risk sessions during execution tend to become administrative rather than analytical. Risks identified are reviewed line by line, but discussion often focuses on status updates instead of understanding root causes or scenario planning. A usual practice is to read the register to stakeholders involved. Limitation is not with the method but with an engagement value. PMs often feel they are wasting time on standard items with known statistics. One PM notes the repetitive nature: "I have sometimes a feeling that I am spending time again... it's not necessary to spend it because I did it already the month before". He suggested focusing on setting "standard numbers in place" for recurring risks to "skip those descriptions" and instead focus discussions on "the matters that really matter and that needs discussion" (PM4).

Project Managers also specify the difference between systemic learning and project firefighting. Many risks that appear during project were already known or were at least foreseeable if we consider some projects, but the conditions around them change faster for registers to keep up maybe due to variation orders or systemic failures. So, “Risk reviews are rather reactive than continuous, and lessons are collected after the fact rather influencing current campaigns” (PM1).

Operational awareness is a recurring point of discussion. It is imperative that risk engineers need closer exposure to real operations to understand how risk translate into delays, costs, or vessel unavailability. Site visits or even short-term participation were suggested as “risk engineers should make time to join an operation or at least to see a bit what they're talking about" to build understanding on real world scenarios (PM3). Such field insights are viewed as critical to improve the relevance of risk evaluations and knowledge continuity in a backward flow along with forward flows. This is meant to align technical optimism with onsite practicality without the context of which, “role becomes just collecting what someone gives them, effectively like a secretary” (PM2). One project manager specifically points out the lack of operational risk consideration during tender, clarifying distinction between roles of risk engineer as risk facilitator yet how important it is to involve in operations that can help with direct reports to true risk owners accountable for outcomes (PM5).

The role of decision authority during crisis is another point of attention. The ability to respond quickly to unexpected conditions often clashes with procedural structure of risk systems. While the existing framework can indeed allow traceability, it also introduces rigidity in updating assumptions, changes, and decisions mid project. The challenge is always balancing structured governance with adaptive decision making in all leading contractor firms (Morris, 2013). Senior project manager highlighted the human element in crisis after a support vessel was selected incorrectly and was not approved by the client, the project lost the whole season. The reluctance to "pull the plug" (cut losses and rent another vessel) stemmed from the personal consequences faced by senior managers, which is "not a decision that people take easily" (PM5).

A deeper insight into one of the past projects shows how monetary losses occur also due to operational decisions taken under commercial pressure. Project teams receive cost-saving choices from tender and negotiation based on optimistic performance expectations whose decisions prove costly in execution. Equipment malfunction, vessel rejection by clients, and legalities lead to extensions. The issue again is not ignorance but persistence in using early warning signs (PM5). Such cases reflect organisational dilemma between competitiveness and caution. In highly contested markets, contractors accept tighter margins and higher exposure to secure contracts, which is a game of demand and supply in the market (CM1). This environment demands courage to reassess assumptions after contracts are signed.

Another vulnerability in the experiences lies in staff turnover. Large projects often see multiple project managers during their lifecycle. Each transition introduces a discontinuity in understanding. Every new manager starts with a different mental model so a project can be seen and approached differently depending on who leads it. "Each handover is an issue," (PM1) leading to a loss of knowledge and a change in risk perception and mitigation strategy. Through all these discussions, managers show how continuity is a cultural issue over procedural one. Registers do work as intended and learning curve is reset when people and priorities change. Maintaining risk knowledge is therefore relied on collective ownership rather than individual memory (PM1).

6.1.3 Tender Teams Perspective

Tender teams work in an environment which is fast paced and assumption driven. These teams focus on tender specific context. Information here is limited and decisions are shaped by market competition rather than by certainty (TM1). The balance during tender lies in managing technical accuracy with commercial competitiveness which can be seen from a commercial perspective in chapter 6.1.5. Tender engineer explains the time constraint sometimes as short as a week, persuading engineers to depend on experience and benchmark reasoning. This was mentioned as “We work on thumb rules.” (TE1). Once the tender is submitted, interaction with future project team stops and they are assigned for other projects. The process becomes a handover through documents rather than dialogue. He adds that, in marine operations, they have a good approach where “experienced personnel rotate back into tender roles” to retain continuity and “young ones are assigned to operations”, but such integration remains rare in offshore divisions or any firms (TE1).

If we consider a broader view of tender managers, the role operates under constant trade off between time and depth. They are the head around which risk engineers and other engineers are reporting to, in the process. Tenders must be responsive, accurate, and priced competitively while constantly developed under limited operational input. However, “cost estimate and risk assessment are merely input to the commercial department. The final price is a commercial decision, and the resulting bid can be something different than what comes out of the tender” (RE3). Considering such constraints, risk engineering during tender becomes less about prediction and more about narrative construction. Each assumption carries a strategic intent. Once the bid is won, assumptions and decisions must be solidified into commitments, as the responsibility is to leave little room for reinterpretation. This often creates an uneasy boundary for tender managers, translating incomplete knowledge into binding offers while knowing that understanding can be lost once project changes hands (TM1).

Tender development progresses through a “funnel” in which uncertainties are high in the start and reduces as team moves toward negotiations. So, the tender manager suggests that “In the beginning the risk budget should be bigger, the closer you come to BAFO, the more detailed you go” (TM1). A recurring challenge tender managers face is the timing of risk session. Running it too early results in incomplete understanding of scope, while running it too late clashes with workload peaks and compressed deadlines. So “Time is always critical, you cannot do it in the beginning because no one has seen the scope, but also you don’t want to do it at the end” (TM1).

The necessity to negotiation related updates is real. “If we ask too much information afterwards, it won’t be done, so it’s better to think ahead and during the risk session, what giveaways might be negotiated has to be discussed” (TM1). So, he suggests risk engineers should proactively ask commercial teams about what concessions might occur such that risk profile changes. Additionally, the knowledge discontinuity is mentioned as “there is a warm handover between tender manager and project manager, but no involvement in project from us. Our part is done” (TM1).

