EXAMINING THE EFFECT OF **CULTURE & BEHAVIOR** ON THE IMPLEMENTATION OF **ENTERPRISE RISK MANAGEMENT** AT A DUTCH CONSTRUCTION COMPANY

MSc Thesis Final Report

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Management summary

Following global economic and business developments, the construction industry has been dealing with increasing complexity and uncertainty in recent years. Since the financial crisis of 2007, construction companies in the Netherlands have seen shrinking profit margins, due to for instance project and process success criteria that have been extended beyond economic objectives to include environmental and social requirements, increasing stakeholder requirements, disrupted supply chains due to global shocks, increased material costs and labor shortages. As part of the call for the continued professionalization of internal business processes, aimed at increased transparency and improved accountability, a holistic approach to risk management at the enterprise level has been on the rise to deal with cross-company risk. Enterprise Risk Management (ERM) is the leading paradigm for holistic company-wide risk management as it aims to bridge the traditional company silos and connect risk management, decision-making, company objectives and control structures.

Designing and developing an ERM system at a construction company requires a customized approach that strikes a balance between top-down and bottom-up information flows and diverse sectional interests while aligning vertical and horizontal risk management (RM) and internal control (IC) structures in order to sculpt an ERM system that is fit-for-purpose. In spite of efforts to the contrary, the academic literature shows however that ERM implementation can often result in decoupling (Arena et al., 2010). When this happens, ERM and RM processes are not integrated into work practices and are perceived as cumbersome tick-the-box exercises, contributing little to core tasks, and are seen as compliance and assurance controls for the benefit of external stakeholders that purport to achieve the "risk management of everything" (Power, 2004) which due to a lack of any real meaningfulness in the minds of practitioners leads in fact to the "risk management of nothing" (Power, 2009).

The integration of existing RM and IC practices into a company wide risk management system is no easy task. External frameworks such as COSO's Enterprise Risk Management Framework (2004) offer prescriptive, idealized guidance that is difficult to translate to practice. The academic literature shows that contextual factors play a critical role in designing ERM systems and therefore the quality and influence of these factors must be identified and understood in order to shape ERM implementation in a specific setting. This study promotes the argument put forth by multiple authors such as Bresnen et al. (2004), Hsu et al. (2014) and Jack & Kholeif (2007) that the use of domain theory (i.e. theory on ERM and organizational culture) combined with social theory (i.e. theory from the field of sociology and behavioral sciencies) can offer a more complete view of the factors at play in this process. To this end, concepts from Giddens' Structuration Theory (1984) have been used as sensitizing concepts in the analysis of the data. The central tenet of ST is the 'duality of structure' which examines the relationship between the ST idea of 'structure' (i.e. organizational structures of meanings, power and norms) and 'agency' (i.e. actions of organizational actors). In this study, the examination focuses on how decisions and resulting actions of the board and top management (ST agency) affects company risk culture and the design of formal ERM elements (together ST structures). The outcomes of this feedback loop can be observed in ERM and RM practices at different levels of the company though time. Analyzing ERM implementation in this way offers a view on how ERM and RM practices change or endure and lays bear the mechanisms that contribute to this.

This study has been structured as follows. A qualitative case study methodology was chosen with the use of ST in the analysis of the data. Based on the main research question, four sub-questions (SQs) were developed, each corresponding to a step of the research. First a literature review was conducted to determine the concepts related to ERM implementation (SQ1). Next, the first step of the empirical research was carried out at the case organization through documentation study, complemented by informal interviews with key respondents and observations of the researcher (SQ2). The results of this exploratory step were used to determine the relevant themes to be explored in more depth in semi-structured interviews that followed (SQ3). The results of the interviews, seen through an ST lens, offered an overview of constraints, enablers and influential factors at the case organization, the last of which were grouped into five main themes to be validated in an expert session (SQ4). The main research question was then answered based on the results of all the SQs. The results were then examined in view of

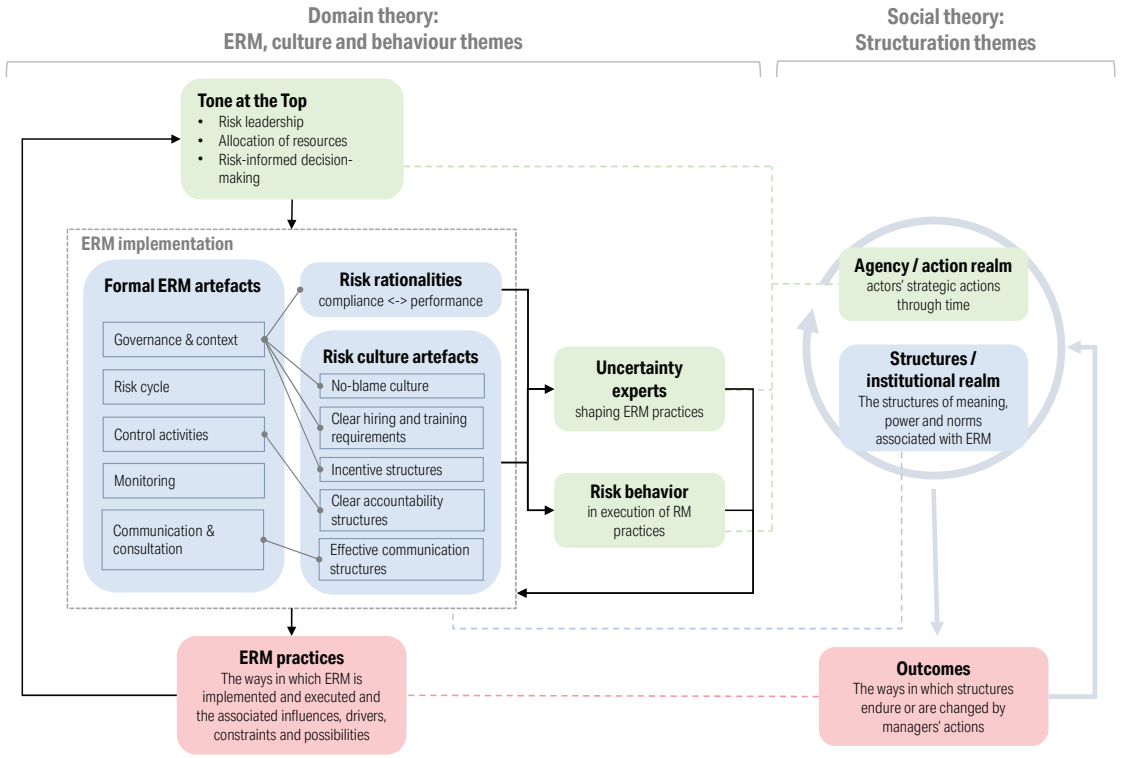

Figure 1 - Conceptual theoretical framework based on theory

the extant literature. Finally, conclusions and recommendations were formulated and the researcher signs off with a personal reflection on the project journey. Below is a brief summary of the partial results of the four SQs followed by a comprehensive summary of results answering the main research question.

Research SQ1: What are the concepts related to ERM implementation in theory?

There are multiple factors which affect ERM implementation. Firstly, the board and top management must demonstrate an adequate vision on risk management. This 'tone at the top' acts as a catalyst and driver while allocating the means needed for effective implementation. External standards, frameworks and practitioner texts provide necessary structure, forming the basis of ERM system designs, however offer an idealized version of ERM implementation that is difficult to translate to practice. Contextual factors together with internal and external influences that lead companies to implement ERM in the first place have a substantial role in initially shaping ERM implementation in practice. A major factor in implementation is the organizational culture, the associated risk culture and the behavior and choices of individual practitioners. Together, these contextual factors greatly influence the implementation of ERM, which proposes to connect these processes with a systematic, top-down logic. Connecting these practice themes to Structuration Theory, it was determined that the action realm was where the board and top management make decisions affecting ERM implementation and the institutional realm is the stage where this plays out. The institutional realm elements include formal ERM elements and risk culture. The effects of the actions of top management are visible in the institutional realm, where practices are changed or endure. The conceptual framework is shown in Figure 1.

Research SQ2: How are ERM practices represented at a construction company in practice?
In this step, a documentation study was conducted, and was supplemented by informal interviews with key respondents and observations. Using the conceptual model as a guide, data was collected on the three main practice themes. The results show that ERM implementation is still in an early, exploratory phase at the company and that the company has chosen a simplified version of ERM, characterized mainly through 17 defined risk domains. Key respondents indicated that RM practices in general differ widely throughout the different industrial segments of the company with differing maturities and stressed that culture and behavior have a big influence on ERM & RM practices. The researcher was able to observe a number of Risk & Control dept. meetings and was able to follow some of the developments real-time. Based on these aspects, it was concluded that the in-depth interviews in the following research step would broadly explore aspects related to new ERM processes, existing risk management processes, interactions between RM levels and the effects of behavior and culture.

Research SQ3: What constraints and opportunities can be identified in connecting ERM to existing hierarchical levels of RM at a construction company?
A number of challenges were identified related to behavioral biases, lack of knowledge and risk competencies. th lack of prioritization of RM by managers at all organizational levels and the need for better alignment between the RM levels. At the same time, there are ERM drivers present at the organization, such as the presence of a Risk & Control Committee and the recent creation and expansion of a Risk & Control Corporate Function. Additionally, five themes were identified based on the results of the previous research steps. The themes concerned 1) the allocation of risk resources 2) the scope and visibility of ERM, 3) the degree of prioritization of ERM implementation by top management, 4) the role of ERM in translating organizational strategy to the operational and the project level, and finally 5) the degree to which ERM and RM should be distinct from other management processes.

Research SQ4: How can contextual factors at a construction company be used to shape an ERM implementation that is fit-for-purpose?
The themes developed in the previous step were translated to five bold statements on ERM implementation to spark a discussion in an expert session with experts on ERM and project risk management within the company. The first discussion explored where risk management staffing and competencies should be improved or extended in the company hierarchy: at the very top through the appointment of a CRO, or at the operational level. The experts argued that the operational layer had the first priority, and a CRO could come later but would have less impact. The second discussion was triggered by the statement that ERM 'doesn't exist' at the project level. Both experts agreed that there was currently little visibility which mainly had to do with the fact that ERM processes are still a work in progress and added that it was difficult to say in the current stage of developmement how it should manifest at the project level. The third statement discussed the lack of urgency concerning the changes needed for ERM implementation. The experts indicated that they felt that this was true and the lack of priority for ERM had to do with a lack of focus on risk on the one hand and the prioritization of other activities on the other. Both experts were in agreement that though RM practices in general should improve and ERM is still in early development, they already see considerable improvements in this area. In the fourth discussion, the importance of ERM as vehicle for translating company strategy to the organization and the projects was discussed. The experts did not find it crucial, especially not in terms of translating strategy to the projects though they did see more importance for translating strategy to other organizational processes. The fifth statement centered around the idea that the desire to simplify and integrate ERM and RM practices can lead to essential aspects being misunderstood or lost. The statement argued that ERM is more than the Deming cycle of Plan-Do-Check-Act. The experts were in agreement and remarked that RM in general is more than just the Deming cycle.

Finally, the main research question is answered:

How can the interplay between risk management levels at construction companies be improved to benefit enterprise risk management implementation?
The results show that the stage of implementation is still in an exploratory phase where dialogue and open communication are key. Processes are currently being developed and improved and the correct mindset and attitude is crucial in achieving this. However the desired risk-aware mindset is not shared by all in the organization. This is due to lack of knowledge and competencies, other priorities and a focus on short-term project goals at the project level.

The initial exploratory phase of ERM implementation in the case study shows that existing RM processes and the maturity of these processes are an important factor. How these processes are executed based on individual behavior and group norms, and the associated (lack of) sanctions when RM practices are not integrated properly into management decisions also have an outsized effect on the development and implementation of ERM processes. Leadership styles throughout the organization should be focussed on interaction, alignment and feedback loops that make continous monitoring and improvement of processes possible. Lack of prioritization of risk management hampers this process throughout the organization.

The **agency** of the three actors groups represent three main groups dealing with risk management: the (top) managers who must both approve the system design of ERM and allocate necessary resources, uncertainty experts from different functional background who together advise on the development of ERM processes and lastly, line managers within the organization who must incorporate risk management into their daily tasks.

Signification structures – Top management wishes to improve risk management practices and risk awareness. This wish must go against deeply ingrained biases against RM. By creating new central risk functions and taking the step to expand ERM to the segments and subsidiaries, RM's increasing importance is stresse. Competencies and lack of knowledge hamper this change to the new way of thinking as well as short-term project objectives ingrained in the current way of working. Risk rationalities at the case organization show a strong focus on compliance and financial reporting risks due to a more mature internal control function.

Domination structures – To underline the importance of RM, top management allocated resources in recent years. Top managers can serve as a catalyst in getting the ball rolling however middle managers in the segments and subsidiaries also have a role to play in the power structures and must collaborate with uncertainty experts in order to effectively create links within the organization. Failure to prioritize ERM at these levels can create blind spots in the organization when creating a full risk profile.

Legitimation structures – The current norms associated with RM (and sanctions when norms are not adhered to) reflect values associated with traditional construction processes centered around unique one-off projects. Due to the shift to modular and standardized construction, the associated values are shifting to innovation and new product development and the organizational norms must change too. There are currently few incentives or sanctions when norms are not adhered to.

As there is no one-size-fits all solution to ERM system design, developing processes will depend on contextual factors at the case organization. External frameworks and best practices can offer clues, however the knowledge needed for effective processes must be obtained through collaboration and open dialogue between uncertainty experts shaping ERM processes and managers throughout the organization. At the case organization, the lack of knowledge and ERM competencies at all organizationl levels hampers the implementation of ERM, together with undesirable risk culture and behavior within the organization. Allocative and authoritative resources must be made available

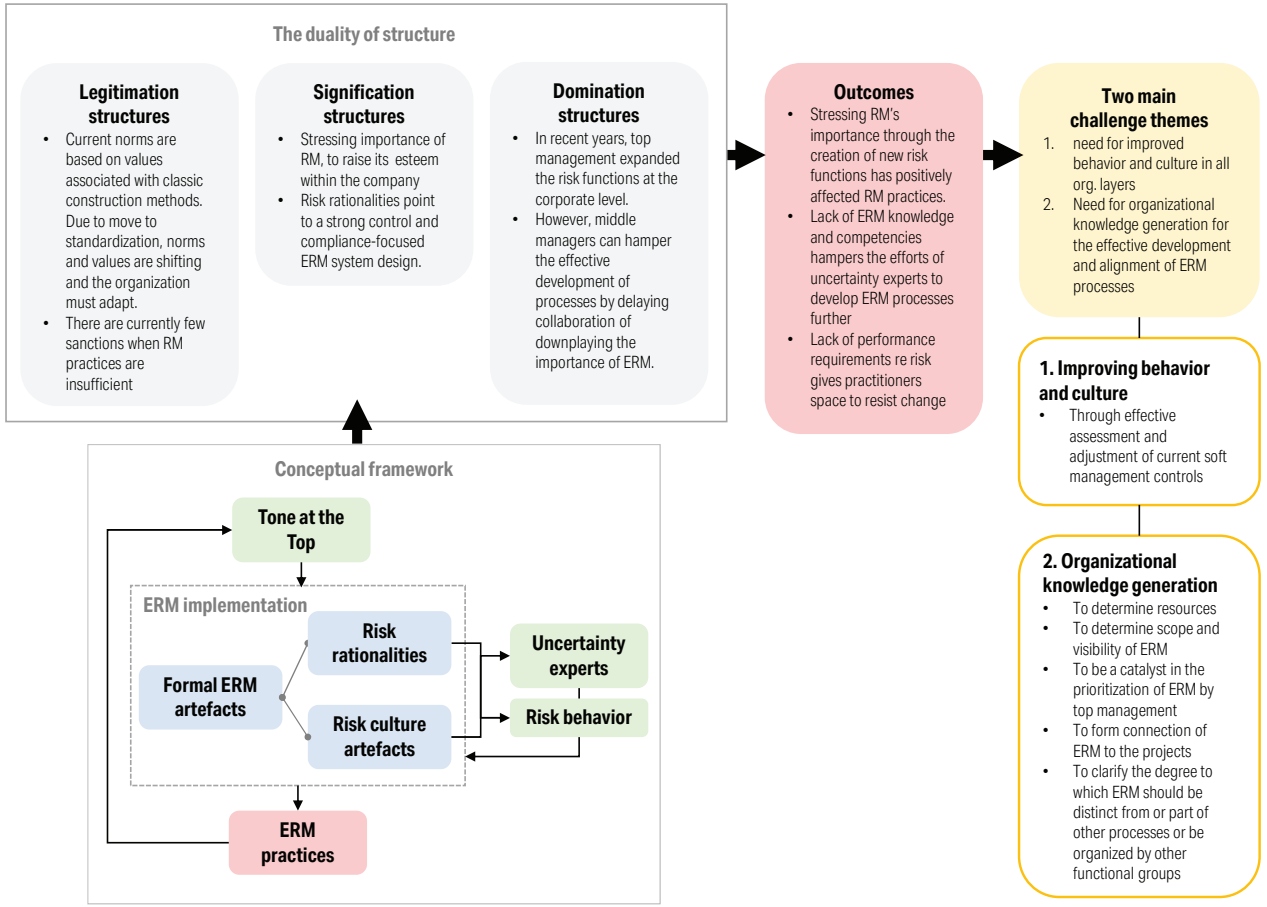

Figure 2 - Results

where needed at all levels of the organization and continous knowledge generation equips actors with tools to design and implement ERM more efficiently. The significance of ERM and RM is already clear at the top management level however translating intentions into actionable steps is difficult without a road map. Therefore an open-minded mindset is needed where open conversations with managers at multiple levels can be had and there is room to make mistakes.

Recommendations

Based on the above conclusions, two interventions have been recommended for the construction company. The first is the creation of an experimental environment as a catalyst for organizational learning which is characterized by trust and the ability to make mistakes. Four experimental labs in each segment cut vertically through the organizational layers from group to project level, and should be comprised of enthousiastic practitioners who actively engage with uncertainty experts in finding solutions to real risk problems that relate to ERM. The knowledge is then used to improve and develop ERM processes in iterations. The second intervention is an organizational-wide mapping of risk culture and maturity. Based on the knowledge generated, risk culture can be influenced through the associated soft management controls.

Dedication

To my mother Catherine, who sadly couldn't watch me cross the finish line,
and to my father Jan, who happily could.

To my husband Remko, who supported me every step of the way.

To my family and friends on both sides of the Atlantic Ocean
who on countless occasions good-naturedly listened
with patience and occasional puzzlement
as I enthousiastically regailed them
with new-found knowledge and insights
on risk, culture and Structuration Theory,
topics highly interesting to my mind
though incomprehensible to most others.

Preface

In September 2020, at the height of the first year of the Covid pandemic, I returned to university after a period of globe-trotting, working, and the occasional freelance project with a strong inward focus on private life and personal creative projects. Reading news reports and seeing what was going on in the world, and also missing a bigger intellectual challenge, I felt a drive to jump back into the fray of the professional world. After years of not focusing on outward pursuits such as career and professional development, acquiring new knowledge and skills was deemed a necessary first step. With my background in architecture and personal interest and experience in projects, organization, coordination coupled with the desire to engage on subjects at the academic level, the CME program at the TU Delft seemed like the right fit.

Going back to university after years of being away was tough. I had to reset my thought process from doing to learning. I was twice as old as the average student. In the first year, all courses were online which made it difficult to develop friendships with fellow students. The CME curriculum included technical courses which required knowledge of statistics, which I had never been required to learn and would require taking extra math courses, adding months to my time in Delft. On the other hand, I also had some advantages. I'm an avid reader and native English speaker which made the required reading easier for me. Having previously done editorial work and freelance writing, I had less trouble putting my ideas down on paper for the reports and assignments. Also, I was highly motivated to learn and to succeed due to my conscious return to university and my enthousiasm for the courses. Now, as graduation approaches, I can safely say that the journey was well worth it and I look back with pleasure and pride at my second chapter at the TU Delft.

This thesis project is probably the most difficult thing I have ever done while at the same time it has been one of the most rewarding. It wouldn't have been possible without the support and guidance of my graduation committee as well as the input and advice of the colleagues at the construction company where I did my research internship and to them I wish to offer my many thanks and intense gratitude. To my company mentor Bas van de Weijer for sharing his expertise on ERM as well as the many inspiring conversations, tips and feedback on my work. To Hugo Aupers at the company for his practical support, valuable insights on risk management and his critical eye. To Martijn Leijten, my committee chairman, who advised the use of Structuration Theory which though very difficult to master, was well worth the effort as it offered me a greater understanding of organizational dynamics. To my second supervisor Erfan Hoseini, for his positive, can-do approach, practical insights and bird's eye view of RM in the construction industry and beyond. And to my first supervisor Marian Bosch-Rekveldt, I offer my very special thanks for all the encouragement, practical advice, critical feedback and patience on top of the many tutoring sessions which helped me move the project forward and finally to completion.

Last, but not least of course, my thanks go out to my husband, family and friends who I dedicate this report to.

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1. Introduction

Following global economic and business developments, the construction industry has been dealing with increasing complexity and uncertainty in recent years. Since the financial crisis of 2007, construction companies in the Netherlands have seen shrinking profit margins, due to for instance project and process success criteria that have been extended beyond economic objectives to include environmental and social requirements, increasing stakeholder requirements, disrupted supply chains due to global shocks, increased material costs and labor shortages. As part of the call for the continued professionalization of internal business processes, aimed at increased transparency and improved accountability, a holistic approach to risk management at the enterprise level has been on the rise to deal with cross-company risk. Enterprise Risk Management (ERM) is the leading paradigm for holistic company-wide risk management as it aims to bridge the traditional company silos and connect risk management, decision-making, company objectives and control structures.

Construction companies are project-based and traditionally the biggest risks and uncertainties affecting organizations have been found at the project level. In spite of the vast array of research, best practices and bodies of knowledge on improving project outcomes, large construction projects continue to fail to meet project objectives (Atkinson, 1999; Koppenjan 2011; Sanderson, 2012; Williams, 2017). As the need for projects to be delivered faster, within a fixed budget and satisfying a steadily longer list of requirements has increased, so has the need for effective risk management in projects (Williams 2002). For this reason and due to increased interconnectivity of organizational processes that extend beyond the scope of individual projects, construction organizations are seeing the need to better understand the effects of such interdependencies and their associated risks and uncertainties. Project Risk Management in that case must be integrated into Enterprise Risk Management to move from a reactive approach to a proactive approach for dealing with uncertainties and risk. (Agarwal & Virine 2017).