Operations being underrepresented in tender risk sessions is highlighted from tender perspective as well. While operational managers sometimes attend, he says the value of involving actual offshore technicians is more by “It would be better to have operational people involved instead of managers” (TM1).

6.1.4 Commercial Teams perspective

Commercial managers are mentioned as most occupied from different perspectives (PM3) (RE1) (CM1) (CM2) (TPM2). They operate at critical interface between market conditions, client negotiations, and internal decision making. Different perspectives revealed how commercial decisions shape negotiation drift in risk profile and logic that ultimately execution teams get to inherit (TM1) (RE1) (LR). Two perspectives from commercial team show how negotiation process influences risk process and their insights to work on the risk continuity.

The largest discontinuity in the risk process between tender and execution emerges during negotiation rounds, “it is definite for gap to appear since risk engineers are not updated in the process” and contractual terms will evolve faster than what it takes for risk engineers to update (CM1). Changes in scope, responsibilities, grace periods, delivery commitments and liquidated damage terms can remain un-reflected in risk profile until after contract signature. Negotiations can occur daily and evolve rapidly, involving risk engineers is operationally unrealistic (CM1). These commercial negotiations are based on confidence, confidentiality, and timing, and therefore “confidentiality cannot be an argument” (CM2). When vessel demands are high, contractors can insist on strong contractual protections, but in market when supply exceeds projects, we sometimes give away which could be less favorable (CM1). Additionally, “simply asking questions and filling in numbers by risk engineers feels adding limited value to risk continuity considering risk engineer has previously worked on previous projects, a real and practical input can be expected. Continuity is also not just in one project but can also be seen from different projects together” (CM1).

CM2 perspective however seems optimistic and reflects on Heavy Marine Transport Business unit. Processes surrounding tender preparation, documentation and transparency appear more structured (CM2). “Tender teams provide complete packages to operational teams, that SharePoint shows clear visibility of what previous actors have done, and risk budgets are consistently applied” (CM2). “Operational input during tender remains insufficient but, in our division, project engineers, including those who later execute the project are already involved in tendering, so as a project engineer, you should be able to take the responsibility of tender engineer as well.” (CM2).

As the project progresses, knowledge gain increases and changes are part of them. After contract award, types of risk can be similar provided, engineers and managers did their job well in tender, and consequences may increase. Technical names are still similar, so if project manager chooses to redo risk analysis “from scratch”, he can, which is unnecessary instead of reflecting on understanding of tender rationale. Any rework in interpretation should not fall on risk engineers. (CM2).

Hence, Commercial managers prioritize deal closure, strategic positioning of portfolio of projects, which will need risk engineers to adjust assumptions tender team had previously quantified. Overall, Commercial Manager 2 concludes negotiation should remain entirely within commercial domain, project managers should hold full responsibility for reinterpreting tender logic since real risk is faced for project before tender, when first risk register is proposed. Information should flow from risk engineers to Commercial team before hand on what can be compromised or given away before negotiations (CM2). However, Commercial Manager 1 has a solid idea and approves of the solution with two gateways to tackle this problem:

Two formal gates can be used at which risk engineers should be updated:

a. After Project specific agreement (PSA) or Vessel Reservation Agreement, when first firm commitments exist.
b. Immediately before signing the T&I contract, when all critical terms are settled.

BAFO does not freeze contracts, and real negotiations happen after the BAFO (CM1). “Sometimes rounds go up to seven, say BAFO7. Client-side calls everything as BAFO because they want to get as lowest offer as possible.” (CM2). Hence, these two gates matter, because clients and contractors have agreed on key commercial and technical positions at more mature level than BAFO. Purpose of gate 1 is, first, to provide the risk department with “executive summary” required for board approval. Second, it is for risk engineers to compare the risk profile with emerging contractual reality. Furthermore, the purpose of second gate is to estimate final, accurate risk profile that aligns with actual contract. This can help risk engineers to adjust quantification, and mitigations if necessary. (CM1).

The executive summary is a solution encouraging information flow from commercial team to opportunity and risk team. Another solution discussed with same information flow direction, is the “short, and targeted negotiation change checklist” (CM1). This is second practical mechanism to reduce risk information loss during negotiation. The reasoning for a short one which “should not take more than five minutes” is due to commercial team’s time constraints” (CM1). Negotiation teams are “simply too busy and cannot continuously brief risk engineers after every discussion round.” (CM1). This checklist should specify exactly what risk engineers need, what drives risk profile, how it can be shaped for future projects, that can be limited to key areas, for example, scope changes, assumptions, major contract clauses, Defect liability maintenance period (DMP), Liquidated damages (LD) conditions, or risk sensitive commercial positions. Finally, “it is risk engineer job to define what must be checked, and what qualifies as a change.” (CM1). In relation to the Rumsfeld Matrix, the checklist directly reduces the volume of unknown knowns that add up during negotiation, thereby improving the accuracy of risk transfer at handover.

6.1.5 Expert Opinions

While the business units define their perceptions, there is always a collective head of the departments who knows the bigger picture of engineering and managerial field within the context. Seniors with extensive experience reflect on the evolution of risk practices in the company. They compare present methods to earlier times when decisions relied on professional judgment rather than data (TPM1). “Structured frameworks are well built over time and have improved consistency”. However, they warn that “overreliance on tools can distance decision makers from making sense practically”. This can be related to the problem addressed by one of the project managers who stated that “there is no clarity yet on how Monte Carlo simulations could be applied beyond verification to drive financial decision making during the operational phase” (PM2). That was one of only two issues identified in that otherwise successful project for which he was responsible for.

Furthermore, Senior Manager of tender and project support provided an expert perspective on the broader organizational and financial context underlying risk transfer challenges. When asked about how risk transfer between phases could be improved, he laid emphasis on how a risk transfer continuity cannot be secured just by process discipline alone and it depends majorly on context in which commercial and contractual decisions are made (TPM2). This highlighted and covered the point of contractual negotiation impact on risk process where risk engineers are absent.

He further explained with exclamation, “Client prepares a stack of requirements one over another and presents an Invitation to Tender (ITT). We as an organization expect less but client requirements are more usual.” After ITT submission, tendering proceeds through multiple negotiation rounds, which undergo clarifications, and revisions. organizations should perform a revised risk analysis because contractual exposure will shift rapidly (RE2). However, in practice, “what comes after tender winning is often a surprise” (RE1). Importantly, the tender phase risk budgets do not protect against effects of negotiation drift. Internal risk budget represents a significant percentage of total tendered amount, and while analytically useful, it sometimes lacks strategic influence. “Even if the risk budget is perfectly prepared, it cannot counteract changes introduced during negotiation rounds” (TPM2), because the largest deviations arise from commercial concessions, pricing strategy, vessel allocation, or client-driven changes and not from the quantified risks themselves. As long as risk engineers remain outside the negotiation arena, “risk budgets will remain analytically strong but strategically weak” in shaping final exposure (TM1).

This view is ultimately expanded by shifting from project lens to portfolio lens. Poor outcomes on a single project should not be interpreted solely as technical or managerial mistakes; they often reflect broader portfolio optimization decisions. He illustrated as an example that “a project may incur a −50 million loss, but the portfolio could still perform at +100 million since other projects generate higher returns.” Commercial teams may knowingly accept losses to maintain fleet utilization, workforce continuity, client relationships, or strategic market positioning, especially in periods when available vessels outnumber available projects. “Idle vessels are expensive; idle people are expensive,” he remarked, noting that “survival in volatile markets often requires accepting short-term project losses to ensure long-term operational continuity”. From this perspective, what appears as a “wrong decision” at project level may be rational at company level (TPM2).

These trade-offs are not Indecisive or untracked. Rather, the challenge is that risk engineers and project teams seldom see the context in which commercial decisions are made. This limitation points toward the need for portfolio-level risk analysis, where project-level risk exposure, vessel allocation, commercial concessions, and strategic pricing decisions can be analyzed in aggregate. He noted, however, that “such analysis is currently difficult because financial information remains decentralized and desynchronized, making it challenging to construct an integrated, organization-wide risk dashboard” (TPM2).

Finally, he underscored the importance of operational exposure for risk engineers. Working exclusively behind monitor screens restricts their understanding of how risks evolve offshore or during execution. He strongly suggested that risk engineers should spend time in field operations, visit sites, or join offshore campaigns whenever possible. It was phrased as, “this screen is all they see,” suggesting that real operational experience is essential for improving contextual understanding, strengthening their interpretation of risk registers, and enhancing the overall quality of risk knowledge continuity (TPM2).

In conclusion, these multiple perspectives shared in sections 6.1.2 to 6.1.7 do not represent contradictory views on risk, but different positions within Rumsfeld matrix which is shaped by role, timing, and proximity to execution. Risk engineers stand in the domain of known knowns and known unknowns who predominantly operate as risk facilitators, formalizing uncertainty through registers, while project actors repeatedly expose unknown knowns (their own understanding and insight that exist but are not surfaced during tender). Commercial perspectives, in turn, introduce shift that temporarily pushes risk into the unknown unknown category by altering assumptions faster than it can be revalidated. As project transits, risks migrate between categories and levels as information matures and this dynamic explains why risk continuity breaks not in single handover, but through gradual accumulation of blind spots and delayed recognition. The emerging themes from all the actors input in these sections are further discussed in chapter seven.

6.2 Risk Sessions

This section analyses live risk sessions observed by the author as decision making events rather than formal outputs of risk management process. Unlike the interview and documents data collected, these sessions provided a direct insight into how risk reasoning is constructed in real time under time pressure and social interaction. Two risk sessions have been explained, where one is from a tender phase and the second one is during the project phase(planning). The sessions show how assumptions are negotiated, adjusted, or dismissed through discussion and how authority, familiarity and prior experience shapes the final risk profile. Examining risk sessions at different project stages helps in understanding how risk evolve and where continuity is strengthened or undermined during transition. However, these projects alone cannot conclude one single output collectively because the actors involved, project context, budget, client, and other aspects in both the sessions are different.

I) Tender phase risk session

Firstly, the tender phase risk session for a project that had not yet been budgeted or submitted in 2025 by Boskalis, brought together risk engineer, tender manager, tender engineer, project manager, and commercial intern. This discussion followed the opportunity and risk register but the process and updating moved smoothly depending on participant input. This was overall a flexible process. However, it was primarily driven by time constraints and limited information. Secondly, determining the timing of risk session was not clear for the tender manager during this tender (TM1).

Some risks were combined or modified on the spot, such as merging equipment breakdown risk and ROV breakdown into a single risk, which was based on tender engineer’s judgement and was agreed without an extended debate. There was a repeated anchor during meeting, which was a reference to one of previous projects. This became repeated during meetings, once mentioned, they influenced subsequent risks irrespective of their relation showing how earlier points shaped later reasoning. Many probabilities and consequence values were adjusted based on experience, for instance, mobilization duration was changed by tender team despite risk engineer initial rationale. At times, risks were simply qualified to client after brief discussion which reflect commercial choices during tendering. Furthermore, new risks were discussed informally, introducing thumb rules or individual experiences. This overall process was a mixture of structured review and rapid intuition driven environment (RE3).

Dynamics and additional observation

Interactions often reflected the differences held in perspective between actor roles. Project manager occasionally corrected misunderstandings (for example, assumption about spare piles) and some risks were kept low when tender engineer said he did not see a threat. In multiple cases, the risk engineer relied on past project information or decisions taken in earlier phases, but the final judgement typically aligned with the tender engineer's or tender manager's preferences. For one risk initially categorized as uncertainty, the worst-case estimate was changed based on the tender manager's intuition when he rejoined. Some risks were reviewed quickly with general agreement between everyone, while others were delayed by commenting on modelling notes for further information. The session also highlighted moments where operational knowledge was missing which demanded involvement of actors like works manager or operation manager and project engineers. Additionally, there were also conflicting opinions, for example, when the tender engineer shared his view on subcontractor personnel typically underperforming based on his own experience, the risk related to which remained unchanged as "low" based on assurance of tender manager from his discussion with a project site actor.