Implementing ERM at a construction company is by no means a straight-forward task. There are multiple factors which affect ERM implementation, for instance the presence of an adequate vision on risk management exhibited and acted on by top management. This tone from the top acts as a catalyst and driver while allocating the means needed for effective implementation. A second major factor is the organizational culture, or how practitioners at different levels of the company and in different groups approach and execute their risk-related work. Together, these contextual factors greatly influence the implementation of ERM, which proposes to connect these processes with a systematic, top-down logic.

1.1. Problem Statement

Currently, there is a need for improved organization-wide, holistic risk management at construction companies, however there is very little known about the relationships and interactions between levels of risk management and its relationship to behavior and organizational culture (Ching ea, 2020, 2021; Zhao ea, 2015a, 2015b).

1.2. Knowledge gap

Multiple authors have called for further research on ERM implementation in construction firms (Ching ea, 2020, 2021; Zhao ea, 2015a, 2015b; Mikes & Kaplan, 2014). Currently there is little research on the relationship between enterprise risk management and organizational culture in Dutch construction companies.

1.3. Research objective

The objective of this research is to explore the constraints and opportunities involved in the implementation of ERM at a Dutch construction

firm and how this relates to behavior, organizational culture and existing risk management practices by developing a conceptual model based on theory, using this model to direct data collection, and finally analyzing the data using a combined practice and structuration theory lens.

1.4. Research Questions

In order to answer the main research question, a number of research sub-questions (SQs) have been formulated to structure the data collection and analysis, see below.

Main research question: How can the interplay between risk management levels at construction companies be improved to benefit enterprise risk management implementation?

SQ1: What are the concepts related to ERM implementation in theory?

SQ2: How are ERM practices represented at a construction company in practice?

SQ3: What constraints and opportunities can be identified in connecting ERM to existing hierarchical levels of RM at a construction company?

SQ4: How can contextual factors at a construction company be used to shape an ERM implementation that is fit-for-purpose?

1.5. Thesis structure

The structure of this thesis report is detailed below.

- In **Chapter 1** the thesis is introduced and put into the wider context of theory and practice.
- In **Chapter 2** the research methods used in this study will be explained and the link between the chosen methods and the research questions will be further defined.
- In **Chapter 3**, the relevant theory on the chosen themes will be presented in a literature review culminating in a conceptual theoretical model.
- In **Chapter 4**, the chosen themes are explored at a Dutch construction company based on a qualitative data analysis, compared to the theoretical concepts extracted in the literature review and a combined conceptual model is presented.
- In **Chapter 5**, data collected through a survey of a select number of practioners at a construction company will be presented, followed by in-depth interviews conducted based on these results. The resulting gaps that have been identified based on this step will conclude the chapter.
- The final step of the study is described in **Chapter 6** where avenues of improvement are presented based on the results of the previous steps and validated by means of an expert panel session with practioners. The chapter will conclude with a presentation of the resulting validated conceptual model.
- **Chapter 7** discusses how the findings of the research subquestions answer the main research question and places the results in the wider context of the extant literature.
- Finally, the study's main conclusions will be summarized in **Chapter 8** together with recommendations for further research.

chapter 2:
Research methodology & design

Structure of this chapter

2. Research methodology and design

In this chapter, the research methodology and design used in this study will be motivated and described. To start, the factors influencing the research design will be discussed, such as calls in the literature for qualitative research on ERM amd the researcher's personal interests, skills and competencies. Next, the research approach will be discussed placing the study in the context of constructivism as the chosen research paradigm. Next, the choice of case study as structuring element of the research will be explained, together with the motivation for the use of qualitative methods. Following that, scope, data collection and analysis methods and stepts to guarantee validity and reliability will be discussed. Structuration Theory will then be introduced as the sociological lens used to structure and interpret the results of the study.

2.1. Factors influencing the research design and execution

The choices concerning the research design for this study were influenced by the following factors:

A call for more research on the lived experience of practitioners in the management sciences
There is a call for more qualitative research in both construction management (Zhao ea, 2015a; Renault ea, 2016; Ching ea, 2021; Ahrens, 2013) and (E)RM (Arena et al., 2010; Mikes & Kaplan, 2014; Hsu et al., 2014; Jemaa, 2022) to complement the many quantitative studies already being conducted. Many authors argue that the inherent complexities and interdependencies in the management sciences prevent quantitative approaches from offering a full picture of phenomena being studied.

Interest of researcher on sociological and psychological factors in project management
The researcher is interested in the social side of project management. Additionally, before this thesis project started, the researcher noticed that during conversations with friends & acquaintances in the field of project management these practitioners often emphasized the importance of sociological and psychological factors in project management practice.

Researcher's personal skills and competencies
Other influencing factors were the researcher's previous experience in editorial work, project management work, and the personal combination of interpersonal, analytical and creative skills. Creative skills can positively influence the data collection when doing qualitative research (Janesick, 2000).

2.2. Exploratory research approach

Based on the factors outlined in the previous section, a choice was made to focus on the lived experience of practitioners through a qualitative, exploratory approach in the study. The research paradigm or 'worldview' of constructivism was deemed the best philosophical fit for the study. A research paradigm is the foundational philosophy comprised of a collection of shared beliefs, principles and thought processes that informs and guides all aspects of the research project under consideration (Kivunja & Kuyini, 2017). As there are many conflicting views on the categorization of research paradigms, a brief motivation will be provided. Depending on the source, the many identified paradigms can be divided into a number of dominant streams. In this study, the division into the three dominant streams of positivism, constructivism and pragmatism was used as a starting point (Creswell, 2009). The fourth dominant stream, critical theory, was not considered as this focusses more on issues related to ethics, gender, race and power (Kivunja & Kuyini, 2017) which though important, were not the focus of this study.
Positivism is almost solely associated with quantitative research while constructivism is still the most dominant paradigm in qualitative research. Later, the exception to this rule became known as pragmatism which argues for a mixing of the two streams (Teddlie & Tashakkori, 2011). The debate on the validity of qualitative and mixed methods was waged for a period of time in the nineteen-eighties but in recent years

both have been widely accepted. Currently, paradigm debates, or wars, focus more on critical theories (Denzin & Lincoln, 2018). As stated above, the subject matter of this study was deemed a prime candidate for a qualitative approach, and possibly for a mixed methods approach. The consideration of mixed methods was linked to a desire to collect survey data and then follow up with semi-structured interviews, however this option was not feasible due to time constraints. Implementation of ERM at the construction firm was still in its early phases and therefore an exploratory, qualitative study was deemed most appropriate. Constructivism was the most logical paradigm in which to position the study.

2.3. Research methodology – qualitative single case study using Structuration Theory

This section will describe the choice of the single case study and Structuration Theory as a structuring tool in the research design and sociological lens in the interpretation of results of the empirical study.

2.3.1. Qualitative single case study

The choice of research methodology was based on a number of factors. Due to the focus on the lived experience of practioners, lack of current theory on ERM implementation at construction organizations in the Netherlands and the opportunity to collect qualitative data at a large construction organization, the choice was made to adopt a single case study approach which Swanborn (1986) describes as exceptionally well-suited to social science research. The chosen unit of analysis is initial ERM implementation at a construction organization.

Yin (2016) defines case studies as "an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident". Swanborn (1996) saw the need for a more detailed definition of the case study including operational aspects due to the multiple interpretations of the term.

As part of the call by researchers in the field for more qualitative research into ERM implementation, the advantages of combining it with a case study approach is highlighted by Mikes & Kaplan (2014) who conducted multiple case studies on ERM implementation at organizations in different industries. They stress the importance of intensive, context-specific research as this may help determine best practices through widening the lens on organizational practices that may not typically fall under risk management.

A number of different literature sources were consulted to determine the most appropriate methods to incorporate in the case study resulting in a combination of techniques based on Swanborn (1996), Eisenhardt (1989), Yin (2016) and Stake (2000). In addition to the theory dedicated specifically to case study research, Structuration Theory (Giddens,1984) is used as a sociological lens to aid in the research design, formulation of the interview questions and the data analysis.

2.3.2. Main components of research design

The research design consists of theoretical, empirical and analytic components and the final research output. The relationships between this components are shown in Figure 2.1.

2.3.3. Components of a qualitative case study

The chosen theories stated above related to case study research show a number of different approaches however most contain some form of Yin's (2018) five key components of research design. These components are used as principles to structure this study. How they are applied in this research are listed below:

1. **Research questions** – stated in Figure 2.2.
2. **Study's propositions** – instead of propositions, a conceptual framework was constructed and tested in the subsequent steps of the research following Verschuren & Doorewaard (2010) based on theory related to ERM implementation as well as behavioral and cultural aspects.
3. **Study's unit of analysis** – ERM implementation at a Dutch construction company.
4. **Logic linking the data to the propositions** – In this study this relates to the practical steps of data gathering, processing and analysis – The steps include literature review based on synthesis of existing theory and assorted meta-analyses of previous studies, qualitative content analysis, semi-structured interviews, assorted coding techniques (Yin, 2018).
5. **Criteria for interpreting findings** – a conceptual model is constructed based on theory of ERM implementation and Structuration Theory (Giddens, 1984) which is used to interpret the findings.

2.4. Additional aspects related to research methodology

In the following sections, the scope, chosen methods, data gathering, processing and analysis will be described further. In addition, the results of the subsequent phases, their validity and reliability and possible researcher bias will be described.

2.4.1. Scope of study

This study examines factors that contribute to the relationship between behavioral aspects, organizational culture and enterprise risk management at a Dutch construction organization. As ERM affects the entire company, the data was collected at multiple entities within the construction organization.

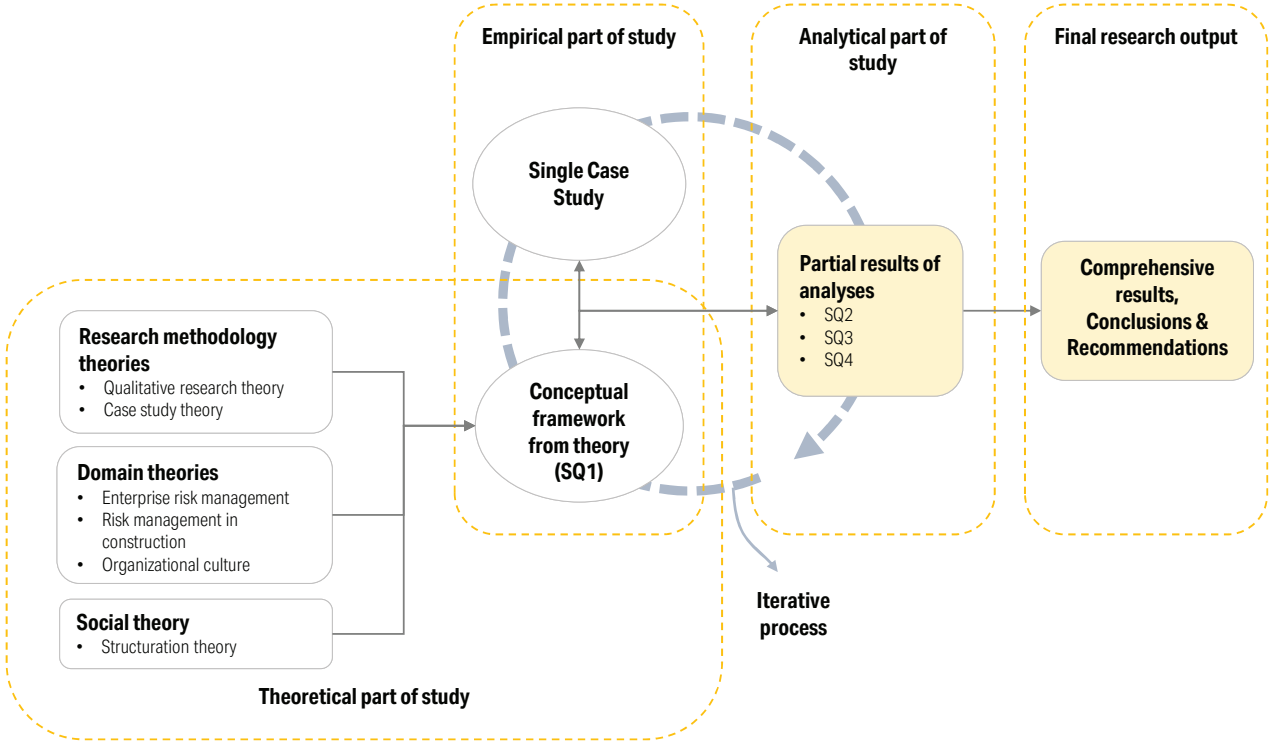

Figure 2.1 - Main components of research design, based on Verschuren en Doorewaard (2010)

2.4.2. Chosen methods per research subquestion

The chosen methods used in the case study are listed below. In Figure 2.2 the chosen methods are shown in relation to input, methods and results.

- Research subqestion 1 (SQ1): Literature review
- Research subqestion 2 (SQ2): Exploratory interviews, document study and observations
- Research subqestion 3 (SQ3): Semi-structured interviews
- Research subqestion 4 (SQ4): Expert session

2.4.3. Data gathering, analysis and results

For **SQ1**, a literature review was conducted. Secondary data was collected via desk research. Data sources were searched on the TU Delft Library website, Scopus and Web of Science and included academic articles, practitioner books, standards and reports. Based on the theory found, meta-analyses were conducted to determine the state of the art of components of ERM implementation and behavioral studies and the total gathered knowledge was analyzed and synthesized, resulting in a conceptual theoretical model.

For **SQ2**, the current situation of ERM implementation at a construction organization was studied. Data was collected, processed and analyzed through qualitative content analysis and triangulation was used to validate the data through informal interviews and observation. Data sources included reports, meeting minutes, official documents and other relevant material in addition to data collected from conversations and meetings with risk and project professionals.

For **SQ3**, the perceptions and work methods of risk practitioners were studied. Data collection took place through in-depth semi-structured interviews with 14 participants. The interview data was processed and coded in Atlas.ti. The data was then analyzed based on ST concepts to interpret the results. The result is an overview of constraints and opportunities and a list of propositions.

For **SQ4**, the propositions of SQ3 were presented for validation at

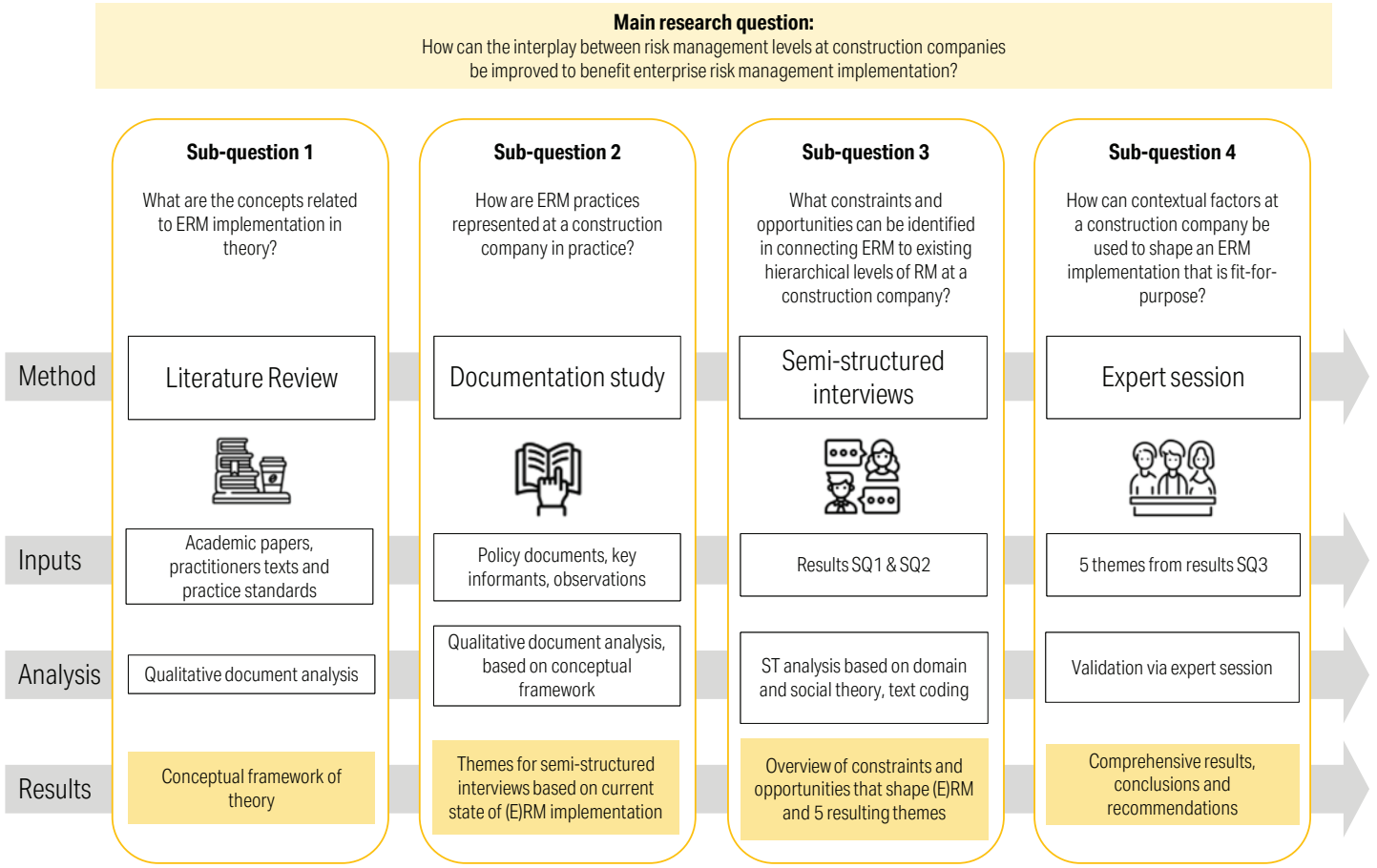

Figure 2.2 - Research framework per sub-questions, methods, and expected results

an expert session with both a PRM and an ERM expert within the construction organization. The feedback was then processed and discussed. Finally, the results of all the subquestions were synthesized and discussed to answer the main research question.

2.4.4. Validity and reliability of results

The researcher has kept field notes during the data collection process to increase transparency in the process. Additionally, summaries and conclusions drawn from interviews were checked with the interviewees for accuracy. Triangulation is used to strengthen the validity of the interpretation of the results. Lastly, though the much attention was paid to ensure the trustworthiness of the outcomes of the analysis, there will always be an element of an "uncodifiable creative leap" when producing theory based on the analysis of data in qualitative research (Jarzabkowski, 2008).

2.5. Using Structuration Theory as a sociological lens in the study

Structuration Theory (ST) is a social theory developed by sociologist Anthony Giddens (1984). Giddens argued that humans (agents) in organizational structures were separate but also closely interlinked whereby the "structure" and the choices and actions of the "agent" perpetually influenced each other. He called this the **duality of structure**. ST has had considerable impact on social theory since its introduction and in spite of its abstract nature has been widely applied in qualitative research, mainly as 'sensitizing concepts' complementing various other research theories and methodologies. Organizational practices and the ways they endure or change can be examined by making use of Giddens' structures which Hsu et al. (2014) argued is key to understanding how organizational RM is implemented.

2.5.1. ST concepts and ERM implementation

Agency (action realm)

Agency is interpreted as purposeful actions undertaken by agents, both intended and unintended, as they move through time and take place in the action realm (Giddens, 1984; Jarzabkowski, 2008). An important aspect of agency is agents's knowledge of the structures they are part of. Knowledgeability and reflexivity is employed by agents as they 'draw on' and recreate structures. Giddens conceptualized the components of agency in the stratification model of the agent, see Figure 2.3. Motivation of action can be explicit or implicit. Rationalization of action describes how agents draw on what they know as a medium of action. This is linked to unacknowledged conditions of action and unintended consequences of action. In certain scenarios, when an agent possesses a higher level of contextual understanding, the likelihood of them taking measures to prevent unintended repercussions increases. However, there are also situations where the unintended consequences hold no significance to the actor, for various reasons, and thus do not impact their subsequent actions. As agents undertake numerous roles and pursue diverse objectives ('projects'), they develop a hierarchy of purposes. The reflexive monitoring of action describes how agents react to context and the choices they make in their hierarchy of purpose, which can be both explicit or tacit.

Structure (institutional realm)

Giddens defined structure (singular) as "rules and resources, recursively implicated in the reproduction of social systems". The degree to which agents are able to use aspects of structures in pursuit of their 'projects' is exemplified by their capabilities. Giddens defined three types of knowledge structures: domination (power), signification (meaning), and legitimation (norms). These structures make up the institutional realm (Giddens, 1984; Jarzabkowski, 2008). Domination (power) refers to 'resources' which can be authoritative or allocative. Signification (meaning) and legitimation (norms), refer to 'rules'. In this way, his use of the term ´rules and resources' is synonomous with structures. The concept most central to ST is the duality of structure (DoS) which Giddens defined as "the medium and outcome of the conduct it recursively organizes". It incorporates the three knowledge structures into a matrix, see Figure 2.4.