II) Planning phase risk session

Second risk session focused on updating risks rather identifying which was during planning phase of the project. The actors involved were risk engineer, works manager, two project engineers, and a project controller. Discussions were practical and linked to operational information which were in immediate priority (Due dates were shortened or extended based on recent conversation with personnel in operation, likelihood values were adjusted where new data was available, and some risks were reframed). By this stage, there was a closer exposure to execution constraints. Participants focused on whether existing mitigations were still valid under an updated condition.

Talking about one specific risk that caught attention relating to this research had been copied directly from reference project which had limited information during tender, the project team reassessed its likelihood with new context and reduced it accordingly. Sometimes, certain generic risks are excluded from Monte Carlo not to influence or stabilize the curve but because those risks would immediately release their budget as project profit. If it is released once, then this money would become revenue, and it is difficult to reassign back to project if unknown events occur. It is also complex task for bookkeeping. Therefore, project controllers keep these amounts in risk budget until later stages of project as a conservative safeguard against unknown unknowns. This is one strategy to keep risk budget constant throughout the project. Furthermore, some risks were stated as “lets discuss this in the next session” and participation varied, with an actor from operations stage not contributing enough. In fact, the session involves quite a lot of risks that made the researcher lose track at points as well. Overall, this phase functioned largely as ongoing adjustments rather than continuity checks and highlights some good practice from risk engineering team with an active involvement in building the lively register.

To conclude, the risk session together shows how risk continuity’s collective reasoning unfolds in practice. A prerequisite for this process is the development of common knowledge within the organization that relates to knowledge management principles. Early phase risk sessions tend to compress uncertainty to stabilize tender assumptions whereas planning and project sessions reopen risks in response to emerging information. These observations show that transition does not occur at single handover moments, but through incremental shifts in how risks are discussed, prioritized, or downgraded. Hence, these sessions function as critical and fragile points in a project for transfer of risk knowledge, where continuity is less dependent on documentation and more on a shared situational awareness and willingness to challenge inherited assumptions.

7. Results

This chapter presents the themes that emerge from the data collection process. The findings are organized into two sections: themes derived from case studies and themes identified across all other interviews in general. Furthermore, the chapter discusses the implications of these findings for both companies in the offshore and construction industry, and for academic research. Finally, this chapter concludes with providing practical recommendations for improving risk transfer quality.

7.1 Case Study themes

The themes identified from analysis of two cases studies in chapter five bring together the observed practices that support both risk knowledge continuity, and discontinuities. These themes reflect cross case regularities rather than discussing a project specific aspect. This is presented below in key points to summarize the empirical findings of observed behavior of risk knowledge across case study project lifecycle.

1. Baseline drift: Across both cases, the tender risk register functions as a fragile baseline instead of serving as a stable reference point. Each project is unique and is subjected to a different context, cost and time. This leads to incomplete information availability in the initial phases of a project. Incomplete or outdated

baseline information becomes a primary risk driver (PM1). However, baseline remained usable in project A because it was iteratively revalidated with an extended planning phase. Linking back to research question (SQ2), risk transfer quality depends on whether tender baseline is treated as living reference or one contractual static representation.

2. Team continuity: Team continuity or staff turnover is seen as a carrier of tacit risk logic. Key actors retention throughout a project strongly influences risk understanding. Repeated personnel changes with no overlap resulted in systematic loss of contextual knowledge in project B which confirms that tacit risk knowledge is primarily transmitted through people. Thus, improving risk transfer needs recognizing team continuity as organisational control mechanism rather than a resourcing decision. (PM3)

3. Stabilization bridge: Planning phase is seen as a critical stabilization interface. “If you make a mistake, or if you do not know something, this is the point to correct or work on it” (CM2). This is the decisive interface that serves as a buffer zone. In project A, planning served as crucial stage for revalidation and to collect technical information from everyone. Sometimes, this stage can be crucial to take decisions and act like a last opportunity to update risk profile or correct risk logic.

4. Engineering rework: Schedule expansion evidence from project A and B shows that offshore wind farms projects are subjected to iterative design/scope development rather than a stable baseline (Boskalis, 2025). Project B experienced extensive engineering rework not just because of work complexity, but it was due to missing information and clarity from tender. High rework volume is an indicator of poor risk knowledge transfer. (PM5)

5. Variation orders: Client demand a variation from existing way of working in a project or work order. Sometimes, this variation can be less significant and can go undocumented. However, few small variations can collectively pose a big loss. Sometimes, large additional engineering/deliverables are accepted without formal variation. These variations need to be an addition to contract and contractual changes not being reflected in risk registers can be significantly adverse. In both projects, contract terms changed during negotiation. However, these changes were not consistently reflected in the updated risk registers in project B. (PM5)

6. Commercial optimism: In project B, tender bid basis is described as underfunded and optimistic, relative to execution complexity (PM5). Commercial decisions which are made under competition and pressure shape operational risk outcomes more than technical complexity.

7. Risk underestimation: Execution in project B showed that risks were known but underestimated. During tender and planning stage, the risks were worked out well by risk engineers in terms of identification. However, they were underestimated in terms of likelihood and impact, which became visible only during execution. (PM5)

8. Client Driven: External and client supply conditions are recorded as major contextual drivers (monopiles supply delay for project A, political clearance). These later phase drivers cannot be sufficiently reflected in tender risk profile. External context must also be continuously reintroduced into risk assessment. “Some projects have more than seven rounds of negotiation. Client team call it BAFO for all the rounds to get the most discounted price as possible” (CM2).

9. Lock-in: In project B, (PM5) reveals a pattern of defensive continuation, where main actors of the project continued to establish plans despite of recognizing/knowing that cost overruns and schedule delays were unavoidable. This behavior emerged when the critical assumptions had already failed and available response options had been narrowed down. Contractual commitments, budget constraints, and organisational momentum limited the feasibility of revalidating earlier decisions and as a result, project team had to focus on coping with losses rather than preventing them (PM5). Under this theme, risk management shifts from influencing decisions to justification and damage control.

   The case study themes are represented below in figure 9. Figure 9 represents knowledge graph of case study themes derived from comparative analysis of project A and project B. The central node is Case study themes, connecting to nine themes representing recurring patterns in the projects. Furthermore, the subbranches or surrounding nodes illustrate their concrete mechanisms like time pressure, contractual changes, client driven dynamics, etc., through which these themes materialize in practice. This figure is a visual summary to show the collective success of a project (in terms of continuity) or failure (in terms of discontinuity) does not arise from single task or handover in a project, but from accumulation and interaction together of contextual, technical and behavioral factors that build on with time across the project phases.

Figure 9: Visual summary of Case study themes

7.2 Interview themes

The themes identified from interview and iterative discussions with tender and project actors in general capture observed practices that support both risk knowledge continuity, and discontinuities. These themes help further develop practical recommendations to build on opportunities for improvement which are discussed in chapter 8.1. The points below present the summary of findings from observed behavior of risk knowledge across project actors from tender to execution in general.

1. Leverage: Previous projects risk data is used as reference/benchmarks to identify, rank, mitigate and quantify the risks of a new project. Each project has

a different context and requires a simultaneous update to the project specific context (RE2). There are projects undertaken by contractor firms, and sometimes, these projects are one of a kind (either first one in a new country/political condition or first one with a whole new team). In these conditions, it is difficult to find a leverage or reference data. Similarly, there are projects which have excessive details that cannot be included and less specificity. These are the known unknowns (RE4). This theme addresses research questions SQ2 and SQ4 showing that historical data support continuity only when contextual differences are actively reinterpreted.

2. Missing Operations: Operational input is often missing during tenders. Operational staff are absent due to availability constraints due to which execution realities are underrepresented. “Operational risks were missing in the risk register when project was realized” (PM2). This drives reactive mitigation actions in later stages rather than having proactive measures beforehand.

3. Risk ownership: Project managers are ultimate risk owners, while risk engineers are positioned as risk facilitators. Engineers are closer to reality and know the technicalities, but they cannot take decisions (like to decrease budget) since the ultimate decision lies within another actor (PM2).

4. Negotiation gap: Negotiation stage introduces untracked changes to risk profiles. Negotiation to project handover lacks interpretive context, leaving PMs to “cope” with what is set (PM5). Negotiations act as major discontinuity point where decisions are not well-informed back.

5. One-to-one: actors report tradeoffs in efficiency in group risk sessions (PM4). one to one discussion is described as easier for extracting specific inputs and “numbering”/quantification (RE1).

6. Power dynamics: There are conflicting opinions in risk sessions, and some risk level outcomes can be driven by role-based assurance and negotiation rather than a single shared probability meaning. Outcomes of risk sessions are shaped by who speaks with confidence or driven by hierarchy. This leads to optimistic bias. Actors hold back due to fear of missing out or hesitate to challenge senior actors. Risk values reflect social negotiation that weakens reliability of transferred risk knowledge over time.

7. Timing issue: Tender-stage timing of risk sessions is perceived as an unresolved process problem. Sessions that are held too early suffer from lack of information, while late sessions are constrained with submission deadlines (TM1).

8. Tool limitation: Tools support structure and visibility, but cannot preserve reasoning, assumptions or shared understanding (TPM1). Tools can support continuity when it is combined with strong communication practices.

9. Centralized risk database: A centralized risk database is supported as a means to reduce the problem of fragmented data from different projects and to prevent repetition of known failures. However, the implementation of this requires input from different teams more than the risk engineering team itself.

10. Operational experience: Risk engineers often lack direct operational experience that can create a disconnect between probabilistic assessment and execution reality (PM4) (PE1) (CM1) (TPM2). However, "risk engineer would not be necessary during the execution of project itself completely" (PM4) ,but "it is imperative that risk engineers need closer exposure to real operations to understand how risks are translated into delays and costs in practice" (CM1).

11. Psychology bias: There is strong human tendency to focus predominantly on negative risks(threats) in project management. In everyday language, risk is universally seen as a danger and comes with adverse consequences. This perception leads project professionals to assume risk management is only about preventing problems. (Bondale, 2019). Although the case study company also has formally titled department as Opportunity & Risk Engineering team, individuals are still called "risk engineers" in a daily practice. Empirical evidence also shows strong bias toward documenting negative outcomes instead of positive practices (Boskalis, Lessons learned portal for project A). Analysis of Project A from case study database reveals that, out of 1141 entries, 992 were classified as opportunities for improvements (OFIs), while only 142 were documented as Examples of Good Practice (EGPs). Furthermore, 34 different actors contributed OFIs, while only 19 actors contributed to EGPs. This indicates negative experiences attract broader attention and reporting than successful practices. The consequence of this broader human tendency leads to focusing on avoiding failure than exploiting success. A defensive learning loop also limits organisational ability to practice a healthy risk knowledge continuation.

12. Backward Integration: In marine services, experienced personnel are assigned to tenders while junior staff execute projects. This will create a reverse knowledge flow where experience informs pricing (TE1). This can help with prevention, active mitigation and quantifying more accurately rather than a reactive approach in later phases by less experienced individuals. Supporting to this, experienced actors can be assigned to timely monitoring in execution phase to get the best results out of this (PM3).

Figure 10: Visual summary of interview themes

The general interview themes are represented above in figure 10. Figure 10 represents knowledge graph of interview themes derived from collecting perspectives of different actors involved in tender and project phase of different projects within the company. The central node is Interview themes, connecting to twelve themes representing recurring patterns in multiple projects. Furthermore, the subbranches or surrounding nodes illustrate their concrete mechanisms like hierarchy pressure, benchmark overuse, success undercapture, etc., through which these themes materialize in practice. This figure is a visual summary to show the collective success of a project (in terms of continuity), or failure (in terms of discontinuity) does not arise from single task or handover in a project, but from accumulation and interaction together of contextual, technical and behavioral factors that build on with time across the project phases.