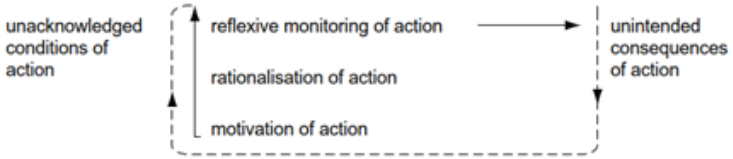

Figure 2.3 - stratification model of the agent (Giddens, 1984)

INTERACTION	communication	power	sanction
(MODALITY)	interpretive scheme	facility	norm
STRUCTURE	signification	domination	legitimation

Figure 2.4 - duality of structure matrix (Giddens, 1984)

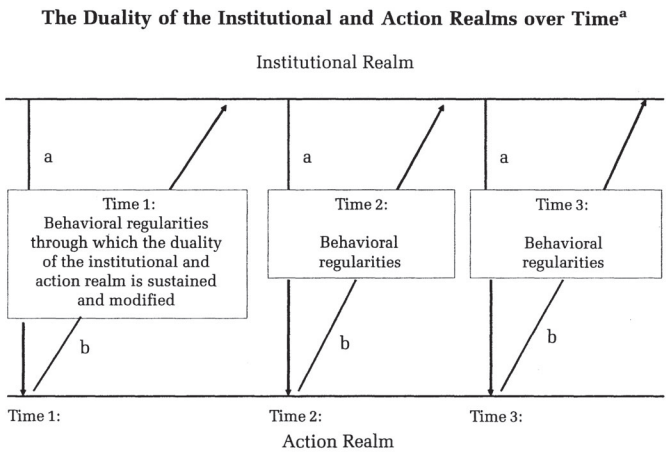

Figure 2.5 - Temporal structuration model used in this study based on Jarzabkowski (2008)

2.5.2. Using ST empirically in this study

ST has been used as an analytical tool in multiple subject areas in the management and social sciences in the past two decades. However, there were no studies found that directly applied ST concepts in the examination of ERM implementation at a construction company. To determine the appropriate analytical approach for the specific focus in this study, ST studies dealing with risk and/or uncertainty management, strategy making, project management and explorations of top-down organizational initiatives at project-based and/or construction companies were consulted. Bresnen, Goussevskaia & Swan (2004) examined the embedding of new management knowledge at a construction company in the UK where ST was used to explore the ways an organization-wide initiative was melded into existing project management practices. ERM in turn can be seen as a new management system and aims to develop and embed new knowledge of risk processes in the relevant organizational levels, through to the projects. Floricel, Bonneau, Aubry & Sergi (2014) discussed the use and usefulness of social theories in project management research, presenting a toolkit approach that incorporates activity theory, actor-network theory and ST. As the focus in this research is on processes at the company level, the proposed toolkit is not a suitable analytical tool however the paper can provide clues on how structuration can explain social phenomena at the project level. In this project, practitioners with a project risk focus have also been interviewed together with the ERM specialists. Jarzabkowski (2008) sought to bridge the divide displayed in previous studies on shaping organizational strategy that either examined how top managers shaped the organizational context or the way organizational members translated these attempts by combining the two perspectives using an ST lens in an exploration of strategy shaping at three universities in the UK. In their study, they employed a model of ST that incorporates temporal aspects, making it possible to analyze data as sequential moments in time . As ERM aims to connect organizational practices to strategy in successive steps, this is a useful approach to the analysis in this research. Additionally, two studies were found that used structuration theory to examine (cross-)organizational risk management processes. In their research on the Zambian construction industry, Tembo-Silungwe & Khatleli (2019) used ST to highlight the social aspects of enablers and constraints surrounding risk allocation. Lastly, Hsu, Blackhouse & Silva (2014) retro-actively explored the successful implementation of operational risk management in the years leading up to and spanning the financial crisis of 2007-2009 at a financial services company. The concepts and practices explored in the last two studies mentioned have strong connections to ERM implementation and are therefore highly relevant in this context.

Methodology and application of ST used in this study

Use of ST was included in the study in the following way. The results of research SQ1 and SQ2 offered a broad overview of the current state of ERM implementation at the Dutch construction company. The most relevant themes that were identified were used as a starting point for the semi-structured interviews with practitioners as part of the data collection of SQ3. The aim was to identify constraints and possibilities in implementing ERM processes and their connection to other RM processes. Social theory can be used as a sensitizing device influencing the research after data collection (Makrygiannakis & Jack, 2018). In this research the concepts associated with ST were studied as well as their practical application in various previous studies as discussed above. After the interview data was collected, it was then coded and analyzed based on the approach described below, and patterns were identified based on a combination of domain and social theory concepts.

The analytical approach for analyzing the data using ST was constructed as follows. The analytical steps and ST model (see Fig. 2.5) used are based on Jarzabkowski (2008). The way ST concepts are connected to RM concepts takes its main inspiration from Hsu et al. (2014) and is further infused with knowledge gained from the other above-mentioned studies on risk management, the specific context of a (project-based) construction company and the connection of top-down initiatives to project management in an effort to adequately understanding the mechanisms involved in the specific topic of this research.

The five analytical steps of the study, following Jarzabkowski, 2008

1. Construction of a chronological narrative of ERM implementation (see Chapter 4).
2. Decomposition of narrative into relevant time frames depending on data (see Chapter 4).
3. Responses of interviewees were transcribed, uploaded to Atlas.ti and coded (see Chapter 5).
4. Action and institutional realms were analyzed (see Chapter 5):
    a. The institutional realm was analyzed by searching the defined analytical time frames for evidence of collective practices, interests and beliefs about ERM and cultural aspects. Data was assigned to this classification group if it occurred in a repetitive pattern and was supported by multiple data sources. These correspond to Giddens' structures of meaning, power and norms. A single datum can be linked to multiple structures as these can be separated analytically they cannot be separated empirically (Giddens, 1984)
    b. The action realm was analyzed by identifying specific actions of top management such as the creation of a Risk & Control Committee, the appointment of a new CEO, the introduction of a new operating plan and the roll-out of the expansion of ERM.
    c. Finally, based on multiple data sources, the relationships between the two were examined, specifically in the use of meanings, power and norms and the ways in which institutional structures were affected.
5. The emerging aspects of ERM implementation in the identified analytical time period and were then mapped together with observable modifications in the institutional and action realms to discover patterns and identify outcomes in the resulting practices (see Chapter 5).

chapter 3: Literature Review

Structure of this chapter

3. Literature review

3.1. Set up of literature review

In this chapter, the first research sub-question will be answered by means of a literature review. The literature review provides the theoretical framework that will inform the data collection and analysis and provides context for the study, showing the state of the art in current knowledge on the subject (Machi & McEvoy, 2009). Research subquestion 1 is stated below:

SQ1: What are the concepts related to ERM implementation in theory?

Searches were conducted on Google Scholar, Web of Science and the TU Delft Library website to determine the state of the art on risk management (RM) in construction, ERM, organizational culture and behavior. Search terms include combinations of the terms risk, management, enterprise risk management, portfolio RM, program(me) RM, project RM, organizational culture, risk culture, RM biases and behavior.

This chapter is made up of four main parts. Firstly, ERM is introduced. Next, external frameworks and best practices described in practitioners' texts are discussed, followed by an exploration of aspects related to ERM implemetation according to theory. In the following section, risk management at construction organizations will be explored with a focus on the different hierarchical levels, specifically RM at project, program, and portfolio level. This is then followed by an examination of cultural and behavioral influences related to ERM and RM. The chapter is then concluded with the presentation of a conceptual framework of ERM implementation and and this connects to Structuration Theory themes that will be used to guide further steps of data collection and analysis in this study.

3.2. Enterprise Risk Management

There has been a development in recent years moving RM from lower hierarchical levels to a company-wide focus (Arena et al., 2010). The increased connectivity of global financial markets with the resulting ripple effect of the negative consequences of business scandals in the 1980s, 90s and 2000s was an important contributing factor (Arena et al., 2010; Bromiley et al, 2015). Organizations in the finance industry were the first to implement ERM in the late 1990s, early 2000s. (Bromiley et al, 2015).

Responding to the scandals, regulatory agencies introduced reforms in corporate governance in the form of codes of practice such as the Cadbury Code (1992) in the UK, and later legislation such as the Sarbanes-Oxley Act (2002) in the USA. These regulations extended RM and the scope of risk categories beyond accounting and finance, and connected RM to internal control (IC). The influence of these regulations, though implemented in specific countries, could be felt internationally (Arena et al., 2010). COSO launched its original ERM framework in 2004 which proposed to connect corporate strategy, organizational structures and management control structures. In spite of the good intentions, poor management decisions and highly speculative practices led to excessive risk-taking in spite of ERM, leading to the financial crisis of 2007. ERM was blamed for being ineffectual (Bromiley et al, 2015).

3.2.1. An overview of the literature on ERM

Systematic reviews were consulted to gain an overview of ERM research in recent years. Reviews that offered a general overview (Anton & Nucu, 2020), that focused on social and management aspects of implementation and theory (Bromiley et al., 2015; Crawford & Jabbour, 2023), or focused specifically on ERM at construction firms (Renault, Agumna, & Balogun, 2016) were included.

Bromiley et al. (2015) reviewed the conceptual underpinnings of ERM as well as possible future directions for scholarly research with a man-

agement focus. Aside from an appraisal of theoretical perspectives, they offered a brief, narrow overview of the empirical studies on ERM which the authors divided into three main groups based mainly on chronological aspects and research approach. The first two groups of research mentioned were early studies that measured specific variables of ERM implementation ('proxies') through quantitative means by either examining organizational contextual factors to determine the presence or lack of ERM through clues such as the presence of a Chief Risk Officer (CRO) or corporate risk committee (Liebenberg & Hoyt, 2003) or by examining performance factors of an ERM program that has already been implemented. The third group concerns qualitative, field studies starting roughly in the midden 2000s that examined ERM in terms of its social and organizational elements such as an investigation on the heterogeneity of ERM practices between firms (Mikes, 2009), or the organizational dynamics of ERM implementation (Arena et al., 2010). Anton & Nucu (2020) conducted a citation-based review on qualitative and quantitative empirical ERM studies from 2008-2019, largely avoiding overlap with the more theoretical review of Bromiley et al., grouping the studies based on subject focus rather than on approach. They identified four main streams of research based on their search criteria: initial ERM implementation, determinants of ERM implementation, performance aspects of ERM adoption and a last mixed group examining various aspects. Due to the citation-based approach and chosen search criteria, the review offers an overview of the most 'popular' studies in that period, which mainly used a quantitative approach. Crawford & Jabbour (2023) offered the most recent overview, focusing more narrowly on the role of behavior, specifically managerial judgement in decision-making as it relates to ERM. A review by Renault et al. (2016) was the only one to examine ERM at construction firms, where they examined the literature on drivers and hindrances in ERM implementation at construction firms however was limited due to the scant research on that topic.

A large number of quantitative studies have been conducted on ERM and a smaller but growing group of studies have been conducted using a qualitative approach. The findings of the selected quantitative studies included in this literature review focus on general ERM implementation, ERM at construction companies and organizational culture aspects. These studies offer insights into organizational variables affecting ERM. The studies that reflect a qualitative approach offer a more nuanced view of the phenomena surrounding ERM implementation, where patterns and relationships between variables as well as important emerging themes have been identified. As this research uses a qualitative approach, the greatest focus lies on the field studies. Selected quantitative studies have been consulted to get 'a lay of the land' in terms of organizational considerations.

Lastly, it was observed in the ERM theoretical works that aside from the international practice standards, practitioners's texts are often cited to create a full picture of theory versus practice. These texts are often descriptive and prescriptive in nature and have also been included in this literature review. This includes books by industry experts that are often cited in theoretical studies (e.g. Fraser, Quail & Simkins, 2021; Hillson, 2009; Lam, 2014) and guidance from professional organizations (e.g. Institute of Risk Management (IRM), 2012).

3.2.2. Theoretical conceptualizations of ERM

Though COSO ERM (2004) is the most cited definition of ERM, it is not the only one. Bromiley et al. (2015) identified two main perspectives in the standards and ratings agencies' guidance on conceptualizations of ERM. The first perspective concerns the link between risks and company objectives: some sources see the two as connected and intertwined (e.g. COSO ERM, 2004) while others view them as explicitly unconnected. The second perspective concerns the relationship between risk and opportunities: some sources view risk as mostly threats to be mitigated while others champion a view of balancing risk and opportunities for value creation. Some authors have argued for conceptualizations of ERM that go beyond these definitions, offering a theoretical counterpoint. Lundqvist (2015) theorized that, as risk governance is in fact holistic RM, ERM is simply the combination of traditional RM processes and risk governance. Based on this idea, the findings indicated that the two facets have different determinants and suggest that firms implement ERM to address risk governance issues, specifically to monitor the decision-making of managers. Jankensgård (2019) argued that ERM is a combination of risk governance and risk aggregation which respectively must deal with agency and information problems. Still others have cautioned that ERM is an umbrella concept that can

refer to a wide variety of practices (Mikes, 2009; Bromiley et al, 2015). This lack of clarity of what constitutes ERM and the steady growth of its influence in corporations often stretching into all facets of organizational processes and practices (Tekathen & Dechow, 2013) led in the early years of ERM to the "risk management of everything" (Power, 2004). A few years later, ERM's vulnerability to major ethical breaches became evident in the financial crises of 2007-2009, leading to the conclusion that ERM, when not harnessed properly, led to the "risk management of nothing" (Power, 2009). Mikes & Kaplan (2014) addressed the shortcomings of ERM implementation in practice by stressing in their definition that ERM processes should be "active and intrusive", challenge assumptions, communicate risk information through risk tools, address gaps that existing processes miss, all with the aim of complementing existing management control processes. Multiple authors argued that uncertainty is an important part of ERM which means that risk management at the enterprise level is not only concerned with loss reduction and control but also with finding optimal balances of and risk and return in strategic decision-making (Bromiley et al., 2015; Hunziker, 2021; Power, 2009; Tekathen & Dechow, 2013). In this light, Hunziker (2021) conceptualized ERM as a combination of traditional risk management and uncertainty governance, see figure 3.1.

Based on a synthesis of the above, ERM can be conceptualized in the following key aspects:

- Comprised of:
  - risk governance,
  - risk aggregation and
  - risk management
- Principles:
  - Company-wide risk is more efficiently managed in a corporate risk portfolio than separately in silos,
  - In addition to more traditional risks (e.g. related to liability or safety issues), strategic risks are a critical element of ERM,
  - Risks are seen as both threat and opportunity with a view to maximizing risk and return in managerial decisions.
  - Decision-making is improved when assumptions can be challenged, risk information is properly communicated, and when gaps can be identified and addressed,
  - Deals with uncertainty.

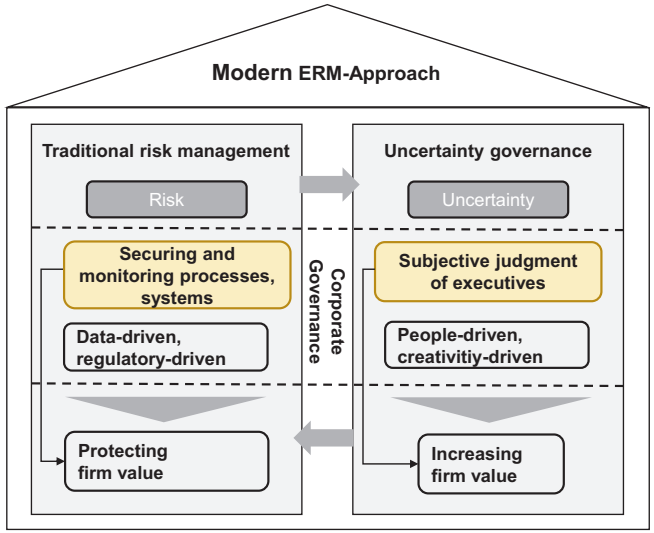

Figure 3.1 - An approach to ERM combining traditional risk management with uncertainty governance (Hunziker, 2021)

3.3. Enterprise Risk Management frameworks and best practices

Enterprise Risk Management (ERM) has been on the rise in corporations in recent years as an effective method in managing cross-company risk (Bromiley, McShane, Nair & Rustambekov, 2015). As it affects an organization in its entirety, affecting multiple interconnected processes, the implementation of ERM is a multi-year process. ERM incorporates aspects of RM, objective-setting, strategy and decision-making (Anton & Nucu, 2020). In spite of the initial investment of time and resources, proponents claim that ERM offers value for the long term as it provides a holistic perspective on risks within the organization as opposed to PRM that operates in silos (Arena et al., 2010; Bromiley et al, 2015). The most widely cited definition of ERM is provided by The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2004): "Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives."

As RM is not a stand alone activity, it is typically incorporated into existing organizational structures. Accordingly, it is traditionally conducted in separate business units or silos within the company. In this way, risk ownership and responsibility is assigned to the group or persons who are best equipped to deal with them. Silo-based RM has both advantages and disadvantages. Advantages include: Managing risks in silos follows existing organizational structure; ownership and responsibility for risks assigned to those best equipped to manage them (Zhao ea

2015c). Company profits from specialist knowledge in business units (Jankensgard 2019). Disadvantages of silo-based RM are: Due to interdependencies between risks in the silos, the total risk aggregation is not equal to a simple sum of its parts. Repetitive risks found amongst multiple projects, portfolios that are not identified and treated as such can lead to duplication of costs in managing the risks. Risks at this level also only focus on operational risks, strategic or financial risks are not considered at this level. A portfolio view of risk allows a holistic view of total risk as though risks were investments in a portfolio (Lam, 2013). A portfolio approach is comprised of aggregating risk exposure, allowing the possibility of diversification of risks and monitoring of risk levels compared to company-set risk limits (risk appetite) Allows hedging of risks within the portfolio. Optimization of risk-return can be visualized (Zhao ea 2015c).

ERM aims to facilitate the aggregation of risk on all levels of the organization, thereby making organizations more resilient by shifting organizations from a reactive to a proactive approach to risk (Renault et al, 2016). An essential aspect of ERM is the fact that it links risks to both internal and external organizational objectives (COSO, 2004).

3.3.1. ERM frameworks and ERM model used in this study

In this section, the two most widely used ERM frameworks will be discussed: COSO ERM (2004) and ISO 31000 ***Risk Management - Guidelines*** (2018) in addition to the 'Three Lines of Defense' model (Anderson & Eubanks, 2015) commissioned by COSO. The simplified ERM framework used in this study in the analysis is then presented followed by critiques of ERM frameworks from the theory.

COSO ERM (2004), ISO 31000 (2018) & the 'Three Lines of Defense' model

In 2004, the Committee of Sponsoring Organisations of the Treadway Commission (COSO) introduced their first ERM framework (Arena et al., 2010). The original framework and its subsequent update (2017) are widely seen as the industry standard for ERM implementation and promote prescriptive, rational guidance for practitioners (Arena et al., 2017). Basic tenets of COSO ERM (2004) include the following. It is a

Figure 3.2 - Analysis of existing ERM frameworks and resulting ERM dimensions used in this study adapted from Ching et al. (2020, 2021)

top-down approach and emphasizes hierarchical control structures. Accountability is strived for through the alignment of roles and tasks through a mandatory organizational code of compliance. There is a strong focus on auditability and disclosure aspects and the formalization of RM processes. Alignment, both horizontally as vertically, is stressed in effort to link strategy to organizational processes (Tekathen & Dechow, 2013). The COSO ERM framework model (2004) is conceptualized in three dimensions. The first dimension is comprised of the main components of the framework, see Figure 3.2 for the eight components. The second dimension applies to the four main categories of company-wide risk: strategic, operational, reporting and compliance. The third dimension is made up the multiple organizational levels that ERM aspires to connect: enterprise, division, subsidiary etc. As COSO ERM (2004) grew out of COSO's previous guideline for Internal Control from 1992, it has a strong internal control focus (Power, 2004). ISO 31000 ***Risk Management - Guidelines*** is also a widely cited standard. It is conceptualized in three parts: a framework, principles and process. It is a more generally applicable guideline than COSO (2004) and can be applied to different types and levels of risk that companies deal with. The 'Three Lines of Defense' model (Anderson & Eubanks, 2015) is also widely cited and used in organizations as it describes the division of responsibilities in functional roles related to risk. It prescribes that risk management is a part of core tasks where the first line of defense is the line manager incorporating RM in their work. The second line of defense is the presence of a dedicated risk function comprised of CRO and/or corporate risk department that advises and challenges line managers in risk decisions. The third line of defense is the audit function which has an independent character and serves as a control measure to provide assurance to the board (Lam, 2014).

In this study, a broad understanding of ERM implementation was sought after in order to understand the impact of behavior and culture. Therefore, a condensed model of ERM elements was created based on an analysis of the different frameworks (see Fig. 3.2) for use as part of the conceptual framework described at the end of this chapter.

Criticism of ERM frameworks

Prescriptive models such as COSO ERM (2004) have met with much criticism. The main issues are that is too prescriptive, ignoring the inherent complexities of organizational processes while also advocating for a 'mechanical', top-down control structure without providing guidance on how to implement these components in actual practice situations ((Arena et al., 2010; Power, 2007; Tekathen & Dechow, 2013). For example, there is no explanation of how alignment should be accomplished or how processes should be vertically 'cascaded' up and down through the enterprise. Additionally, COSO simplifies organizational structures into 'controllable building blocks, or areas of responsibility' which does not reflect the complexity of processes and responsibilities in practice and based on this idea of a neat and clear separation of roles and responsibilities it avoids offering guidance on managing uncertainties (Tekathen & Dechow, 2013).

3.4. ERM Implementation

ERM implementation is made up of any number of processes, tools and governance structures and has strong links to control processes, strategizing and decision-making (Arena et al., 2010; Arena et al., 2017; Mikes & Kaplan, 2013; Mikes, 2005; Power, 2007; Tekathen & Dechow, 2013). In contrast to prescriptive texts in standards and practice guides which promote top-down, systematic implementations, an alternative view has been developed based on case studies in recent years which presents a more nuanced view of ERM as an array of different combinations of tools and resources according to the needs of the organization (Arena et al., 2017). Hierarchical models tend to downplay the 'fluid' nature of ERM and ignore the outsize role of contextual factors in the implementation (Arena et al., 2010) such as the influence of managers' preferences and organizational ('calculative') culture aspects (Mikes, 2009). Research into the reasons for the heterogeneity of practices has been approached from different perspectives. Seen from a contingency perspective Mikes & Kaplan (2013) pointed to contextual factors as determine the correct 'ERM mix' of system design. Contextual factors such as the industry, regulatory requirements and business context affect and shape the implementation of ERM at a particular organization. Risk owners on the different levels of the organization can develop and adjust their risk practices based on the business context and at the same time, can advise the organization on risks (PMI, 2019).