7.3 Implications

The findings presented in sections 7.1 and 7.2 reveal consistent patterns in how risk knowledge can be preserved and actively transferred, or alternatively be degraded and lost overtime between handovers, during the transition from tender to execution in project-based companies. These patterns extend beyond individual cases and stakeholder perspectives, which indicate characteristics of the structure in a project-based risk management rather than just isolated incidents. Implications of these identified themes above are derived for both practice and academic research. Being derived directly from empirical evidence, it is structured to reflect the relevance at organisational as well scientific levels of project management. Accordingly, section 7.3.1 addresses implications for the company from which case studies are chosen, and for other industries in general, while section 7.3.2 addresses implications for advancing in the field of risk management theory and project management research.

7.3.1 Implications for company

From the findings of this study, continuation of risk knowledge across tender, negotiation, planning, execution, and project closeout is not seen as an absence of risk management procedure or tools, rather, depends on how the risk data is interpreted and carried forward among the project actors in a qualitative project environment. In simple words, the continuity of risk transfer depends strongly on preservation of common knowledge, as conceptualized in Knowledge Management (refer section 4.1.3) by providing sufficient space for discussion, reflection and exchange of knowledge (for example: through informative sessions) (Sveiby, 2001). Furthermore, company's main problem is not missing information, but weak knowledge conversion from tender data to execution knowledge, and of execution knowledge input in tender data. This is framed in the KM conversion cycle (refer section 4.1.2). In case studies, project B shows the absence of conversion creates a situation where project teams delay recreating the logic (scope creep and engineering rework). So, the first baseline implication is to improving risk transfers is less about adding more fields in ORR, and more about conversion routines exist and are repeated at right moments (TM1).

Another major implication is the need to bridge the "blindsided" period during contract negotiations, where commercial changes occur rapidly and often go unreflected in risk profile inherited by risk engineers. Addressing the negotiation gap is a serious challenge considering external and client driven constraints. However, information flow can be fed back to the team responsible for working on risk profile and budget during key negotiation milestones (refer commercial perspective (CM1) insights). For example, a brief executive summary or checklist (refer to section 8.1) can document significant commercial changes before final commitment. This approach will promote more accurate risk budgeting and profiling for future projects, as risk engineers will have full visibility of what has changed.

Secondly, the results imply a clear organisational governance role. Risk continuity also fails when company moves across transition layers without maintaining coordination between levels (refer section 4.2.1 of TM). The grey zone during negotiation is not a result of practical inconvenience, but also a textbook case of tactical level decisions (vessel reservations, concessions) moving ahead while operational level understanding remains behind. This is why BAFO rounds appear as discontinuity points in both interview and case analysis. Hence, negotiation and early planning must be treated as a transition arena where coordination between levels must be explicitly managed (strategic, tactical and operational).

In the similar context, actors must recognize that what appears to be "wrong decision'' at the project level such as accepting a loss-making decision on vessel choice, may be rational decision at the portfolio level to maintain company's growth (on a long run).

Thirdly, company implication is about decision quality under uncertainty. Projects need strong adaptive capacity used in TM (refer section 4.2.3), but it is applied very narrowly to few commitments that created irreversible exposure. The story of project B showed that when bad decisions happened, organization lacked practical way to define "when we switch plan" based on signals (PM5). This is studied as adaptive pathways and tipping points in transition management theory (refer section 4.2.3). Thus, this implies a need to explicitly define adaptive signals with associated tipping points. While mitigation actions are well defined beforehand by risk engineers, timely interventions depend on thresholds that indicate when those actions must be activated rather than relying on judgement once it is already too late.

Fourthly, to improve the relevance of risk assessment and see it with a practical view from beginning, risk engineers should have closer exposure to real operations. This can be done with practical recommendations explained in section 8.1. Fifthly, organization maintaining key personnel throughout project lifecycle is vital to preserve the tacit knowledge and experience of previous projects of the company. Lastly, operational input is a key requirement during tender phase. This leads to a structural gap that degrades the quality and reliability of risk data. If the people who actually experience risk do not explain what it is and how it behaves, if it is still likely after mitigation action is performed, then actors who only see documents after project cannot fully define what really happens in practice. Author observes that in each risk session conducted, risk engineers share the guide on how to describe the cause, event and consequence. Additionally, the opportunity and risk register, evaluation criteria, likelihood of occurrence and severity(impact) of risks. However, it is noted that "operational team are less familiar with risk management process, they do not know completely about the risk matrix either" (TE1).

7.3.2 Implications for science

Scientifically, the study implies that risk continuity can be driven as a knowledge conversion phenomenon through managing transitions. KM chapter becomes useful here because it shows how conversion breaks. Tender risk profile is devised with time constraints and heuristics, which is later updated and reinterpreted continuously. This process is more precise than general literature claim that “tacit knowledge is lost”. The academic implication is that risk continuity can be evaluated by tracing how knowledge conversion steps are performed over time. There is a shift from information to continuity. Scientific research in project management encourages us to move beyond studying information availability and instead, focus on knowledge continuity and how organizational interfaces influence the loss of transfer.

The study also finds how TM and PM can be combined to explain phase transition or handovers in complex offshore contractor environment. It highlights a significant gap in current academic literature on qualitative study of phase transitions in any kind of project-based work environment (Andresen, 2025). Furthermore, the problems with transferring risk data are linked to feedback delays and dynamic coupling (refer section 4.2.2), especially in long cycle projects, decisions happen in weeks, but consequences have resulted for months or even years later. Execution feedback arrives too late to influence the current project or even the next tender (TM1).

7.4 Recommendations

This section presents five recommendations responding to observed discontinuities and the focus is on reconstructing interaction mechanisms and decision visibility.

1. The first recommendation is to solve the negotiation phase discontinuity with two solutions as follows:

i) Involving risk engineers directly in negotiations is impractical due to time pressure, role separation, and complications (CM2). However, absence of feedback from commercial team to risk engineers will create a gap between board approved risk positions and final contractual outcomes (RE4). To close this gap, building on (CM1)’s proposal, a two-gate negotiation risk executive summary prepared by commercial team is recommended. Gate one is after Project specific agreement (PSA) or Vessel Reservation Agreement, when first commitment takes place between firm and the client. Second gate is immediately before signing the T&I (Transport and Installation) contract, when all critical terms are settled. These summaries should be limited to a single page consuming not more than 10 minutes to complete due to feasibility constraints. The summary should include identification of which top risks were affected by negotiations, and qualitative indication of whether negotiation outcomes are challenging assumptions underlying approved risk budget.

ii) Secondly, negotiation impact checklist can be operationalized, and structured around top fifteen risks (top five financial, contractual, technical and operational risks with an option to include additional one from any category instead of the other depending on its severity). Following the existing board risk structure in company instead of introducing new classifications, each top risk should be reviewed using simple change-log logic (unchanged, modified, removed, newly introduced). Low and medium risks have negligible influence, therefore need not be tracked during negotiation (RE4). Emphasis must be placed on changes to contractual mitigation measures, alterations to shared risk arrangements, and shifts that invalidate previously determined mitigation measures. For different risk areas like environmental conditions, supply chain, novelty/nonstandard operation, design risks, 3rd party costs, client risks, and ability to achieve production/timeframe, checklist should enable team to "tick off" whether key safeguards have been agreed before contract signing. The checklist should confirm if: consortium roles and responsibilities allocated with escalation lines defined, standards and communication are formally aligned with local subcontractors, performance commitments do not assume normal productivity where nonstandard operations apply, and responsibility & compensation for any vessel modification or readiness delay.

Since a checklist alone cannot confirm contextual changes, a short one-line answer questionnaire should be supported along to verify assumptions, interfaces and constraint clarity. Together, they will not eliminate the issue entirely but are expected to resolve 60-70% of potential misalignment in capturing risk profile (RE4).

Table 6: Example of negotiation checklist and verification questionnaire

A. Consortium and Responsibilities	
☐ Installation method approvals: confirmed which JV partner obtains marine warranty approvals	
☐ Delay liability: agreed who pays if delay is caused by design review or late IFC drawings	
B. Commercial/contractual movement	
☐ Grace period, LD cap, or liability split changed during negotiation	
☐ New technical risk transferred to contractor.	_________ (if yes, mention which)
C. Non-Standard or First-Time Operations	
☐Standby cost rules confirmed if subcontractor delays main vessel day-rate exposure clarified.	
1.Did any delay exposure shift toward the contractor? ________________________________ 2. Is the monopile installation productivity assumed to be standard or reduced? ________________________________	

To further optimize the process, risk engineers should also discuss what can be given away or compromised from an engineering point of view in discussions with commercial team during the tender risk sessions (CM1). Additionally, this study proposes risk delta flagging, an approach drawn from change management principles used in complex engineering systems, where delta tracking preserves continuity across iterations without fully reworking (Flyvbjerg, 2023). It allows risk engineers to give attention to critical deviation so they can report to project managers.

2. The second recommendation's focus is to address the need for practical knowledge of offshore energy operations during tender. This can be ensured in two ways:

i) Multiple actors (RE1) (TM1) (PM2) shared that operational risks are often insufficiently represented during tenders, and emerge fully during execution. Following (PM4) and (PE1)'s suggestions, risk engineers should periodically involve within execution environments. Temporary exposure during offshore campaigns or during critical project phases can help risk engineers to internalize the tacit operational constraints which cannot be captured through mere documentation. Since this can also be dependent on individual choices and flexibility in roles, (TE1)'s measure followed in marine services can also be regulated. Under this arrangement, junior risk engineers are deployed on project sites to gain practical experience, while experienced RE's contribute to tenders. This ensures execution and practice driven insights are systematically reintegrated into early phase risk assessments.

ii) Secondly, operational input during tenders should be formalized through a defined advisory role, instead of unprepared involvement. As suggested by (RE1), at least one operational representative should contribute to tender risk sessions at predefined milestones. This need not be continuous, rather, targeted, time bounded and scoped to feasibility.

3. The third recommendation focuses on actor dynamics and organizational learning. (PM3) and (PM5) share the value of retaining experienced teams throughout the project. However, work flexibility also recognizes that team continuity cannot be enforced due to individual career choices. Accordingly, this study recommends shifting emphasis from retaining individuals to retaining knowledge. This can be achieved through structured, short informative sessions during project milestones, informal forums, shared platforms between different teams, team building sessions and business unit collaborative events. This reflects (TPM1)'s observation that tools remain stable while people change, so organisational mechanisms are vital to preserve experiential knowledge beyond individual tenure.

4. Fourth recommendation addresses process timing, specifically on clear guidance on when risk sessions must be conducted relative to tender maturity (TM1). Two possible events can be seen from this problem, where sessions could be scheduled too early when information is insufficient or too late when decisions are already taken. This can be addressed with a two-stage risk session. First, an exploratory risk session focused on identifying and ranking key uncertainties and strategic assumptions. Second, a risk finalization session when it is close to tender freeze, focused on validating ownership, mitigation measures, and quantification.

5. Fifth recommendation is in general, to focus equally on positives (opportunity driven) in the field of Risk Management. This recommendation addresses recurring pattern across empirical material from case study project A and interview with (PM1), where risk discussions during tenders and negotiations are predominantly framed in terms of potential losses, constraints and downside exposure. This is essential to safeguard

project outcomes, but it can unintentionally narrow down decision making by overemphasizing avoiding threats at the expense of recognizing and exploiting opportunities. Additionally, even in the lesson learned feedback from projects, actors need to input equally in number about examples of good practice (EGP's) similar to opportunities for improvements (OFI's).

Table 6: Summary of Recommendations and addressing themes.