On the other hand, Arena et al (2010) argued that strategic behavior of actors determined the contours of ERM. In their widely cited study, Arena et al. framed ERM implementation as a continual process of connections and adjustments with pre-existing processes resulting in ERM system designs lie between the two extremes of decoupling and embeddedness. Tekathen & Dechow (2013) examined the relationship between ERM and accountability, determining that the discrepancy between prescribed organizational processes and actual practices is unavoidable however there exists a valuable dynamic within organizations which continually attempts to bridge the gap. Arena et al. (2017) examined the processes, tools and common language used in ERM implementation as 'integrating devices' which transcend organizational dividing lines, known as 'boundary objects'.

ERM is promoted as a top-down approach to integrated risk management. However, attempts at true holistic implementations have varying success and result in varying practices (Arena et al., 2010). Tekathen & Dechow (2013) argued that this was due to the origins of ERM in management accounting. ERM is fundamentally different in its approach as it does not follow the same logical hierarchical structure and deals with uncertainty. Arena et al., (2017) argued that ERM implementations in practice are often neither integrated nor unified. In their study, Tekathen & Dechow (2013) concluded that in practice, as ERM systems are made up of a vast array of different processes and organizational levels with their own taxonomies and rationalities, these systems create 'inverse information hierarchies, pushing complex, unresolved and abstract information to the top of the organization". They went on to argue that ERM is well equipped to facilitate discussions on risk information as these systems produce "awkward, incomplete, yet complex information objects that require users to engage critically with the ways in which risk and chance documentation concurrently produce clarity and opacity".

3.4.1. ERM Drivers

ERM drivers are factors that lead a company to adopt ERM. There are multiple drivers for the initial implementation of ERM. Internationally, drivers of ERM implementation have been ratings agencies, regulatory bodies and shareholders wishes for improved assurance (Bromiley et al, 2015). Additionally there are internal drivers that lead companies to adopt ERM which chiefly center around the idea that holistic risk management improves business performance. Examples include increased stability in business results, more effective decision-making, increased transparency and accountability, and better allocation of resources (Renault et al., 2016). Other drivers include increased complexity and uncertainty in business environments, the inclusion of environmental and social aspects into business performance as well as a rise in complex public-sector contracts (Arena et al., 2010). One study was found that focused on drivers in the construction industry. Based on a survey, Zhao et al (2015) identified the top five drivers for ERM implementation at Chinese construction companies: improved decision-making, reduced costs and losses, competitive advantages, reduced earnings volatility and improved control of an enterprise over its projects. Concerning the relationship between ERM and performance, some studies show a positive correlation. Farrell and Gallagher (2019) argued that the increased firm value was a result of two possibly interconnected resulting mechanisms. On the one hand, decreased earnings variability due to more effective company-wide risk management led to lower risk premiums when financing was sought, thereby reducing the firm's cost of capital. The second mechanism was the positive effect of ERM on corporate culture, whereby key stakeholders were incentivized in their general practices to be more cognizant of risks and opportunities thereby increasing company value.

Though there are no regulatory requirements for ERM specifically in the Netherlands, corporate governance aspects that overlap with ERM systems are regulated in the Dutch Corporate Governance Code (2016) which is required for public-listed companies and includes high-level, general stipulations concerning risk management.

3.4.2. Tone at the top

Practitioner texts, standards and many authors agree that the single most important factor in successful ERM implementation is the support of top management (COSO, 2004; Fraser et al., 2021; Hunziker, 2021 p.79; IRM, 2012; Lacković et al., 2022; Lam, 2014; Lam, 2017; McShane, 2018; Renault et al., 2016; Zhao et al., 2013). Desired aspects include clear delineation of ERM ownership through the appointment of a CRO or a corporate risk function, striving for risk-opportunity balance and the setting of risk appetite and tolerance by the board (Ching et al., 2021; Zhao et al., 2013).

- **Risk leadership** - As ERM is implemented top-down within an organization, the need for a clear show of support from the executive board is an important factor influencing a risk-aware culture. Leaders should encourage disclosure from employees on sensitive risk issues thereby promoting a no-blame culture. The movement away from silo-based thinking to a holistic approach to RM must be also be initiated and encouraged by the board through clear actions and guidelines. Finally, promoting employee engagement in the ERM process and positioning ERM as a change management intitiative increases the chance that ERM will be properly embedded into the organization.
- **Allocation of resources -** The creation of a corporate risk function, the creation of a risk committee to advise top management on risk matters and the appointment of a Chief Risk Officer (CRO) are resources that contribute to ERM implementation (Zhao et al., 2013).
- **Decision-making -** Top executives should also practice what they preach, and set the example for the type of behavior expected throughout the organization (Ching et al, 2021). Additionally, decision-making should be based on risk information and not purely on professional judgment.

3.4.3. Risk techniques and tools

Risk techniques and tools are the medium through which uncertainty experts, guided by organizational risk philosophies, put risk management into practice. How managers perceive ERM and its relevance is related to the choice of ERM technologies used and the level of embeddedness in existing processes (Arena et al., 2010). The choices made when designing processes and systems determines the extent to which lower-level risk information is communicated up through the hierarchy of the company and back down again. Organizational procedures and tools used for business management and the execution of strategy are influenced by the ways in which risk is evaluated and measured (e.g. quantitative vs qualitative measures, reporting methods). Additionally, the extent to which statistical models are used versus interactive approaches and professional judgement can determine the way risk is incorporated into decision-making (Tekathen & Dechow, 2013).

3.4.4. ERM Maturity

Organizations strive to maximize the predictability of results through the qualitative and quantitative management of risks. To this end, organizations seek to determine the proper level of process maturity based on the associated cost-benefit considerations and balance this with the desired level of performance (PMI, 2019). When implementing ERM, the level of maturity of pre-existing RM processes will have considerable implications for the alignment of ERM processes (Lam, 2014 . Maturity relates to the level of quality of specific processes (Zhao, 2014). Firms can use existing maturity frameworks or models to assess the maturity of implementation in order to benchmark their current practices (Hillson, 1997). In a study on ERM maturity at Chinese construction companies, Zhao et al (2015a) showed a positive correlation between ERM maturity and firm size in addition to a high degree of consensus on the ranking of maturity criteria amongst respondents.

3.4.5. Influence of expertise and functional roles

The combination of actors, or 'uncertainty experts' according to Arena et al. (2010), from different functional groups and how they collaborate

is another important factor influencing ERM implementation. Some examples include risk manager specialists, internal control managers, internal auditors and management accountants. Actors' translations of ERM to practice were affected mainly by their personal approach and their sphere of influence. Arena et al. (2010) argued that the combined influence of uncertainty experts greatly influence ERM's development and design in two important ways: the expertise group mainly responsible for the initial ERM design determines to a great extent the further development of ERM practices and secondly, the mix of different expertise groups will have implications in terms of power dynamics between those groups, with two possible extremes. On the one hand, power struggles can arise between actor groups and ERM is then decoupled. On the other hand, the mix can lead to hybrid expertises allowing ERM to be embedded into organizational processes. ERM is strongly related to internal control and accounting, and in fact the COSO ERM framework originated in the COSO framework for internal control from 1992 which is characterized by accounting forms of control and auditing. For this reason, ERM is often implicitly or explicitly structured according to accounting norms (Power, 2009). Some authors warn of the dangers of applying accounting logic to ERM as the inherent uncertainties that are part of ERM mean that risk information will never 'add up' in the same way accounting information does (Broadbent et al., 2008; Lam, 2017; Tekathen & Dechow, 2013). Additionally, an excessive focus on audit and IC aspects in ERM leads to the perception of ERM as a tick-the-box requirement (McShane, 2018).

Arena et al. (2017) determined that managers position themselves on a sliding scale between compliance (focus on formalized and standardized tools and processes) and performance (through use of professional judgement, network activities and uncomplicated risk tools) though Jemaa (2022) claimed that expressing ERM implementation in terms of these two extremes was in fact too simplistic and that through recoupling and double embeddedness of uncertainty experts, organizations can make strides to achieve both objectives. Kaplan & Mikes (2016) had argued in favor of this, stating that risk functions can be comprised of different groups of risk managers with their own focus, thereby balancing the competing needs of compliance and performance goals.

3.5. Connecting ERM to other levels of risk management

When ERM processes are implemented, they must connect to existing accounting, internal control and risk management systems. Pre-existing processes will greatly influence ERM processes and their efficacy (Arena et al., 2010). As construction companies are project-based companies, risk management of projects plays an outsized role in company-wide risk management. Additionally, due to the steady increase in size, scope and complexity, project risks can have significant impact on the company risk profile. Aspects related to project risk management and ERM are discussed in the following three sections.

3.5.1. Risk and uncertainty management in the construction industry

Risk management is "the process that shapes decision-making across the organization... and involves identifying, analyzing, responding to, and monitoring risks" (PMI, 2019). In practical terms, risk management (RM) is typically organized according to the "built-in, not bolt-on" principle (Hillson, 2009) and is executed as an integral part of management practices. Construction companies are project-based businesses. Due to the fact that construction projects are unique and custom-built, they involve higher levels of risk than standardized processes, though due to the slow pace of innovations or change within the industry, they have a level of predictability (Olson & Wu, 2020). Project risks are dealt with through project risk management. In addition to project risks, construction organizations deal with operational and strategic risks which are addressed through business risk management processes and in some cases holistically through ERM. A risk management cycle on any level generally includes the following components: risk identification, qualitative & quantitative risk analysis, formulation of risk response plan, implementation and monitoring, review and reporting of lessons learned (PMI, 2019).

Some authors argue that risk and uncertainty are not only different in scope and content but also require different management forms (Vidal & Maarle, 2008; Miller ea, 2008, Perminova ea, 2008). For instance, Miller ea (2008) posited that effective management of uncertainty within organizations necessarily must take on hybrid forms that extend beyond formalized risk management control structures. Hoseini et al. (2021) supports this notion, in their research on the discrepancies between predicted and actual project cost contigencies through an examination of the combined effects of "unknown unknowns" (uncertainties) and "known unknowns" (risks) where they conclude that incorrect estimations are caused by the lack of relevant competencies, cultural aspects and cognitive biases, factors which extend beyond the realm of classic RM structures. Perminova ea 2008 was also in agreement, citing the need for attention to organizational learning and sensemaking to support adaptability and improved maneuverability in decision-making when managing uncertainty. Atkinson et al. (2006) argued that projects are highly uncertain, and management of such projects should accept this lack of clarity and be adaptive as opposed to control-focussed.

3.5.2. Project risk management

Project RM is part of project management. A project is a "temporary endeavor undertaken to create a unique product, service, or result" (PMI, 2017). The focus of RM at the project level is typically on the impact that risks can have on budget, schedule and scope (Sanchez et al. 2008) and in more recent years, sustainability objectives have been added. Project RM aims to prevent deviation from the set project plan such that the probability and/or impact of threats are decreased and the probability and/or impact of opportunities are increased. Much of the knowledge on how to manage projects is tacit as it a process managed by people. For this reason outcomes are difficult to predict and the management of projects will always be based on a combination of hard and soft skills (Morris, 2004). Miller & Lessard argued that construction projects are risky endeavors due to high irreversable commitments, considerable chance of failure and returns on investment that can come years later (2001). They posited that the integration of risk resolution into the project management process is a determining factor for project success. There are mixed opinions in the literature concerning the relationship between risk management and project performance but most studies conclude that the application of some form of risk management contributed to increased project success (Williams, 2017).

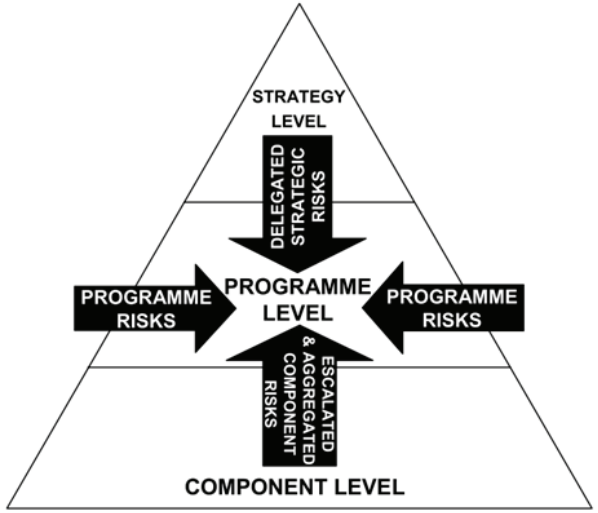

Figure 3.3 - Connection of RM levels (Hillson, 2009)

3.5.3. ERM as it relates to PRM

Liu et al., 2013 examined how ERM influences PRM at two Chinese construction companies. They determined that the creation of a corporate risk function, a facet of ERM, has many benefits at the project level such as enhanced resource allocation, reduction of information asymmetry, improved knowledge management, and the ability to offer specialty expertise knowledge to project teams. In addition, the corporate risk function can assist in handling complex projects, ventures into new markets, establishment of partnerships with external parties to reduce costs and streamline work process at project level when external expertise is needed. Building partnerships and establishing networks can improve collaboration in projects, thereby reducing risks.

3.5.4. Connecting ERM to portfolio, program and project risk management

A common approach to RM is needed company-wide for effective ERM implementation. ERM facilitates the alignment of the various levels of risk management with strategy through escalation of risks from lower levels according to defined thresholds and cascading risk management strategies as appropriate to portfolio and project levels, see Figure 3.3 (Hillson, 2009). When quantification of risks is possible, normalization and aggregation of risks on portfolio, program and project level can be achieved through a common approach to RM, allowing organization's to determine the degree to which it is adhering to the defined risk appetite and tolerance. Risk review functions are typically located in multiple hierarchical levels of the organization (PMI, 2008). Understanding boundary conditions and interfaces between risk levels are needed to achieve an integrated approach across all levels. Additionally, clear definitions of escalation and delegation criteria at each risk level are needed (Hillson, 2009, p80). The RM process should be scalable, customizable and fit the specific contextual factors of the org. This common

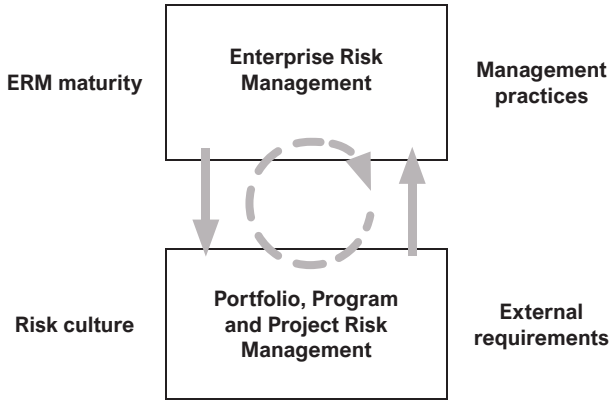

Figure 3.4 - Elements contributing to the degree of alignment between ERM and portfolio, program and PRM (PMI, 2019)

process can include simpler, qualitative means at the project level, while using more sophisticated quantitative methods at the strategy level (PMI, 2019).

ERM is both a top-down and bottom-up process as shown in Figure 3.4. Risk review functions are typically located in multiple hierarchical levels of the org. Escalation of risks is mainly done for monitoring purposes or to seek help from higher up to address the risk, where each level has its own escalation criteria. For example, risks can be escalated if a project's objectives are threatened and this has a knock-on effect triggering a risk at the program level. It can also happen in de the opposite direction, risks can be delegated from higher levels of the organization. Risks from portfolios, programs and project are considered as a part of an alignment process with ERM, gauging their effect on broader business objectives. As a result of this process, organizational risks from portfolios, programs and projects can become enterprise risks and vice versa. Prioritizations, probabilities and impacts of risks can change based on this process. Realignment between ERM and the constellation of organizational risks is necessary when changes to any of the components takes place. Indicators Linking ERM indicators to organizational risk indicators depends in the first place on the presence of such indicators and when present, how well integrated and aligned these indicators are. When present and aligned, these indicators can be cascaded to other levels of the organization, connecting company-level strategy to the these operational levels (PMI, 2019).

3.6. Cultural influences

The need for the 'right' organizational culture is expressed in most studies on ERM. However, the literature is less clear on what that entails. In the following sections a number of influencing factors will be discussed that contribute to the culture of ERM and RM in general. Firstly, aspects related to organizational culture and risk in construction projects will be discussed. Secondly, the effects of organizational views on risk and uncertainty will be explored. The third section offers a consideration of the effects of risk techniques and tools. Lastly, the impact of maturity levels of pre-existing processes will be discussed.

3.6.1. Organizational culture and RM

The high levels of uncertainty inherent in construction projects requires more focus on soft skills and organizational culture in management of the projects (Atkinson ea, 2006). Renewed attention to norms and ethics, which determine the way in which RM practices are shaped and are part of company culture, began to increase in the years following the financial crisis (Bromiley et al, 2015). Atkinson (2006) argued that an organizational culture that does not foster uncertainty awareness and organizational learning is a barrier to uncertainty management, an idea that can be extended to ERM as it also deals with uncertainty. Arena et al. (2010) posited that for ERM to be effective, technical and rational aspects of ERM must be combined with cultural aspects conducive to risk management and embedded in daily work practices. However, this is easier said then done due to the many different organizational settings and cultures where ERM is introduced. Possibly as a result of variations in organizational cultures and individual organizational approaches to risk, in many cases ERM implementation has not resulted in true integrated risk management (Tekathen & Dechow, 2013). Some authors argue that not all organizations have the corporate culture ERM needs to thrive (Fraser & Simkins, 2016). Tekathen & Dechow (2013) went as far to argue that internal organizational differences in risk language, methods and risk culture hamper a true enterprise-wide view of risks. For this reason they concluded that ERM adds more value through its role as a knowledge management tool, laying bare ambiguities that organizations face rather than as a tool to reduce organizational uncertainty.

Schein (2017) defined culture as "…a pattern or system of beliefs, values, and behavioral norms that come to be taken for granted as basic assumptions and eventually drop out of awareness." In terms of organizations, Mullins (2011) summarized culture simply as 'the way we do

1. Artifacts
- Visible and feelable structures and processes
- Observed behavior
  - Difficult to decipher

2. Espoused Beliefs and Values
- Ideals, goals, values, aspirations
- Ideologies
- Rationalizations
  - May or may not be congruent with behavior and other artifacts

3. Basic Underlying Assumptions
- Unconscious, taken-for-granted beliefs and values
  - Determine behavior, perception, thought, and feeling

Figure 3.5 - Three levels of culture (Schein, 2010)

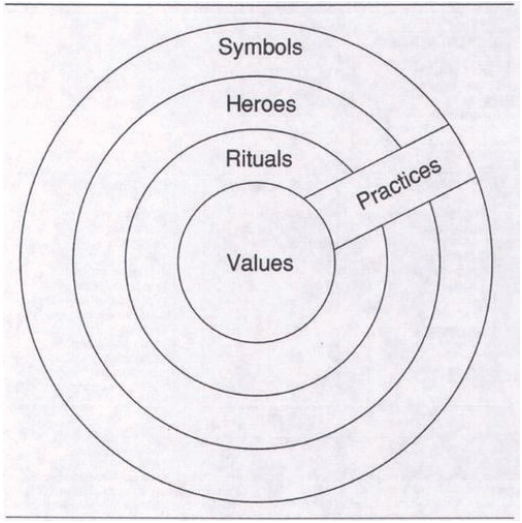

Figure 3.6 - Manifestations of culture (Hofstede, 1990)

Table 3.1 - Risk culture dimensions

Risk culture artefacts (soft controls)	Risk behavior dimensions	normative / prescriptive manifestation	[1]	[2]	[3]	[4]
No-blame culture	Reacting to risk information	Promotion of open, no-blame culture, employees are encouraged to share bad news.	x	x	x	
Clear hiring and training requirements	Promoting competencies	Desired risk attitude, knowledge, skills and competencies are promoted through hiring and training		x	x	x
Incentive structures	Motivating through incentives	Rewards and incentives for employees displaying desired behavior in risk taking and management	x	x	x	x
Clear accountability structures	Understanding roles and responsibilities	Roles, responsibilities and accountabilty of management and employees are defined and clear.	x	x	x	x
Effective communication structures	Communicating risk information	Reporting and communication structures ensure timely communication of risks, transparency, risk events are seen as learning opportunities	x	x	x	x

Sources: [1] Ching et al. 2020, 2021; [2] IRM, 2012; [3] Kunz & Heitz, 2021; [4] Lam, 2017

things here'. Within organizations, subcultures can exist as well (Hofstede, 1998). Hofstede (1990) and Schein (1984) developed similar theoretical organizational culture models. The model of Schein (1984) is comprised of three layers: underlying assumptions (foundational layer), espoused values (middle layer) and artefacts (top layer and most visible layer). Hofstede's (1990) onion model has values at the core, with subsequent layers representing rituals, heroes and symbols. Hofstede's model distinguishes between aspects which are visible in practices (rituals, heroes and symbols) and those which are only known to individuals (values). Based on a survey, Hofstede (1990) determined that organizational cultures are influenced and characterized not by shared corporate values but in fact by shared practices. Based on these two models, the conceptual aspects can be divided into two main groups: 1) a combination of beliefs, values and assumptions and 2) the manifestation of these in artefacts or practices. The first group is not directly observable (values and beliefs) or even something actors are conscious of (underlying assumptions) while the second group is more visible though not necessarily easily understood.

3.6.2. Risk behavior and culture

In this study, behavioral and cultural aspects related to risk management were examined. Risk culture or risk management culture is the term most often used to define this subset of organizational culture, which is mainly found in practitioner texts and standards. PMI (2019) prescribes that for an organization to be effective in RM, a positive risk culture is needed where practitioners are instilled with the knowledge and know-how to act accordingly when dealing with risks and opportunities. The Institute of Risk Management defines risk culture as "the values, beliefs, knowledge and understanding about risk, shared by a group of people with a common purpose" (IRM, 2012). Lam (2017) described risk culture as the desired state where people implicitly incorporate good risk behavior into their daily work. There is however little theoretical discussion on what risk culture is and it remains a 'vague' concept (Bromiley et al., 2015). For this study, a combination of practioners' texts and academic studies were consulted to determine the dimensions of risk culture. An overview is provided in table 3.1. Two studies were found that focused on risk culture as it relates to ERM at a construction firm, by the same research group of Ching et al. (2020, 2021). Additionally, a study was found examining the effect of risk culture on project sustainability goals in an IT firm (Moczydlowska et al.,2023) and a study on the relationship between risk culture and management control systems in the financial sector (Kunz & Heitz, 2021). The previously stated definitions stress risk culture as collective actions or behaviors, influenced by common (understandings of) beliefs, values and assumptions. To facilitate the Structuration theory analysis used later in this study, it is hypothesized that these two sides of risk culture can be analytically

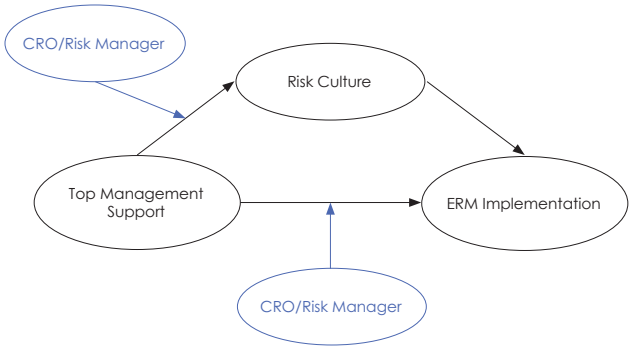

Figure 3.7 - Theoretical model of the relationship between ERM implementation and risk culture at a construction company (Ching et al., 2021)

divided as follows. Behavioral aspects of risk are interpreted as ST agency and risk culture artefacts influencing risk behavior (also known as soft management controls) are interpreted as ST structures.

3.6.3. Barriers to ERM implementation

There are also barriers that can impede the successful implementation of ERM. In terms of the influence of top management, some barriers include failure to prioritize ERM, unclear definition of risk appetite and using ERM as a stand-alone system that is not integrated into decision-making. An implementation barrier is the tendency to make ERM system designs too complex or the inadequate connection of ERM to existing processes such as PRM. Competency barriers relate to insufficient knowledge and skills of ERM possessed by the board, management and employees which can lead to the inclusion of non-key risks. Related to this is the barrier of inadequate training on ERM. Data barriers refer to low data quality or the lack of data. Behavioral barriers include: resistance in moving away from the silo mentality which can be due to lack of perceived value of ERM and issues related to organizational turf.

3.6.4. Risk rationalities - organizational philosophy on risk and uncertainty

All organizations deal with uncertainty and risk due to internal and external events (PMI, 2019). The concept of risk and what it entails can differ depending on the organization, group or person (Jeitziner et al, 2016). How managers approach risk management depends on how they conceptualize and operationalize concepts related to risk and uncertainty. These guiding principles or philosophies, what Arena et al. (2010) describes as 'risk rationalities', are critical in shaping (E)RM process designs and approaches. A critical component of such views is the definition of the foundational concepts that they are built on. As there are multiple interpretations of risk and uncertainty in the literature, an overview of the different views is sketched below, followed by the motivation for the chosen definitions used in this study.

Definitions of risk and uncertainty in the literature as well as explanations of how the two concepts are linked appear to depend on two factors: the theoretical domain and whether a qualitative or quantitative approach is preferred. For this study, definitions from the project management and accounting literature have been explored.

In the project management literature the following examples were found. The quantitative view can be seen in Jaafari's (2001) definition of risk as "the exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude" Another often used conceptualization of uncertainty that is related to project management is project uncertainty or "the probability that the objective function will not reach its planned target value" (Jaafari, 2001). Seen through a qualitative lens, Perminova et al. (2008) defined uncertainty as the wider frame of circumstances in which risks or opportunities arise as events that can affect project objectives. The prevailing notions of uncertainty and risk in the project management literature appears to suggest that the connection between them defines them both. This is demonstrated by the definitions of uncertainty by Perminova et al (2008) and in PMI's Standard of RM in Portfolios, Programs and Projects (2019) where 'uncertainties are all phenomena that can potentially impact an organization whereas risks are threats or opportunities that are managed as part of risk management processes". This can also be seen in PMI's (2019) definition of individual risk as "an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more objectives" which echoes the idea that risks are basically "uncertainties that matter" (Hillson, 2009). The majority of literature on ERM can be found in accounting and finance journals. The quantitative view is expressed for instance by Broadbent et al. (2008) who stated that risk "involves the possibility of placing some 'calculable probability' on a future event occurring" while uncertainty is present when the probability of occurrence of a future event is completely unknown. COSO's ERM framework provides stand-alone qualitative definitions of risk and uncertainty defining risk as: "the possibility that events will occur and affect the achievement of strategy and business objectives" while uncertainty is "the state of not knowing how or if potential events may manifest". Based on the above definitions, it is concluded that the context in which the terms are used determine the choice for a quantitative or qualitative interpretation. When discussing general risk and uncertainty as they relate to processes and projects, the qualitative interpretations are

used. For an understanding of how risks impacts objectives in terms of time and money, the quantitative definitions are appropriate. Here it becomes clear why uncertainty as a concept is such a 'sticky wicket' in organizations. As it has by the quantitative definition no known probability, it cannot be calculated using the simple risk formula described above and must be approximated and visualized via other means such as through scenario analysis, Monte Carlo simulation and decision trees (Mikes, 2009). As quantitative models become more complex, they can be seen as in indeciferable 'black boxes' which are often not easily understood by managers without adequate knowledge of the techniques used and the quality of the data applied, limiting the extent to which such models are trusted and used as the basis for decision-making (Hunziker, 2021).

Other concepts occurring in the literature related to risk and uncertainty are also useful to mention. Project complexity is an important theme at construction companies due to the outsize influence of complex mega-projects on the risk profile of the entire portfolio of projects. Project complexity is comprised of structural aspects due to differentiation and interdependency of elements on the one hand and uncertainty in goals and means on the other (Williams, 1999). Some authors have argued that project complexity is the cause (Vidal & Marle, 2008)) while others have posited that it can also be the effect of project risks (Bosch-Rekveldt, 2011). Ambiguity is related to the amount of information available on a certain risk and greatly influences the degree to which risks can be effectively identified (PMI, 2019). A behavioral aspect is risk attitude which is defined as "a chosen response to uncertainty that matters, influenced by perception" (Hillson, 2009). Risk appetite is the defined as "The types and amount of risk, on a broad level, an organization is willing to accept in pursuit of value" COSO (2017). In recent years there has been an increased focus on the role of risk appetite in organizations due to its function as a guide for project professionals in navigating risk-related decision making on multiple project levels (Renault et al., 2016). A risk threshold is "the measure of acceptable variation around an objective that reflects the risk appetite of the organization and its stakeholders" PMI (2019). Risk thresholds form an important part of connecting risk management levels and aligning them to strategy.

3.7. Behavioral influences

A number of important behavioral aspects have been identified in the literature. Previous research has established that individuals tend to be overly optimistic about the uncertainty they are dealing with which can lead to overconfidence in risk decisions (Bromiley et al., 2015). Assumptions that should be challenged are instead accepted due to various psychological biases such confirmation bias (Bromiley et al., 2015; Jeitziner et al, 2016). Confirmation bias occurs when information is judged based on preconceived ideas rather than on the actual merits (Hunziker, 2021). Individuals tend t o not be consistent in terms of their risk judgments or preferences. Additionally, group dynamics can have an outsized effect on personal judgments such as with groupthink, where managers who do not want to be the odd (wo)man out go along with the rest of the group and quash their doubts, keeping information to themselves that is contradictory to the group consensus (Bromiley et al., 2015) which can have considerable consequences for risk measurement. Related to this is the tendency to make simplifying assumptions, therefore ignoring information that does not fit with the rest. In addition, the desire to simplify problems can cause wicked problems (Rittel & Webber, 1973) to be incorrectly identified as tame problems, leading to the use of routine procedures which can also lead to the decoy phenomenon where tame problems get more attention and divert attention away from more difficult problems (Jeitziner et al, 2016). In terms of the information used in decision-making, differing opinions amongst stakeholders on how information is generated, shared and valued can lead to contested information and therefore knowledge must be negotiated to be of value to decision-makers (De Bruijn & Leijten, 2007). This is related to framing, which is the purposeful shaping and presenting of information in order to influence others' responses (Hunziker, 2021).

3.8. Use of Structuration Theory (ST) and the conceptual framework used in this study

The literature review is concluded with an explanation of how ST is applied to the domain theories as described in previous sections. This is followed by the presentation of the resulting conceptual theoretical framework used in the following steps of the study.

3.8.1. Relating ST to behavior and culture concepts

According to the online Merriam-Webster dictionary, behavior is "the way in which someone conducts oneself". In ST terms, behavior is therefore part of actors' agency (Giddens, 1984) though agency is a more expansive concept, as it describes purposeful action based on knowledge. There is scant research using ST to examine organizational culture. A study was found by Riley (1983) where political culture within organizations was examined using an ST lens. In that study, culture is defined as an institutional phenomenon, and therefore a part of ST structures. However, the study also explored agency through actions, motivations, assumptions and beliefs. This is similar to a 'cultural' analysis based on for instance Schein's cultural model, however the sociological perspective of ST makes it stand apart. This example as well as others cited in section 2.5.2 together with the previously stated definitions of culture appear to show that ST's duality of structure and the idea of culture have many similarities and conceptual overlaps, while also having diverging theoretical underpinnings leading to the alternative structuring and focus of analyses. Based on this conclusion, the connections between ST and culture have been hypothesized as follows.

- Cultural values, beliefs and assumptions as defined by Schein and Hofstede seen through an ST lens are part of actors' knowledge related to the structures they are a part of and which drive their actions.
- Cultural artefacts or practices as defined by Schein and Hofstede contain both informal elements such as collective behaviors as well as formal elements such as processes and both formal and informal codes of conduct. In this study, collective behaviors will be analytically divided into desired behaviors and actual, observed behaviors. Desired behaviors as stated in formal processes (i.e. soft controls) correspond to ST structures. Actual behaviors are interpreted as ST agency as these behaviors act upon existing structures either as a catalyst for change or to maintain existing structures, reflecting the feedback loop of the duality of structure. Resulting from this process are new or enduring cultural practices which are again a combination of structural and agency components and correspond to ST outcomes.

3.8.2. Relating ST to ERM concepts

Formal ERM processes, procedures and governance frameworks (e.g. hard management controls) correspond to ST structures. Risk culture artefacts that impact risk behavior (e.g. soft management controls) and risk rationalities also can be seen as ST structures. The way organizational actors influence these structures through their actions and behaviors correspond to ST agency. For this reason, the actions of top management (i.e. the 'tone from the top), the actions of uncertainty experts shaping ERM implementation and the risk behavior of practitioners within the organizations represent separate groups in the action realm. The combined feedback loop of structure and agency (i.e. the duality of structure) leads to ERM practices which can be seen as ST outcomes.

3.8.3. Conceptual framework used in this study

A conceptual framework was developed based on the most relevant domain theory concepts from the literature review combined with the connected ST concepts as described in the previous two sections. Two specific models were combined and served as the basis for the overarching framework. The model developed by Ching et al. (2021) in Figure 3.7 is used as it shows the relationship between top management, risk culture and ERM implementation at a construction company. The moderating effect of the CRO / central risk function in the original model corresponds with uncertainty experts in the proposed framework presented below. The second analytical model is drawn from Arena et al. (2010) where the dynamics of ERM implementation at three non-financial companies were explored, through the use of three themes: risk rationalities, the influence of uncertainty experts and the risk technologies in use (NB 'risk technologies' in that paper refers broadly to both formal ERM processes and tooling). The resulting framework is used as a guide in the empirical part of the study, see figure 3.8. The framework is comprised of the following parts :

The ST **action realm** is comprised of the groups of actors whose actions are observed through time. The domain theory themes that are connected to this are:

- **Tone at the top** represents support of the board and top management and is a driving force in ERM implementation, affecting all structures of ERM implementation.
- **Uncertainty experts** in different functional roles shaping ERM practices
- **Risk behavior** of practitioners within the organization at multiple hierarchical levels, whose choices and actions impact ERM practices.

The ST **institutional realm** is where the actions of all identified actors play out in the organization. In this study, the corresponding domain theory themes are:

- **Formal ERM artefacts (hard controls)** are the formal elements informed by external frameworks and practitioners texts. Of these formal elements, the following are considererd in more detail:
  - **Risk rationalities** are the ways organizations conceptualize and craft approaches to uncertainties and risks.
  - **Risk culture artefacts (soft controls)** are organizational artefacts that are related to formal ERM elements that affect employees' risk-taking behavior and influence how formal ERM elements are translated to practice.

The **interplay between structure and agency** occurs as follows. Starting at the top, the management board sets out a mission and vision for risk, allocates resources for ERM and displays behaviors related to risk-related decision-making. These actions have a dominant influence on ERM implementation. Based on this influence, and making use of external frameworks and best practices, formal ERM artefacts are shaped. Stemming from these are organizational risk rationalities and and risk culture artefacts (soft controls) which specifically influence risk behavior and the behavior of uncertainty experts. These in turn influences ERM implementation as a whole. The interplay between the displayed structures and agency results in practices which are interpreted as ST **outcomes**. These resulting practices then influence top management actions in a continuous feedback loop representing the continuous monitoring and improvement of organizational processes.

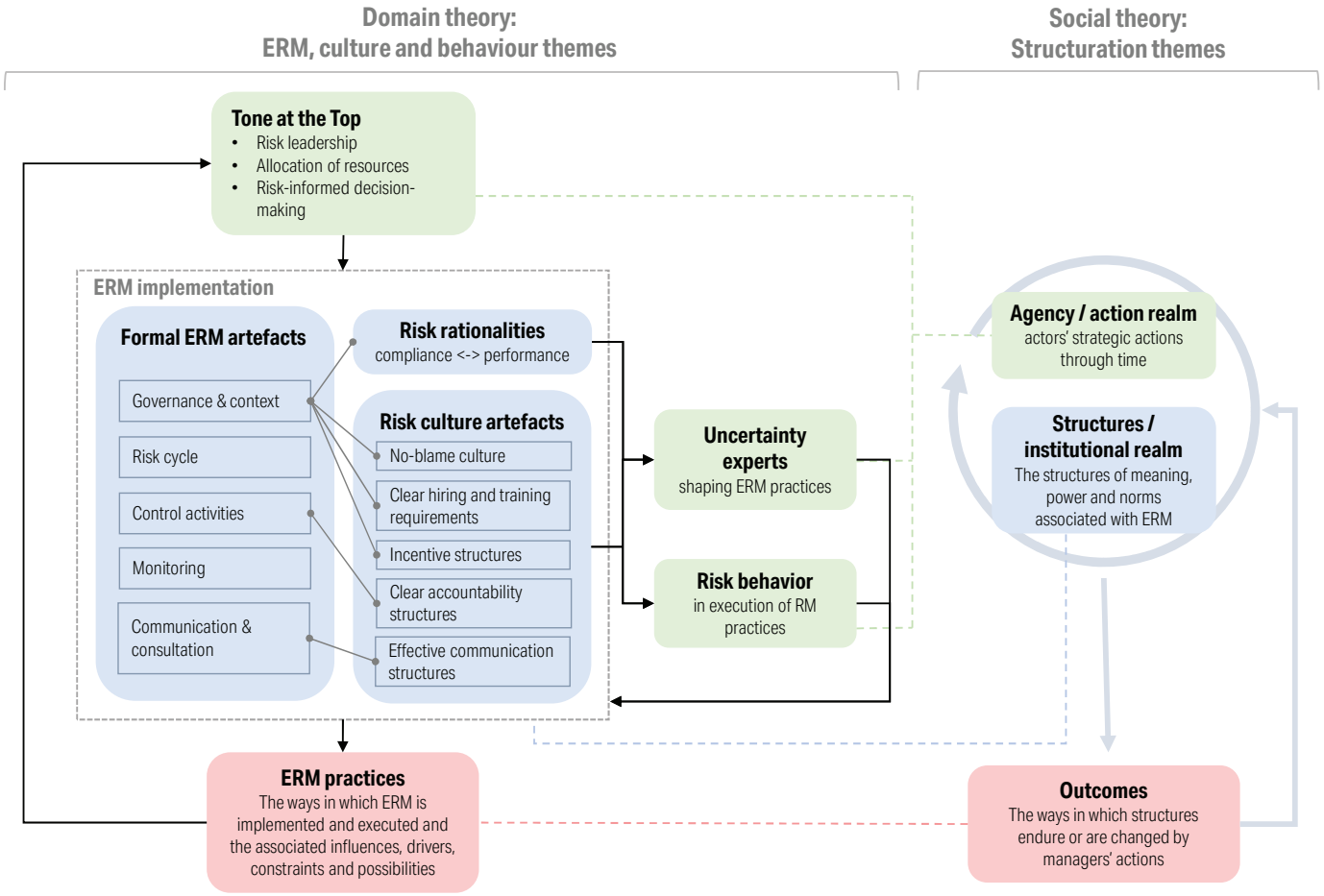

Figure 3.8 - Conceptual theoretical framework for use in empirical part of study, adapted from Ching et al. (2021) and Arena et al. (2010).

chapter 4:

Documentation study

Structure of this chapter

4. Documentation study

4.1. Chapter setup

Following a consideration of the theory on the subject of ERM implementation, the practical aspects at a Dutch construction company will be explored in this chapter through the first empirical step of the study. A combination of documentation study, informal interviews and observations have been used in this step, offering an answer to the second research sub-question, namely:

SQ2: How is the implementation of ERM represented in practice?

The chapter is structured as follows. Firstly, data sources and data collection methods will be discussed. Secondly, based on the conceptual framework described in the previous chapter, the collected data will be presented according to three main themes:

- Evidence of top management support - the 'tone at the top' – company profile, organizational structure, evidence of board and top management's commitment to ERM implementation
- Formal ERM elements – eg policy documents, statements on corporate values and desired behaviors, ERM cycle, governance and control documents and resources and tooling.
- Risk culture aspects – evidence of the five dentified components of desired and actual risk culture

The chapter will be concluded with a brief wrap-up. For the analysis and discussion of the data, see Chapter 5.

4.2. Data sources and data collection methods

In this part of the study, ERM implementation has been studied by consulting formal documentation, policy notes, and additionally through informal interviews with key respondents and observations of the researcher.

The following sources were consulted:

- Publicly available documents (annual reports)
- Internal documents
- Company intranet (Sharepoint)
- Interviews with key informants
- Personal observation of practice at the organization and during team meetings

The methods used to answer the research question were:

- qualitative content analysis (QCA),
- informal interviews following Yin (2018) and Swanborn (2008) and,
- observation.

Documentation study
Studying documentation provides useful information that augments other data sources (Verschuren & Doorewaard, 2010) but care must be taken when collecting data from these sources as they may be biased and/or contain incorrect information (Yin, 2018). At the construction company, the researcher had access to a number of internal documents in addition to publicly available annual reports dating back to 2008. The documents correspond to the following themes: publicly available annual reports, organizational structure, corporate strategy, control activities, ERM documents, company values, processes, change management and general internal information, see Table 4.1.

Informal interviews with key respondents
In order to gauge the extent to which the formalized rules and guidelines were implemented in practice and to gather additional information not mentioned in the documents relevant to the research, circa 8 informal interviews were conducted with key informants who were members of the corporate-level Risk and Control team. Informal interviews allow the researcher to collect qualitative data not present in other data sources on practitioners' methods and ideas (Denzin & Lincoln, 2018). To strengthen reliability and validity, field notes were taken during these interactions and/or recordings were made. Summaries were made of the topics discussed and emailed to the respondents for approval. See Table 4.2 for a list of the key respondents and Appendix A for field notes.

Observation
The third data collection technique was through observation. Observation is valuable as a complementary method to the previous two data collection techniques (Swanborn, 2008). The researcher was granted access to monthly risk team meetings and was invited to a number of risk-related meetings where practioners discussed issues related to ERM. To strengthen the reliability of the findings, the key observations were discussed with key respondents in regular feedback sessions.

Limitations

- Due to the prevalence of working from home and working at multiple locations by members of the risk team, the opportunity for informal conversations 'at the coffee machine' or when seeing one another at the office was limited to once every two weeks, on average. This limited the possibility of informal observation.
- The recording of meeting minutes is not currently standard practice in the Risk & Control team, therefore there was little formal documentation to be found on past meetings.
- Due to the lack of meeting minutes, and lack of (the researcher's access to) formal evaluations of existing processes, there was little documentation of the reasons leading to changes in policies and processes that were evident in subsequent versions of guidelines, frameworks and process descriptions.

Table 4.1 - List of documentation sources

Theme	Document name	Code
Publicly available documents	Annual reports and company website	D.01
Organizational structure	Company operating model document	D.02
Corporate strategy	Strategy 2021-23	D.03
Control activities	Requirements framework	D.04
ERM documents	ERM policy document	D.05
	Risk domains and risk appetite	D.06
	ERM maturity scan	D.07
Company values, desired behavior	Code of conduct	D.08
	Employee survey on shared values	D.09
	Performance Management Handbook	D.10
Process descriptions	Stage Gate Requirements	D.11
Change management	Transformation Toolkit	D.12
General internal info	Company intranet	D.13

4.3. Top management support - the 'tone at the top'

In this section aspects related to management support of ERM implementation will be explored.

Risk leadership
The case study organization is a large, publicly traded construction company in the Netherlands. As ERM is linked to business results, a high-level analysis of recent developments is presented. The company's yearly reports since 2008 were consulted, which are available on the company website and are publicly available [D.01]. In the annual report of 2013, Enterprise Risk Management is mentioned for the first time, and de-risking is announced as a new objective. This development is observable in the year after the company's deepest net loss in the period under consideration of €187.4 million in 2012. In the most recent period of 2019-2021, revenue remained relatively stable with total costs putting pressure on margins resulting in small gains and a substantial net loss of €122 mln in 2020. In 2021 a new CEO took the helm of the parent company, selling off most foreign subsidiaries as part of de-risking objectives. The company has not exhibited substantial growth or healthy

Table 4.2 - List of key respondents

Key respondents	Code
All key respondents members of NL Div. Risk & Control Dept.	
Head of Dept. (HOD) Risk Lead - ERM specialist	Emp_A
Segment Risk Manager - PRM specialist	Emp_B
Segment Risk Manager - PRM specialist	Emp_C
Head of Dept. (HOD) Internal Control (IC) Lead - IC specialist	Emp_D
Segment Risk Manager - ERM specialist	Emp_E
Internal Control Manager	Emp_J

margins in recent years and has been struggling to stay profitable, which reflects an industry-wide trend in the same period. The annual report from 2021 describes three main themes in its strategic plan: focus on sustainability, profitable growth and continued de-risking. De-risking aims to improve the risk/reward profile of the company. Some specific applications of this concept are the move towards use of two-phase tenders and framework agreements as well as the limiting of lump-sum tenders to maximum €150 mln. The report further states that the risk management framework, stage gate process, risk profile and appetite and in-control statement are fundamental aspects of its ERM program.