No.	Focus	Addressing themes	Recommendation
1	Negotiation phase	Client driven, commercial optimism, lock in, negotiation gap	i) Two-gate negotiation risk executive summary ii) Negotiation Risk impact checklist
2	Practical Knowledge in tender	Engineering rework, missing operations, operational experience, and risk ownership	i) Junior RE's deployed on project sites. ii) Mandatory advisory role/ operational representative
3	Actor dynamics and organisational learning	Team continuity, Tool limitation, Power dynamics	i) Knowledge sharing sessions (short informative sessions during project milestones, informal forums, etc.)
4	Process timing	Baseline drift, Risk underestimation, Timing issue	Two stage risk sessions (Exploratory and Finalization)
5	Negative bias (In general)	Psychology bias, Leverage, Centralized risk database	i) Opportunity driven Risk Management ii) Input EGPs equal to or more than OFIs

8. Conclusion

The aim of this chapter is to conclude the research's key findings, results and solutions. Furthermore, we identify future scope of research that originates from this study findings.

This report examined risk handovers and knowledge transfer as projects move from tender to execution, with focus on negotiation phase, team transitions, and role of organisational practices (linked with timing, role boundaries, and transfer of decision intent) in sustaining continuity.

Based on two case studies and additional cross functional interviews, findings have shown that risk discontinuity has not been caused by lack of technical knowledge, tools or risk management formal processes. Since the organization has implemented structured risk sessions, formal risk registers, and quantification methods, the problem was a focus on how risk knowledge is transferred across project phases instead of how it is identified, mitigated or quantified.

Case studies showed the comparison between project A and project B, which resurfaced underlying reasons for project success/failure in terms of risk profile. Project A's risk profile was shaped with majorly team continuity, and active revalidation during phases whereas, project B's fragmented handover, and a underestimated, locked in tender context led to repeated engineering rework in project. Additionally, both projects were influenced by certain similar aspects of handover discontinuity like negotiation gaps, client driven (supply and information) and missing operational input. This analysis confirms the off center of risk profile in some means even for different projects.

Additional interviews from other actors in company further solidify the case study findings. We come across major recurring problems like: contracts changing but risk profile is not updated due to lack of flow of information, execution experience not fully represented in tender and the reasoning for decisions stay with people instead of centrally preserving data. To move from expert driven opinions to data driven decisions, recommendation section directly addresses these issues. The recommendations introduce structured feedback gates after negotiation milestones, providing ideas on implementing short negotiation impact checklist for top risks, advise on formalizing operational advisory input for tenders and suggests on strengthening knowledge retention. All these measures are aimed at reducing the misalignment of risk profile even before exposure becomes irreversible.

In conclusion, this research investigated that risk continuity in offshore projects (that can be applied to other project-based industries) is a fundamental knowledge conversion challenge through handovers. Handover failures emerge at interfaces where decision intent has not transferred clearly between strategic, tactical and operational levels. Therefore, improving risk transfer requires a stronger transition discipline, cross department collaboration, communication and revalidation at critical points. If the contextual reasoning can be preserved across phases, then system can function effectively. Building on transition management, where some companies have a dedicated interface manager, Systems manager, or Portfolio manager, is hence the most effective pathway to improve risk transfer from tender to execution.

8.1 Practical Significance

This study identifies three major points that can add significance to industry:

i) Firstly, as the study shows significant changes during final negotiation stages, Industry should implement lightweight post negotiation update (e.g., a structured change log aligned with top project risks) to make sure changes made in contract is explicitly recorded.

ii) Secondly, organizations need to introduce more cross phase involvement, like reverse rotation of experienced operational staff into tender teams or early operational involvement.

iii) Third one is to shift risk management from expert opinion to data driven decision making.

8.2 Research Significance

i) Idea is to reframe risk discontinuity as organisational interface problem. The findings have shown that risk data loss has not been caused by methodological weakness in risk tools. Organisational boundaries between tender, commercial and execution teams induce this significance for the risk team.

ii) Second key significance is to expand the understanding of tacit risk knowledge. Since the actors involved in companies hold knowledge within, researchers should further explore transformation of tacit to explicit knowledge in risk management. This applies especially for the growth of those sectors, where high complexity and contextual reasoning drives decision making.

iii) Lastly, highlighting temporal dimension of risk interpretation, case analysis shows risks are time bound and evolve significantly when projects are either delayed/extended. Further research needs to investigate risk as a dynamic constructive aspect over project lifecycle.

8.3 Future Scope of Research

This research has qualitatively examined risk data being transferred, degraded or reconstructed. Findings have provided empirically grounded insight into organisational, behavioral and transitional mechanisms. However, several paths remain open for future academic investigation. Some of these identified future research directions are outlined below for researchers and professional practitioners in project-based organizations.

1. Future work should extend risk analysis from project level view to a portfolio level perspective. This research case studies and interviews from project level actors have primarily analyzed risk continuity within individual projects as they transition from tender to execution. However, interviews with senior management (TPM2) and (TPM1) indicate that, several risk related decisions which appear suboptimal at project level are, in reality, rational when viewed from a portfolio level. Future research should therefore investigate how portfolio level objectives influence project level exposure and continuity. For example, this can include how risks are consciously redistributed across projects, how losses in a project are compensated for by gains in others, and how strategic decisions could be made more transparent to project and risk teams. Methodologically, this would need input from commercial, financial and risk teams across multiple projects.

2. Future research can focus on shortening feedback delays from execution actors to be useful in tender phases. Meaningful learning about risk behavior emerges during project closeout, by which it cannot influence original tender decisions. Mechanisms need to be developed to capture earlier feedback from execution into ongoing tenders, such as intermediate learning checkpoints or a structured lessons learned. The case study company has developed and is actively utilizing the lessons learned portal for the same.

3. Thirdly, study identifies company’s growing efforts and ideas to develop a centralized risk database. Future research can be conducted on this archiving process of occurred, un-occurred, identified and unidentified risks to improve consistency.

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