Allocation of resources

The current operating model of the company is described in the document Operating Model, published in December 2021[D.02]. The top level of the company is structured as follows. Governance at the top level of the company is divided into supervisory, management and operational parts. At corporate level, the executive board is made up of two members, the CEO and CFO. They are also members of the executive committee which additionally includes the COOs of the two main divisions of the company and a Chief HR Officer. There are two national divisions: a Dutch division and a foreign division. The governance structure has three main layers: supervisory, management and operations. A risk and control committee is present at this level. Malik et al (2020) argued that an effective board-level risk committee is essential for successful ERM governance. Additionally, an audit committee is present, providing oversight. The corporate risk function was expanded and a divisional Risk & Control department was created in the Dutch division in 2022. This department falls under the umbrella of the department of Finance NL that in turn reports directly to the CFO. Previously, risk departments were located in the separate business units, reflecting a silo-based approach to risk management. See Figure 4.1 for an organizational diagram and Figure 4.2 for a timeline of events.

Risk-informed decision-making

How enterprise risks influence decision-making at board level is described in general terms the ERM policy document (D.05). There was however little evidence found of how this is done more specifically.

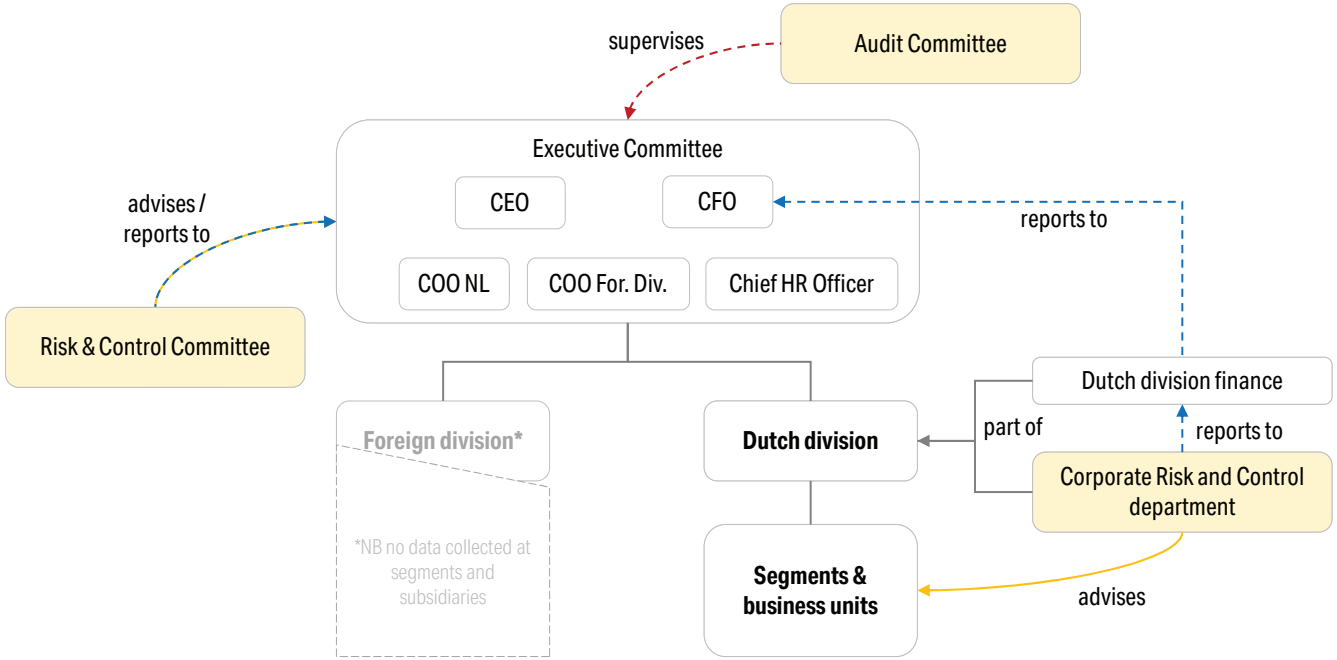

Figure 4.1 - High-level organizational diagram of construction organization

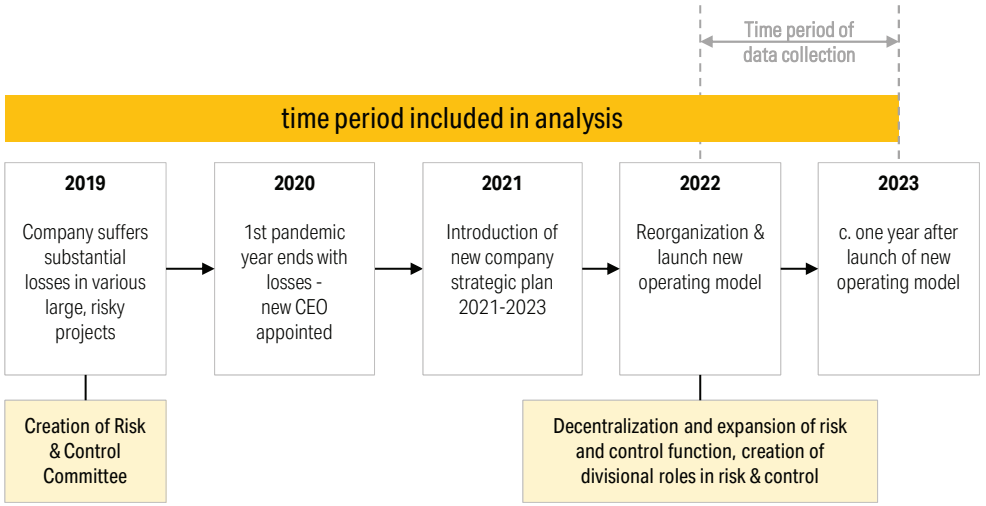

Figure 4.2 - Timeline of important events affecting ERM implementation

4.4. Formal ERM elements

In this section formal elements of ERM will be described. As ERM is still in the initial phases of design and implementation, the majority of data was found describing governance and context aspects. The other operational aspects have either been broadly described in formal documentation or are still being developed.

Governance and context

ERM is operationalized at the construction organization by considering its integration with three key areas: project risk management and internal control (IC) and knowledge sharing and training. The terrain of ERM is sub-divided into 17 risk domains. An updated Requirements Framework has been developed to further specify IC's role and relationship to ERM. In terms of the connection to project risk management there are existing risk management processes in place per business unit which are currently being analyzed by the newly formed corporate risk department. Currently, though there are some existing functional connections between them, the Heads of Department (HODs) of the newly formed Risk & Control department at corporate level, Emp_A and Emp_D, stated that there is a lack of synergy between these areas that is needed to achieve the company's objectives. A list of the most important risk areas was developed. This list was further developed into the seventeen key risk areas at the company, see Table 4.2.

In order to determine the optimal implementation of ERM at the company, or what Mikes and Kaplan (2009) call the 'ERM mix', Emp_A indicated that there are two central questions to structuring ERM activities: determining what decisions to make at the strategic level and determining what information is needed.
Currently, the Risk and Control department is in the process of determining what information at a 'granular' level is needed to make decisions at a strategic level.

ERM cycle

ERM cycle consists of enterprise risk identification, assessment and responses. The ERM cycle is described in a brief policy document outlining the general components of ERM at the company. It is a first version, high-level description without operational detail (D.05, Emp_A). The executive board of the company has defined

Table 4.3 - Formal ERM elements - Governance and context

	Formal ERM elements	**Data source(s)**
Governance and context		
Board risk oversight	The Supervisory Board (NL: Raad van Commissarissen) is responsible for oversight at corporate level. The board is supported by four committees: the Nomination Committee, Audit Committee, Health, Safety & Sustainability (HSS) Committee and the Remuneration Committee. The Audit Committee is responsible for supervising the quality of internal reporting and effectiveness of internal risk management and control systems on behalf of the Supervisory Board.	D.02
Establishment of operating structures	A Risk and Control Committee at corporate level supports the Executive Board in an advisory capacity on risk oversight with regard to Enterprise Risk Management. The R&C Committee does not have decision-making authority. Requirements Framework documents at three levels of the company (Corporate, Divisional and Business Unit) describe the operating structures of key domains, the associated key risks, control activities	D.02, D.04
Corporate risk function	In July 2022, a central risk department was created at Corporate level offering advice and support on RM matters to the organization. A Risk & Control committee at corporate level to advise the Executive Board on risk matters was created in 2019. Currently the most senior manager with decision-making power for risk management is the CFO.	D.02
Formal statement of risk appetite and tolerances	High-level risk appetite statements are described for the 17 identified ERM risk domains. No evidence of formalized risk tolerances was found in the documentation. A key informant indicated that the company is currently working on developing tolerances.	D.01, Emp_A

17 risk domains, corresponding to 4 main COSO (2004) risk catgegories. The Strategy category includes market, acquisition, change and innovation risk. The operational category includes health & safety, property development, project, supply chain, HR, IT, sustainability and business continuity risk. The financial category covers reporting and resilience. The compliance category includes regulatory and reputation risk. The level at which the policies for these risks are generally defined either at corporate level or divisional level. Emp_A indicated that the defined risk domains have all been assigned a domain owner who is responsible for that risk domain and shaping the way that domain is cascaded through the company or division. ERM is connected to the project risk level through two risk domains that focus on tendering and contract execution. Emp_E indicated that the design and operationalization of the ERM cycle is currently being worked on and discussions are currently taking place with key stakeholders.

Control activities
Internal control activites are laid out in the company requirements framework which was originally introduced a few years previously and is currently operational. The current version is now being updated (Emp_D). This process has a higher level of maturity as the framework was introduced a few years previously (Emp_D). The responsibility for risk management and internal control are equal but separate responsibilities within the corporate risk function and for this reason is called the Risk and Control function (Emp_A, Emp_D). There are two department heads, one is Head of Dept (HOD) for Risk and a HOD for Internal Control.

Monitoring
A dashboard had been developed for presenting overviews of risk information and facilitated in the monitoring of the status of risks, mitigation strategies and action plans (own observation). Further data was not collected on this subject.

Communication and consultation
The dashboard was therefore used as a tool to discuss and communicate the status of risk information during meetings (own observation). In the summer and fall of of 2022 the R&C team members were finishing up RM activities on projects related to their former roles at the Infra segment. After finishing these projects they shifted their focus from active management and advice in projects to a risk leadership role at segment level (Emp_A, Emp_B, Emp_C).

4.5. Risk rationalities

Arena et al. (2010) and Tekathen & Dechow (2013) posited that the rationalities driving ERM implementation are often located on a spectrum between compliance on one side (focus on compliance and reporting risks) and performance on the other (focus on all four ERM risk areas: strategic, operational, compliance and reporting). At the case organization, the more highly developed internal control function has a dominant role in ERM as is evidenced by the requirements framework (D.04) which has been in use for several years. The risk side of ERM that deals with uncertainty is currently under development according to the key respondents (Emp_A, Emp_E). This would suggest that the current ERM system design has a strong compliance focus. Evidence from the documentation strengthens this notion. According to the operating model (D.02) the HOD for Risk at divisional level reports to the finance department which is strongly control-focused. At a level higher, the ERM manager at group level reports to the divisional management team member responsible for Internal Control. This also suggests at that level a focus on control and compliance aspects in ERM.

4.6. Evidence of risk culture artefacts

There is currently no formalized document on risk culture at the company. Aspects related to risk culture can be found in other documents. The following general aspects of desired risk culture were found. Company's espoused mission, values and vision are expressed in the annual reports (D.01). Additionally, a recent internal survey was held on the top five shared values (D.09). Employees voted for the following values: Sustainable,

Inclusive, Trustworthy, Ownership, and Collaboration. These values were promoted in various other documents on the company intranet as a part of a campaign (D.13). Additionally, general desired behavior is described in a Code of Conduct which contains descriptions of expected employee behavior related to ethics and compliance (D.08). Key respondents indicated some patterns of behavior concerning risk management (Emp_A, Emp_B, Emp_C). They all stressed the importance of behavior and culture as the biggest factor in RM success or failure at the company.

- **Open, no-blame culture** The company promotes an open, speak-up culture in its Code of Conduct where ethical behavior is promoted and employees are encourage to share bad news. This is a general guidance, not specific to risk management practices. The defined company values as outlined above are stressed in this document and translated to practical applications.
- **Hiring and training** Key respondents indicated that risk competencies are improved through regular training sessions for risk professionals at the project level. There was no evidence of specific training or hiring requirements pertaining to ERM competencies in the documentation.
- **Incentive structures** There was no evidence found to confirm or refute the presence of rewards of incentives for good risk management behavior.
- **Accountability structures** High-level roles and responsibilities are described in the ERM policy document (D.05). The Executive Committee (ExCo) is responsible and accountable at the top level. The audit committee has a supervisory function. The Risk & Control function is responsible for developing and advising on ERM. The Risk& Control Committee monitors the effectiveness of the ERM framework and advises the ExCo. There are no policy documents outlining more specific accountability structures below this level.
- **Communication structures** Monitoring and communication of risk information is described in the ERM policy document. It describes a quarterly reporting cycle in which control incidents are reported and discussed. There is no documentation of communication between stakeholders that provide more details below this level.

4.7. Risk behavior

Key respondents indicated that RM maturity in the different segments of the division was greatly influenced by behaviors and cultural differences. Specifically that the civil engineering segment due to requirements of the public clients had a higher maturity and therefore risk awareness was higher in that segment than in the other segments where there was no external stimulas. There was no evidence found in the documentation specifically on risk behavior.

4.8. Uncertainty experts

The ERM policy document (D.05) describes roles in ERM for internal control managers, risk managers and auditors. Additionally, the divisional Risk & Control function reports to the divisional finance director therefore the finance function has a pivotal role in shaping ERM processes.

4.9. Key observations

Observations took place at four monthly formal R&C Team meetings between July and December 2022 and additionally during informal meetings at the company office as well as via Microsoft Teams. A first important observation was the interactions between R&C team members during team meetings. The risk side of the R&C team originated to a large extent at the Infra segment where they consulted almost exclusively on civil engineering projects. All key respondents indicated that the Infra segment is characterized by a high level of RM maturity compared to the other industrial segments of general construction, residential construction and specialized business units. Another observation was the general turbulent state in the first months after the creation of the new team. During the meetings, minutes were not recorded and participants took notes for themselves. One of the senior risk managers (Emp_C) stated that this was due to busy schedules and was presently not a priority. Another observation was the lack of clarity of roles among the risk managers in the fall of 2022. At the same time that ERM processes were

being developed, the functions of several risk managers within the team had changed from a project focus to a higher advisory level within the organization, now with the focus on all industrial sectors, not just the civil engineering sector. Another observation was that as ERM processes were being developed, these developments were unknown to most R&C team members not directly involved with it. As the R&C function is in fact an enterprise risk entity whereby all team members have some role, this was the source of much confusion in the months after the team had been formed. This appeared to be partly due to lack of guidance from top management which was evident in a meeting where the financial director was present in charge of the R&C team. During this meeting the R&C team displayed frustration at the lack of decisive action from top management concerning the positioning of the team within the division. The financial director spoke for some minutes outlining the issues that were currently being considered and the prioritization of these issues as it related to the risk and control function. It was however not clear what the exact prioritization was of the the issues discussed.

4.10. Chapter wrap-up

In this section, the research sub-question 2 will be answered based on the analysis of documentation, key respondents and own observations in this step of the research.

SQ2: How is the implementation of ERM represented in practice?

The data indicates that ERM at the construction company is in the early phases of implementation. The corporate Risk and Control function is in a state of flux where the ERM processes have only been recently been initiated. The ERM cycle is presented in a simple way, and centers around the 17 defined risk domains. Internal Control processes have a higher level of maturity as these processes have existed longer. Existing risk and control processes greatly influence the design of ERM processes according to the key respondents. No evidence was found in the documentation to indicate specific preferences for quantitative or qualitative approaches to handling risk at the ERM level. The key respondents indicated that risk practices in general in the construction industry have a low level of maturity and this is reflected at the company as well. They also indicated that negative attitudes at the operational level towards risk management are another barrier as well as the preference of managers and project professionals for decision-making based on professional judgment instead of on risk information. The respondents stressed that behavior and culture were important factors affecting RM maturity at a levels of the company.

Based on the results of this research step it was determined that the semi-structured interviews in the next step of the research should focus on the following aspects:

- Due to the limited documentation concerning both ERM and PRM practices, interviewees were asked to provide process descriptions, and to describe roles and responsibilities.
- As the literature review indicated that the expertise of uncertainty experts is a determining factor in ERM system design, this should receive attention in the interviews
- As project risk is a big part of ERM, the connection of PRM to ERM was another important topic to discuss in the interviews
- Behavior and culture were indicated by the key respondents as being the most important to RM success, therefore these aspects were considered a critical part of the next step.

chapter 5:

A structuration perspective on ERM implementation

Structure of this chapter

5. A structuration perspective on ERM implementation

5.1. Chapter setup

Based on the results of the first two steps of the research which included the literature review, (sub-question 1, SQ1) and document study (SQ2), a number of key themes were extracted which formed the basis of the next research step with the aim of answering research SQ3. In this step, semi-structured interviews were conducted with practitioners within the construction organization. The aim of this step was to answer the third research question as stated below:

SQ3: What challenges and drivers can be identified in the implementation of ERM at a construction company?

5.2. Data sources and data collection methods

5.2.1. Choice of respondents

Based on the previous research steps, it was determined that managers from different functional backgrounds or expertises involved in ERM design and implementation should be approached to gain a full picture of ERM implementation. The expertises were general management (3 respondents), finance/accounting/business control (3 respondents), risk management (2 respondents in PRM, 2 respondents in ERM), and internal control/audit (4 respondents). Additionally, managers from different organizational levels were approached to understand how ERM implementation is experienced throughout the organization. The respondents names were coded for privacy reasons with the use of the prefix Emp_ followed by a capital letter. In addition, two extra criteria were used: Firstly that all four industry sector segments within the Dutch division should be represented and secondly that at least 2 respondents representing the foreign division would be included. For an overview of the respondents, see figure 5.1.

5.2.2. Interview themes

The results of the previous research step described in Chapter 4 indicated that ERM implementation is in a very early phase at the construction company. Many aspects of ERM are currently 'under construction' and were to some degree subject to changes during the period of data collection. For this reason, the following broad themes were defined to structure the interview questions, see Appendix B for the interview guide and Appendix C for interview transcripts:

- Personal background, education, work experience
- Expertise, roles and responsibilities
- Execution of ERM and other RM processes
- Interactions between RM at corporate, segment, subsidiary and project levels
- Influence of behavior and culture in risk management practices

5.2.3. Conducting the interviews and data analysis

Fourteen interviews took place in May 2023, which had average durations between 30 – 80 minutes. The average interview duration was one hour. Seven were conducted live at the company offices, and seven were conducted online via Microsoft Teams. All interviews were recorded

and transcribed via Microsoft Teams (both live and online). The transcripts were then edited for clarity and summarized, taking care to retain the original meanings of the texts. The respondents were then sent the transcripts for approval of the summaries. Requests for small textual changes in meaning and/or language use were submitted by two respondents. The corresponding summaries were edited based on these requests and resubmitted for approval. The summaries were then uploaded to Atlas.ti and coded. The texts were scanned for concepts appearing in the conceptual framework which includes aspects of ERM theory and Structuration theory. Additionally, emerging concepts were identified and coded. After the first round of coding, the codes were grouped into categories. The last analytical step involved the identification of dominant themes. Structuration themes were leading in structuring the data in the final step in order to facilitate the analysis in the next phase of the process.

5.3. Results

In this section the results will be summarized.

5.3.1. Context

Influencing factors and general goals for ERM

In 2019 the company was dealing with big issues. A number of big, high-risk projects had run into problems (3 resp) which due to their outsized influence on the total company portfolio, led to substantial losses, threatening the company's existence (4 resp total). This was the most signicant driver cited. Related to this are the organizational goals for ERM. The most responses in this category came from respondents at group/div level. The responses reflected general ideas about ERM. Improved monitoring of portfolio effects of organizational risks was the most mentioned goal (8 resp). An improved connection between PRM and ERM and the desire for improving RM maturity were the second most cited goals (7 resp for both). Other cited goals are ERM as a means to execute strategy (3 resp), and the need to satisfy compliance requirements (2 resp).

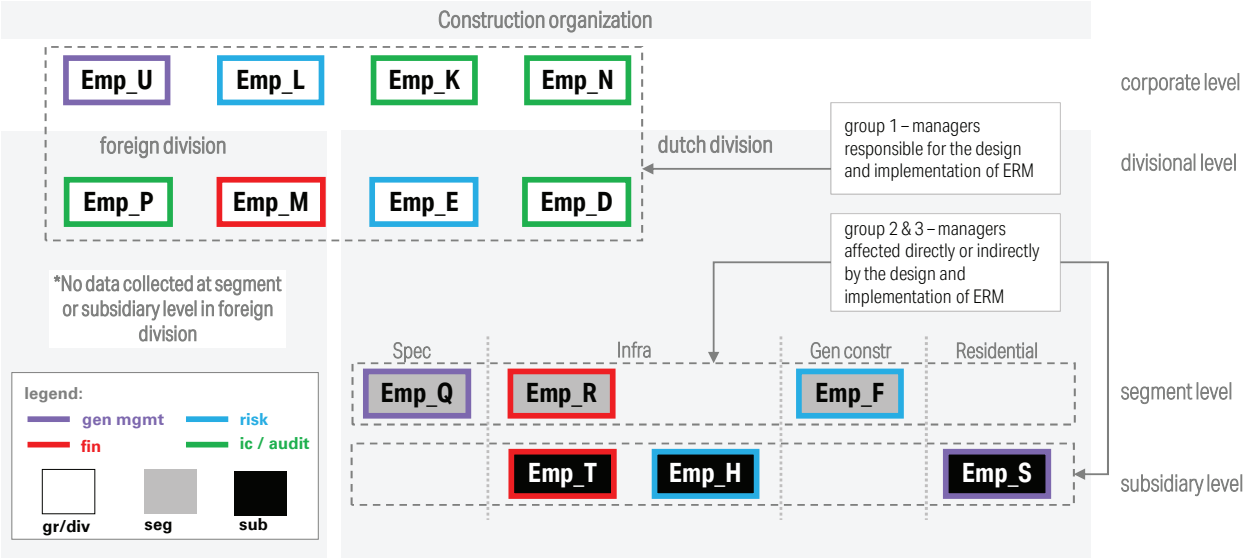

Figure 5.1 - Respondents according to expertise and position in hierarchy

Table 5.1 - List of respondents

	respondent	job function	Hierarchical level	National division	Functional area	years work experience	years at company
1	Emp_U	member of executive committee	group / div	group / NL div	Gen. mgmt.	25-30	25-30
2	Emp_M	high-level executive Finance	group / div	foreign div	Finance	25-30	25-30
3	Emp_N	high-level executive Audit	group / div	-	IC / audit	30-35	0-5
4	Emp_K	high-level executive Internal Control	group / div	-	IC / audit	25-30	0-5
5	Emp_L	Group ERM manager	group / div	-	Risk mgmt.	20-25	0-5
6	Emp_D	Divisional Risk & IC manager	group / div	foreign div	IC / audit	15-20	0-5
7	Emp_P	Divisional Internal Control manager	group / div	NL div	IC / audit	10-15	0-5
8	Emp_E	Divisional ERM manager	group / div	NL div	Risk mgmt.	10-15	0-5
9	Emp_Q	Managing director of specialties segment	segment	NL div	Gen. mgmt.	25-30	25-30
10	Emp_R	Financial director of infra segment	segment	NL div	Finance	25-30	10-15
11	Emp_F	Segment risk manager	segment	NL div	Risk mgmt.	25-30	0-5
12	Emp_S	Branch director of residential subsidiary	subsidiary	NL div	Gen. mgmt.	30-35	30-35
13	Emp_T	Manager business control of infra subsidiary	subsidiary	NL div	Finance	25-30	25-30
14	Emp_H	Subsidiary risk manager	subsidiary	NL div	Risk mgmt.	0-5	0-5

5.3.2. Formal ERM artefacts

Knowledge and organizational learning

In terms of knowledge, expertise and lessons learned, there was a divide between respondents at group level and at the operational levels below. For respondents closer to operations and the projects, aspects related to knowledge management were discussed. They stressed the importance of experience and knowledge gained on previous projects or in other previous work-related situations in new situations (8 resp) and most related this to the recording of lessons learned at project close and/or the general importance of reliable data and tooling (6/8 resp).Respondents responsible for ERM system design and/or the top excutives interviewed discussed learning in terms of monitoring and improvement of ERM processes and how this related to judgments concerning risk profiles. In general, many respondents further noted in this context the slow rate of change within the organization and the low adaptability and learning capacity (7 resp). A small group noted that collaboration and knowledge sharing has improved to some degree but needs to improve more (3 resp). Three respondents responded that they had collected their know-how through the years in their 'bag of knowledge' (Dutch: 'rugzakje') and used it as needed.

Connecting ERM and PRM through cascading risks

The general consensus is that ERM risks are currently cascaded down to the operational and project layer through communication and dialogue rather than through indicators and tolerances which are currently under development, with the exception of some risk domains such asf safety where processes are more regulated. One example is the screening of projects at the front-end to deterrmine if they fit the portfolio risk profile or not. If the project is deemed too risky based on the defined thesholds then the project is rejected (R, T). Another connection can be seen when an incident or a number of incidents occur within a certain risk domain such as for example supply chain. The incident(s) trigger a dialogue and an examination of whether the incident(s) are structural or incidental. If the former is the case, this determination at project level can change the entire risk profile at ERM level (L). Another example is the launch of internal organizational projects to mitigate risks identified at enterprise level such as reputation risk (D). Two specific ERM risk domains are linked to the projects (E, N) which is currently the most direct link between ERM and PRM . A number of respondents did not believe that this connection existed yet or were not aware of it (4 resp).

ERM challenges

The challenges mentioned were divided into four themes:

- **ERM execution** - The most important challenge in current ERM processes named by respondents (8 resp) is the need for better vertical alignment between project risk management and ERM and the need to embed ERM processes deeper in the organization. Risk management processes in general are not well executed (6 resp). Process and project complexity is another significant challenge (6 resp). Time, margin and transition pressure were named as another challenge (6 resp). Risk identification is a barrier according to 4 respondents. Contract management should be improved (3 resp).
- **Balancing conflicting objectives -** Need for increased objectivity in processes was mentioned by 9 respondents. Only the subsidiary level is not represented. Conflicting objectives and values and the resulting prioritization was named by 6 respondents. This relates to challenges due to differing ideas on the allocation of resources for ERM as there are differing views on the added value of it (5 resp). Need for better integration with the internal control framework was another challenge. This was mostly a view of IC/audit and risk and only at the top level of the company. Determining the right pace for the ERM change initiatives was also mention by three respondents.
- **Heterogeneity of organization -** Issues related to the heterogeneity of the organization were mentioned mostly by the top hierarchical level. Of this theme, lack of role clarity and difficulties related to the differing contexts of the defined ERM risk domains was mentioned most often (5 resp). This is reflected in stark differences in RM maturity per segment (5 resp). In terms of aggregation of risk, this aspect also makes creating a consolidated picture of the organization very difficult (4 resp). Lastly, different approaches to risk and choices regarding risk tools was mentioned by 2 respondents.

Table 5.2 - Code totals for respondents' views on organizational goals.

Code	Sum of Totals (count)	Sum of Totals (sum)
goal - improved monitoring of portfolio effects	8	11
improve connection of RM and ERM	7	8
improve maturity of RM and ERM	7	9
ERM is a means to execute strategy	3	3
It's a must, a regulatory requirement	2	2
Total	**27**	**33**

Figure 5.2 - Respondents views on organizational goals

Table 5.3 - Code totals for respondents' views on added value of ERM

Code	Sum of Totals (count)	Sum of Totals (sum)
^Improved behavior and culture	13	26
^Improved business performance	8	13
^Improved governance	7	11
^Improved ability to provide assurance and accountability	4	5
Total	**32**	**55**

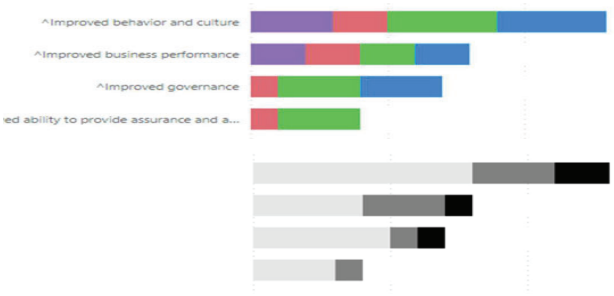

Figure 5.3 - Respondents views on added value of ERM

5.3.3. Risk rationalities

The added value of ERM

Respondents had a wide variety of views on the added value of ERM which fell into 4 main themes. Improved behavior and culture was seen as the most important benefit of ERM (13 resp total). Increased awareness of RM as a daily part of work was the most cited benefit, followed by moving from reactive to proactive RM and the creation of more common risk language. Improved business performance was the second most cited theme (8 resp total). This included improved decision-making, financial performance, better insight into market changes leading to improved business stability and more predictable results. Improved governance was another benefit where collaboration and communication between stakeholders is positively influenced, as well insight into risks and controls within the organization, increased clarity on organizational norms and standards and increased role clarity. Lastly, the ability to provide assurance and accountability to internal and external stakeholders was cited (4 resp total) including improved safety performance and increased shareholder confidence.

Role of RM in construction processes

Some mentioned that construction projects are inherently risky (5 resp) and the importance of stressing not just threats but opportunities as well (5 resp). Three respondents stated that RM is in fact information provision, all of whom were risk managers.

Maturity aspects

A large number of participants stressed that good RM practices are important (9 resp). This is related to RM maturity which differs per segment, affecting the quality of RM processes. Though maturity has improved in some segments, it needs to improve more across the board (8 resp). One respondent stated that the maturity of RM processes were satisfactory. This was an interviewee from the Infra segment which has the highest RM maturity of all the segments. In contrast, one respondent described the construction segment as having low maturity at all levels including site, branch and management level.

5.3.4. Risk culture artefacts and risk behavior

Communication between stakeholders concerning ERM

The way dialogues concerning ERM take place between stakeholders was known by seven respondents, all of which were located at group/div level except for one. IC/audit was the functional group with the most knowledge on communication structures surrounding ERM (4/7). A small group at group/div level indicated that they thought that communication on ERM was good (3 resp). A mixed functional group from all hierarchical levels believe that communication on ERM is not optimal (4 resp). Lower in the organization, ERM communication structures were unknown (4 resp).

Leadership styles

In terms of leadership styles in general, 7/14 respondents indicated that new leadership styles are needed which are more open, less judgmental and whereby leaders set the right example. All functional groups were represented. An emerging theme was the idea that 'the top' means different different things to people within the organization (F, R, T)

Opinions on behavior and culture

A majority observed recent changes in organizational culture and felt it is improving (8 resp). Another expressed sentiment was the fact that behavior and culture affect RM practices but RM practices also affect behavior and culture (6 resp). Other opinions on this subject include the idea that desired risk culture is clearly communicated (3 resp), the perception in the own work environment that there is a positive, open-door policy for discussing risks (2 resp) and that the actual risk culture is not always good (2 resp). Lastly, one respondent in one of Infra subsidiaries stated that risk management competencies in the own work environment were sufficient.

Figure 5.4 - Respondents views on recent developments

Table 5.4 - Code totals for respondents' views on recent developments

Code	Sum of Totals (count)
the organization is in transition, changing way of working	6
emerging challenge: different risks arise when working on standardized concepts	3
shift to more standardization, industrialization and modular construction	3
stricter internal tender criteria, future projects must be financially sound	3
de-risking and divestment	2
new operating model	1
new top leadership	1
no more lump-sum projects larger than 150 mln	1
Risk and Control Committee created in 2019, advises ExCo	1
Total	**21**

Behavioral and cultural challenges:
The lack of an open culture where mistakes can be made is seen as a major barrier (9 resp). All functional groups except finance were represented and all hierarchical layers are represented. Half of respondents (7) stated that competencies in RM are insufficient. All functional groups are represented. All hierarchical layers are represented though the majority are at group/div level (6/8). There are many different subcultures within the company (6 resp). All functional groups and hierarchical levels are represented. 6 respondents indicated that resistance to change is a major barrier. Finance and segment level are not represented. Braindrain, understaffing and personnel changes were named by 5 respondents. All functional groups except IC&A and all hierarchical levels are represented. There is a lack of embedding of organizational values (5 resp). Gen mgtm and segment are not represented. Further, RM being seen as a compliance activity (4 resp), people not reporting bad news (4 resp), lack of incentives for rewarding good RM behavior (3 resp) and the presence of the 'fire fighters mentality' (3 resp) were mentioned as cultural challenges to RM.

5.3.5. Tone at the Top

Recent developments
A number of significant changes were implemented at the company in recent years. Due to the substantial losses in 2019, a Risk and Control Committee was created to advise the board on enterprise risk matters. In 2020 a new CEO was appointed, top leadership was changed and a new strategy was introduced that would take effect in 2021 and run through to the end of 2023. A part of the strategy involved a reorganization of the company, which was presented in a target operating model. De-risking and divestment was an important part of the new strategy and limiting lump-sum projects to a maximum of 150 million euro. Other changes related to a stricter focus on risk are the move to stricter internal tender criteria where projects had to be financially sound (3 resp) and a shift to more modular construction (3 resp). As a result of these shifts in focus, it was observed that different risks emerged due to working with standardized concepts (3 resp).

Risk leadership of top management and ERM objectives
In terms of clarity of goals, responses fell into two distinct groups. Five respondents indicated that the company's objectives concerning ERM are unclear. Of these, gen mgmt., IC&A and risk were represented at three levels of the company with the exception of finance. Half of respondents indicated that the ERM goals are clear (7 resp). Of these, finance, IC&A and risk are represented, with the exception of respondents from gen mgmt. 5 respondents indicated that risk leadership at the top has improved but should still improve more. Of these, all functional groups were represented, with the exception of finance. Only the top and segment levels were represented, with the majority of respondents (4 resp) at group/div level.

ERM achievements
ERM achievements include the creation of a central corporate risk function (11 resp), the introduction and/or improvement of risk tools (10 resp), the definition of risk appetites (8 resp), the increased input of divisions and segments in ERM processes and successful efforts to make RM processes 'SMART'er.

Effects of recent changes due to new strategy
Most responses in this category were about the ways this new focus has impacted the way projects are run as the transition to greater risk awareness is changing the way of working (6 resp). In terms of this change, respondents had a number of general views. A positive change is the fact that RM procedures used to be one-size-fits-all but are now more tailored to the specific characteristics of the project (4 resp). Others pointed out that in the 'old' way of working, RM was executed in a reactive way whereas in the new way of working a pro-active attitude is required (4 resp). Another positive change mentioned is the steady improvement and formalization of RM processes (3 resp) where designing and implementing new ERM processes is 'a journey of discovery' (3 resp).

5.3.6. Uncertainty experts

Demonstrated knowledge of ERM and other levels of risk management
Respondents were asked to describe the ERM and/or RM cycle or process that they deal with in their work. They were offered the option to describe characteristics of either one or both levels of risk management.

- **Knowledge of ERM** - The most heard response was a general description of ERM as all-encompassing, top-down risk management (10 resp). This level of understanding was evenly distributed over functional groups and hierarchical levels. In terms of more specific aspects of ERM, only the respondents at group/divisional level offered more detailed aspects of ERM such as ERM comprised of the 17 risk domains (7 resp), the ERM quarterly reporting cycle (4 resp) and regular monitoring of residual risk set against the risk appetite (4 resp). Lastly, the fact that ERM is generally less developed at construction companies was mentioned by two respondents.
- **Knowledge of PRM** - Most respondents named the general characteristics of PRM as some combination of the following: bottom-up, focus on procedures and processes, project-specific and part of ERM (9 resp). Other responses included RM as a part of the Plan-Do-Check-Act cycle (4 resp), the position of RM in the stage gate processes and project execution (4 resp), and the importance of RM as a team effort (2 resp). Other aspects discussed are the effect of RM requirements by clients as a driver of RM maturity (2 resp), and the observations that the PRM is clearly described (2 resp) and that in general, PRM is more advanced than ERM (2 resp).
- **Knowledge of portfolio risk management** - An emerging category was knowledge of portfolio risk management. This is not a formal risk management process at the company however it takes place at muliple operational management levels of the company. General managers and finance managers at the segment and subsidiary levels discussed aspects of portfolio management in relation to risk, corresponding to concepts from portfolio RM (4 resp). The respondents discussed balancing risk and return aspects in the project portfolios as well as specific aspects in relation to this such as project staffing and the distribution of work amongst subcontractors.

Preparedness for role in ERM
Seven respondents indicated that they are ready for their role in ERM. In general, respondents from IC/audit discussed reporting and compliance aspects and how ERM relates to the internal control requirements framework, were satisfied with their level of ERM knowledge and felt ready for their role (3 resp). Two finance specialists, one general manager and the ERM specialist most closely involved with the current ERM system design expressed 'yes' without further explanation (4 resp total). Three respondents indicated they were either working on improving competencies or hampered by a lack of information or guidance on their role in ERM. Of these, an ERM specialist stated that they had the necessary ERM competencies but felt impaired by the lack of guidance and feedback from top management in order to be able to effectively make progress in shaping ERM processes. A segment risk specialist, previously project risk specialist, indicated that they were currently working on their ERM competencies through higher education courses. A subsidiary risk specialist indicated that due to the current state of development within the corporate risk function, it was as yet unclear to them what their role in ERM was and was therefore not currently ready for that role. Two respondents from the subsidiary level indicated that they were ready for their current roles in terms of risk management but as of yet did not have any specific role in ERM processes.

5.4. Structuration analysis

The structuration analysis is based on the steps described in section 2.5.2 of this report. The chronological narrative of the case can be found in Chapter 4, where the analytical time frame has been defined. In the previous section, the results of the coding of the data have been presented. In this section the last two steps of the structuration analysis will be presented which are as follows:

- Definition of action and institutional realms

- A description of the ways top managers' actions influence existing organizational structures and the ways these structures endure or are changed through time.

5.4.1. Action realm

Seen through an ST lens, ERM implementation in the action realm includes three types of agency: the actions of top management, the actions of uncertainty experts and the risk behavior of practitioners within the organization.

Tone at the top

In terms of top management's actions through time shaping ERM processes, a number of critical actions have been extracted from the data.

- creation of Risk & Control Committee in 2019
- appointment of a new CEO in 2020
- introduction of a new organizational structure in 2021
- introduction of new strategy for de-risking in 2021
- creation of divisional Risk & Control department in 2022

Influence of uncertainty experts

The uncertainty experts responsible for shaping ERM belong to 4 different main functional categories, namely RM, IC, finance and audit. All respondents at group and divisional level had roles and responsibilities in shaping and evaluating ERM processes (8 resp). The managers at the segment level offer input and form the link to the operational level of the company for further embedding of ERM. Their roles are currently being developed. At the subsidiary level respondents had no role in shaping ERM processes however the subsidiary risk manager interviewed at this level will have a role in embedding ERM into the subsidiaries in the future. Agency in practice is complicated, especially at higher managerial levels. The effects of actions are not easily analyzed due to complex webs of responsibilities and decision-making power. The managers who were interviewed had different roles in ERM implementation. All at group/divisional level were active participants in ERM processes and were in some way involved in the production, analysis, monitoring and communication of enterprise risk information. It was clear that open discussion was an important part of designing and implementing ERM processes. Ultimately, the management teams at the different levels of the company have decision-making power, however they rely heavily on information, advice and expert judgment from others in order to do this.

Risk behavior

Construction companies have historically always dealt with risky projects due to their unique nature and for years, risk management was given little attention when it was not required by external stakeholders. In the period before the financial crises of 2007, profit margins were high enough to cover many project blunders and the call for a professionalization of risk management only came later, when in the years following the crisis uncertainty and complexity increased in rapid tempo, both of which are drivers for risk, and profit margins decreased substantially as a result. However, the rising need for preventing instead of solving problems after the fact would have to overcome deeply entrenched ideas about what it is to procure and execute a project and what it means to work in construction. To a lot of construction professionals, spending too much time thinking about and discussing what can go wrong in a project is the very opposite of why they entered the business. They are often highly-movitated, can-do professionals who work best with a minimum of what they consider micro-managing and meddling from outside the project team. They don't see the point in spending time trying to predict what will happen when you could spend your time more efficiently just getting on with it.

5.4.2. Duality of structure - how the agency of the defined actor groups relate to the institutional realm

ST structures are made up of rules and resources. Rules translate to meanings (signification) and norms (legitimation). Resources can be both authoritative and allocative (domination). Seen through a ST lens, ERM implemnentation in the institutional realm can be conceptualized as follows.

INTERACTION	communication	power	sanction
(MODALITY)	interpretive scheme	facility	norm
STRUCTURE	signification	domination	legitimation

Figure 5.5 - duality of structure matrix (Giddens, 1984)

- Signification structures are structures of **meaning**: ERM implementation is based on **interpretive schemes** which practitioners use to design processes and procedures, interpret risk information, choose risk tools and make plans,
- Legitimation structures: ERM implementation is based on **norms** that reflect the values and beliefs of the organization and prescribe what is acceptable and what is not, and
- Domination structures: ERM implementation is enabled by **allocative** or **authoritative resources** that are put in place by managers that offer practitioners structure while exercising control over their activities.

Structures of meaning - Signification

A major factor influencing ERM implementation is the current meaning or significance ascribed to risk management in general in all operational levels of the company. In terms of organizational ideas of what RM symbolizes, risk management practices are not highly esteemed in general as is indicated by the current undesirable risk behaviors. RM is generally viewed as something extra, instead of something integral. This is an idea that top management wishes to change. This persistent organizational bias has a number of causes. RM competencies are generally insufficient. Projects are traditionally judged based on the iron triangle of cost, time and quality and understanding how sustainability goals fit into this requires a more nuanced view of project success. The personal motivations for choosing a career in construction, combined with the personality traits often associated with successful project management is another cause of bias against RM.

Risk rationalities are strongly related to signification structures as they are described by Arena et al. (2010) as representing interpretive schemes. At the case organization, there is a strong control focus in ERM practices. The original ERM system design was operationalized soley at the corporate level where mainly compliance and reporting risks were managed. Expanding ERM into lower hierarchical layers is also strongly control-focused and as the organization has low RM maturities in many sectors, spending time on improving the execution of known processes is given priority over the more ad-hoc and unpredictable nature of developing new processes dealing with uncertainties on the risk management side. This is also related to the focus on short-term objectives and prevalent use of professional judgement in decision-making as opposed to basing risk decisions based on the risk register.

Allocative and authoritative resources - Domination

Important allocative resources provided by top management were the creation of the risk committee in 2019 and the creation of a central risk and control function in 2022. The risk and control function does not have authoritative power as it is an advisory group. This means that the group must rely on approval from top management in decisions concerning the design and development of ERM processes. Authoritative resources can be seen as the formal or informal power of individuals to influence processes and or people. The attitudes and actions of middle managers leading to situations whereby RM is not prioritized in terms of the allocation of personnel to aid in the shaping of process is an example of how such power can be used to resist the call for change to proactive RM. Within the subculture of the group or collective, reigning norms and lack of sanctions have made this behavior possible in the past, however, due to the introduction of stricter performance requirements, the norms have changed and this has positively affected behavior. Another factor emerging from the data affecting this is the lack of necessary knowledge in order to be able to efficiently and effectively embed ERM in the lower organizational levels.

Domination structures refer to power relations. To better understand the responses of respondents in relation to ERM implementation, a power and interest grid was created demonstrating respondents' relationship to ERM implementation based on their described roles and responsibilities, see Figure 5.6. This analysis showed that the group with the greatest power and interest are the managers at the top of the company who have the greatest influence on decision-making. Members of the Risk & Control Team who are represented at all hierarchical levels make up the group with high interest but low power due to their advisory role. Another group with high power but low interest in ERM are the managers at segment level who have a greater focus and interest on portfolio and project risk management in their respective segments. The group characterized by low power and low interest in ERM implementation is made up of the two managers at subsidiary level who are similarly more focussed on portfolio and project risk management and have no direct role in ERM processes. This analysis serves to show that managers at lower hierarchi-

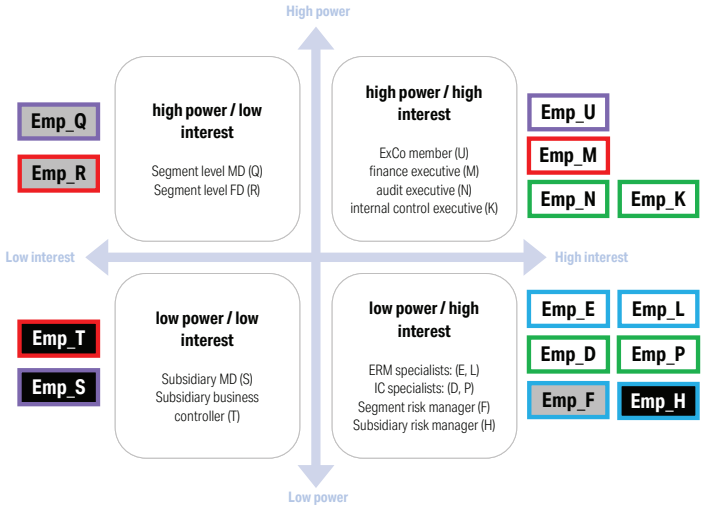

Figure 5.6 - Power-interest grid of respondents in relation to ERM implementation

cial levels who form the link with layers beneath them play a pivotal role in the development of ERM processes. Lack of priority or attention to ERM by these managers leads to gaps in the vertical alignment of processes. As these managers have access to specialist knowledge in the support functions surrounding them that is needed to develop ERM further, they have substantial power when controlling these authoritative resources.

Structures of norms - Legitimation

Legitimation relates to social rules (Hsu et al., 2014). The norms and associated rules can be both formal and informal (Giddens, 1984). At the construction company, consensus and collaboration are a big part of governance structures, as opposed to more rule-based countries like the UK. This allows more leeway for personal interpretation of processes and procedures. In ST, this phenomenon is called 'the ability to do otherwise'. The ability within the organization to resist change to improve RM practices or to execute RM as one sees fit as long as the relevant subculture supports this without fear of reprisals is an example of this. In power relationships, actors with less power still often have a degree of freedom to act and influence decision-makers based on their knowledge and expertise. This is known in ST as the "dialectic of control", which describes the two-sided nature of power structures. Based on the data, this is an important mechanism influencing ERM implementation and RM processes in general. An example of this is wehen practitioners within the organization strategically use their expertise, knowledge of structures and information to exercise control over decision-makers.

The company is in the middle of a transition to increased standardization and industrialization in construction processes. This shift in focus is accompanied by the introduction of new types of risks and a stronger focus on process and product leadership. For this to occur, norms that currently reflect values associated with the production of unique one-off projects must shift towards values that support innovation and new product development.

Sanctions

Sanctions are closely related to structures of legitimation. The choice to conform to social rules and norms or not is often weighed against the sanctions imposed as a result of non-conformance. In terms of incentive structures, the results show little evidence of sanctions when risk management processes are not executed sufficiently and also no rewards. Aside from formal sanctions, social sanctions also can influence the way in which practitioners uphold reigning norms. The results show that the different subcultures within the company, depending on industry sector, often have a tolerance for insufficient RM practices showing that there is little social pressure from group members to manage risks proactively.

5.4.3. Key outcomes

The effects of managers' actions in the action realm combined with the structures identified in the institutional realm lead to outcomes. These outcomes are observable in ERM and RM practices. The choice to create a R&C committee and a R&C corporate function and the ensuing campaign to raise risk awareness can be seen both as a practical move to increase risk staffing at the top level of the company while at the same time symbolically lifting RM to a central position within the company, signifying its increased importance. In this way, the prevailing interpretive schemes, or rationalities, informing practitioners mindsets were influenced to hold RM in higher esteem. Formal and informal rules and norms related to risk practices are highly diverse and often geared towards short-term project objectives whereby there have traditionally been few sanctions for practitioners not conducting risk management sufficiently. There are currently no performance requirements for managers connected to risk management, and without possible sanctions, there are no real consequences when foreseeable problems occur. This lack of action by management has the effect of allowing practitioners to resist integrating RM into their work. This lack of sanctions can also be seen as a sign, negating the efforts to raise RM's profile throughout the company.

5.5. Chapter Wrap-up

Based on the results described in the previous sections, the research sub-question can now be answered:

SQ3: What challenges and drivers can be identified in the implementation of ERM at a construction company?

5.5.1. Challenges to ERM implementation

The challenges that were mentioned concerned the following themes: knowledge and competencies, implementation aspects, leadership styles and interactions between RM levels, and behavioral and cultural aspects. RM knowledge and competencies are insufficient in many parts of the company which is related to differing RM maturity levels per segment. Where competencies are sufficient, insufficient guidance from decision-makers or lack of necessary information from stakeholders hamper the further development of ERM processes. Implementation challenges include the need for better vertical alignment between ERM and other RM levels, the need for better execution of RM tasks, process complexity and uncertainty and pressures due to time and budget constraints. Leadership styles at all organizational levels should be improved where managers practice what they preach and set the good example. This proves difficult in practice and influences the interaction between RM levels within the company. In terms of behavior and culture, respondents indicated that a lack of an open, no-blame culture was a major barrier which prevented necessary dialogue on risk issues. The presence of various subcultures within the different functional groups and industrial segments with their own norms, beliefs and ways of working was another factor that hampers integral RM processes. Additionally, when risk management activities are not considered meaningful, RM practices are often treated as a tick-the-box or compliance exercises.

5.5.2. ERM Drivers

The respondents named many recent developments and initiatives that are currently underway that are supporting ERM implementation and geared towards improving risk culture. Top management has demonstrated commitment to RM objectives through allocation of the necessary risk resources, including the creation of a risk and control committee with a board-level supervisory role and the expansion of the corporate and divisional risk and control functions for supporting and advising the segments and subsidiaries. Furthermore, ERM has been operationalized in 17 risk domains with associated risk appetites and risk domain owners have been assigned. Dialogue and discussions are taking place between corporate/divisional level and the operational level to further develop the connections between the risk management hierarchical layers, which did not occur before the introduction of the new operating model in 2022. This is considered an important element for determining the proper scope of ERM activities at the company. The company strategy 2021-2023 specifically focussed on de-risking, the effects of which are felt throughout the organization due to the company policy where bids are no longer placed on lump-sum projects above 150 million euro and the introduction of stricter project selection and bidding criteria. Other drivers are the general perceptions amongst practitioners of the advantages of ERM: that is improves behavior and culture, performance and predictability, governance and transparency for stakeholders.

5.5.3. Resulting key themes related to current ERM implementation

Based on the previous sections, two dominant streams have been identified that are most relevant to the current phase of implementation at the case organization: the need for improved risk behavior and culture in all levels of the company in ERM and RM and additionallu the generation of organizational knowledge to aid in the efficient and effective development and alignment of ERM processes within the organization layers. Based on the theory, the first stream can be adequately improved through soft management controls. For the second stream, five aspects were identified that the organization must find answers for in order to craft ERM processes at the case organization in the current stage of implementation. These aspects were then used as the basis for five statements to be validated and discussed during an expert session which will be discussed in the next chapter.

- **Allocation of resources -** The results show that the company has allocated resources at group and divisional level to facilitate ERM. The composition and scope of risk resources at the different levels of the company will have considerable influence on further development of ERM.
- **Scope and visibility of ERM -** ERM is mainly a top-down management system and to be successful must be embedded in existing processes. Respondents stressed the high-pressure aspect of operational and project environments where RM is but one of many tasks that is part of the daily work. Therefore care must be taken in finding balance in the way in which ERM is introduced and incorporated into these environments and the extent to which project professionals are active participants in ERM.
- **The degree of prioritization of ERM implementation by top management -** The company strategy states that de-risking is a key company objective and much must be done to attain the sustainability goals the company has set for itself. The results show however that the development of ERM as a driver in accelerating this process is currently limited. This relates to the prioritization of objectives by top management where enterprise-wide risk management appears to lack the necessary urgency.
- **The role of ERM in translating organizational strategy to the operational and the project level -** The academic literature and a majority of respondents expressed the view that ERM is an important means for translating strategy to the organization and the projects. However the case organization currently has communicated little about ERM to the organization at large with the exception of a short policy document which is largely due to the initial exploratory phase of ERM implementation. However, how communication channels are set up and maintained contribute to the meaning and importance given to ERM by practitioners and has a great impact on dialogue and further development of ERM.
- **The degree to which ERM and RM should be distinct from other management processes -** The data showed that in keeping with other project-based companies, practice is characterized by focus on short-term goals, the presence of cross-functional work groups, and ingrained existing local work practices. As a result, introducing ERM or improving RM processes must take place in a hectic, high-pressure work environment. For this reason supporting processes are often pared down, simplified and at times 'dumbed down' to demonstrate practical applications and convince practitioners of their usefulness. In this process the essence of ERM and RM can get reduced or lost.

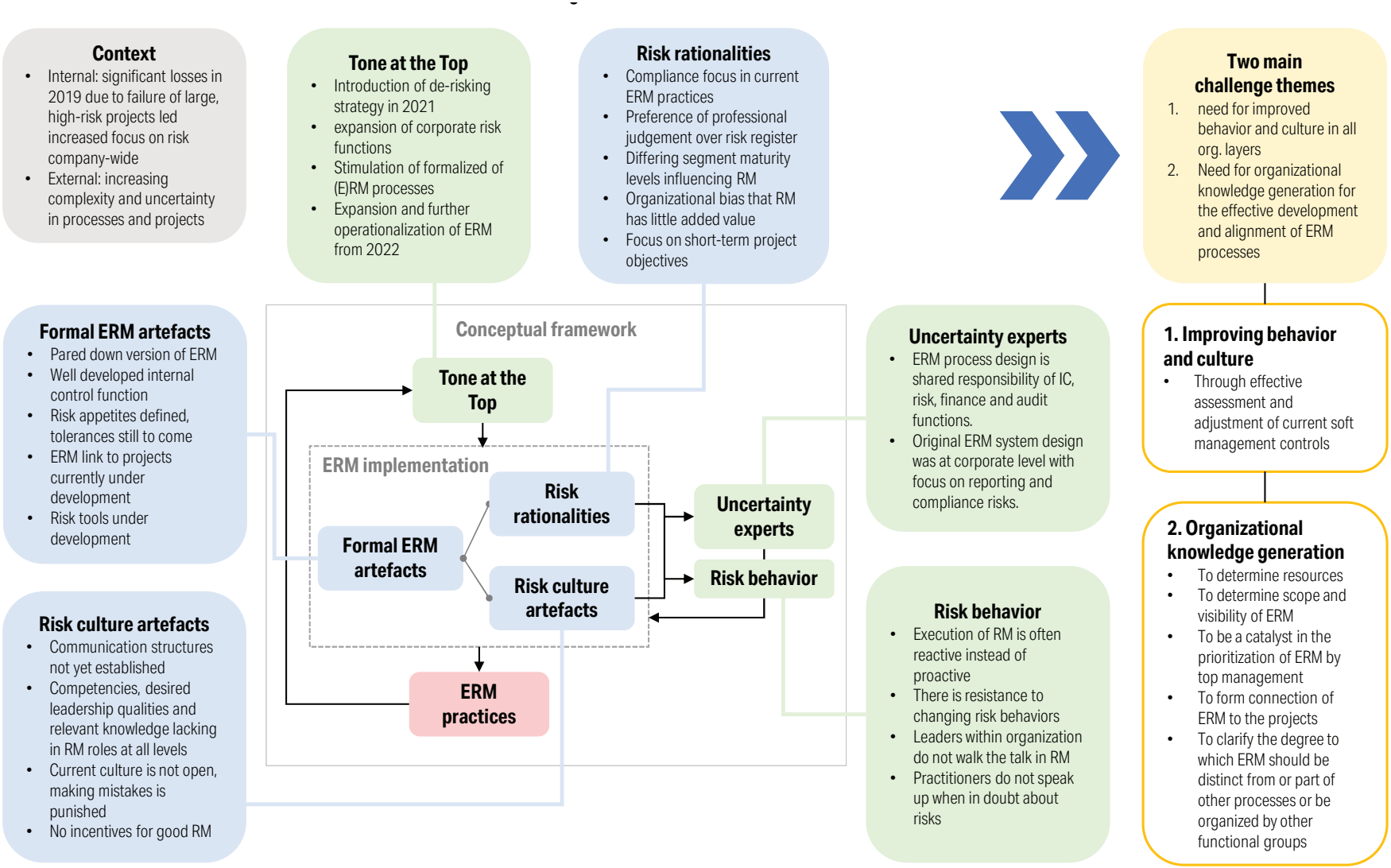

Figure 5.7 - Linking results to theoretical framework

chapter 6:

Expert session

Structure of this chapter

6. Expert session

6.1. Chapter setup

After the first three steps of the research, which focus on understanding how ERM is implemented at a construction company in theory (sub-question 1 or SQ1), in practice (SQ2) and the effects of influencing factors and their associated restraints and possibilities (SQ3), this final step of the research uses the knowledge gained in the previous steps to answer the last sub-question, as stated below:

SQ4: How can contextual factors at a construction company be used to shape an ERM implementation that is fit-for-purpose?

In the context of this research step, expert knowledge is utilized with the aim of testing and confirming an artefact, in this case a number of statements developed by the researcher based on the previous steps of the research. A literature search revealed that there are many terms used to describe such a process related to expert evaluation used in qualitative research. For instance, Tremblay et al (2010) made use of focus groups, of which they posit there are two main kinds: exploratory focus groups and confirmatory focus groups. The previous serves to hone and shape an artifact while the latter serves to evaluate it. These correspond to the summative and formative evaluations described by Venable et al (2016) who wrote more broadly about the importance of evaluation of artefacts as a means for further development in the context of design science research (DSR), stating that the aims of DSR are two-fold: to determine the practical usefulness of an artifact in the setting for which it was developed, as well as to test its veracity and validity as an addition to the greater body of knowledge on the subject. Similar processes found in the literature describe the utilization of key agents as opposed to experts, in problem-centered expert interviews (Döringer, 2020), as a means of laying bear implicit knowledge. Similarly, expert panels were used by Galliers & Huang (2012) where a group of leading experts was convened to further develop and validate knowledge and insights into improving the use of qualitative methods for information systems research. For this study, the expert session procedure will mostly closely follow the model of the confirmatory focus group (Tremblay et al, 2010), or the formative evaluation (Venable et al, 2016).

6.2. Expert panel setup

Based on the conclusions of the previous chapters, five statements were developed to present to a panel of 3-4 practitioners working at the construction company in order to initiate a discussion on the ways in which ERM can be implemented and operationalized within the company. An important pre-requisite for the panel was the inclusion of at least one expert with expertise in project risk management and at least one expert with expertise in ERM. Due to scheduling constraints, the panel ultimately consisted of two experts representing the two fields of expertise. See table (6.X) for an overview of the panel members.

Table 6.1 - Description of expert panel participants

Background panel members	Emp_C	Emp_G
Expertise:	project risk management	ERM
Job position:	Senior risk manager	Senior risk manager
Work experience:	[30-35]	[30-35]
Number of years at company	[5-10]	[0-5]

Table 6.2 - Statements based on key themes emerging from results

	Key themes from § 5.5.3	Statement	Description
1.	Allocation of resources	**A Chief Risk Officer (CRO) should be appointed**	Determining the proper position, size and scope of the risk management function in particular and risk management practices in general at the company is challenging due to diverging views on their roles, lack of policy on uncertainty management and cultural and behavioral factors. Previous research has shown that appointing a CRO can be a positive catalyst for improving risk management practices within a company.
2.	Scope and visibility of ERM	**ERM does not exist at project level**	The added value and goals of ERM are mainly known and recognized at the corporate level of the company. It is unclear to what extent and in what form ERM should necessarily be known and visible at the project level itself.
3.	prioritization of ERM	**There is no urgency within the company to implement ERM**	There is a discrepancy between the company's stated transition goals related to sustainability, CO2 reduction and general de-risking and the rate at which ERM, a necessary tool to attain those goals, is being operationalized.
4.	role of ERM in translating organizational strategy	**ERM is crucial for connecting the company strategy to the organization and the projects**	Identifying and managing risks was cited as either the most important or one of the most important tasks of the work that is done at the company. ERM is a system developed to connect RM, company strategy, decision-making and object setting throughout the company.
5.	ERM and RM in relation to core processes	**ERM is more than Plan-Do-Check-Act**	The Plan-Do-Check-Act cycle of Shewhart/Deming is an operational control cycle that is used within the company in projects. During both the formal and informal interviews that were part of this study, practitioners cited PDCA when asked to describe the RM cycle. However the RM cycle is broader than PDCA.

The five statements and two questions presented at the expert session are presented in Table 6.2.

Additionally, the experts were asked two general questions on the applicability of the the discussed themes in a wider context. The questions are listed below :

Q1: What are your views on the connection between ERM and PRM and what challenges are there concerning the interactions between the two levels?

Q2: To what extent can the themes described in the previous statements be generalized to the construction sector as a whole?

6.3. Results of session

The session took place online via Microsoft Teams and was recorded and transcribed. A transcription of the session can be found in Appendix D. The participants took turns offering their initial responses to each new statement or question, followed by short discussions. At a number of moments, the researcher posed follow-up questions in order to clarify the experts' answers or to go in to more depth on certain topics. To verify the content of the session, the transcript and a summary of the main points were sent to the experts after the session for approval.

Statement 1: A Chief Risk Officer (CRO) should be appointed
Emp_G conditionally agreed with the statement but stated that the risk maturity must first improve within the company before it would have any real effect. Emp_C disagreed with the statement, believes that RM should be a part of the daily work for all practitioners and appointing a CRO and creating a separate RM pillar within the company would not accomplish that goal. The researcher (AG) then challenged the assertions by asking whether it was possible that appointing a CRO would in fact work as a positive stimulus to improve risk maturity throughout the company. The experts replied that bottom-up improvements in behavior and culture would have more effect and were more important that the top-down appointment of a CRO. Additionally, Emp_C indicated that the recent organizational change whereby the risk function was placed under the finance function was an important first step in elevating the risk function within the company. Both experts stressed that changes in risk awareness, culture and behavior were of higher importance. In addition, it was agreed that the appointment of a CRO could be something for the future.

Statement 2: ERM does not exist at project level
Emp_C responded that the explicit presence of ERM is indeed not present at project level, however there is a connection, or exchange between the business level and the project level that does already exist though not always for all 17 identified ERM risk domains. Emp_G stressed that ERM is not just corporate level RM but in fact comprises all RM within the company, including PRM but aside from clarifying the definition of ERM, agrees with Emp_C that it depends on the situation and project. Both experts agreed that some projects that are not strictly related to the company's core business have a stronger relationship with ERM objectives.

Statement 3: There is no urgency within the company to implement ERM
Both experts were in agreement that this is indeed the case. Emp_G added that this has to do with a stronger focus on finance objectives than risk objectives within the company. Emp_C added that the lack of clarity on the specific characteristics of ERM at the company as well as its objectives makes it difficult to create more enthusiasm within the company on the subject of ERM. Even within the corporate risk team, ERM objectives have been unclear until very recently.

Statement 4: ERM is crucial for connecting the company strategy to the organization and the projects
In terms of the current way in which construction projects are executed, Emp_C did not agree with the statement, responding that for many years projects have been run successfully without ERM. AG further clarified the statement by asking whether the opinion stayed the same considering the current transition the company is in, in terms of for instance the new desired way of working, higher focus on modular construction, and the shift to product-market combinations in certain company clusters. Emp_C responded that in this wider sense, ERM definitely has a role however does not see it as crucial. Emp_G agreed with this last statement, disagreed with the word 'crucial', finds ERM rather a useful tool for structuring risk management processes. Emp_C agreed with this and added that in terms of the connecting of ERM to the organization in general, that there was more relevance for the statement but both experts repeated that though perhaps important for translating company strategy in various ways, ERM is not crucial for this.

Statement 5: ERM is more than Plan-Do-Check-Act
Emp_G responded in the affirmative, stating that the PDCA cycle is in fact a management and control cycle, while RM is broader, referring to the basic principles of ISO 31000 to illustrate the point. Emp_C added that RM begins with defining the context and objectives, steps which take place before PDCA begins. Both experts agreed that ERM is indeed more than PDCA but stresses that RM in general is also more than PDCA.

Question 1: What are your views on the connection between ERM and PRM and what challenges are there concerning the interactions between the two levels?

Emp_C sees clear indications that the connection is improving between PRM and ERM, citing recent requests from the corporate level to the corporate risk department to determine the consequences of certain ERM risks at the operational level, however believes that outside the corporate risk team, the connection is not seen or experienced by others. Emp_G responded that the question once again positioned ERM as being separate from PRM but stressed that ERM is all-encompassing and therefore includes PRM. Having clarified that point, Emp_G agreed with Emp_C that the connection between corporate-level risk management and PRM has improved. Emp_C added that the next step is to get others outside the corporate risk circle on board, which will is going to be a big challenge as the ERM processes and objectives are still unclear. In terms of challenges, Emp_G stressed the need for an increased openness and risk awareness as training sessions for employees to improve risk competencies will only truly have the desired effect if employees have a different mindset. Emp_C added that the right knowledge, skills and awareness are key to improving RM practices which can practitioners understand how it can add value at the project level which is very important. Emp_G added that the need for practitioners to be open to new ways of thinking about risk is necessary at all levels of the company, for instance the ERM risk domain owners also greatly benefit from accepting guidance from the risk experts as these are new competencies for most practioners. Emp_C wrapped up the discussion by stating that as far as convincing others was concerned, the ball is in the court of the corporate risk department to make it happen.

Question 2: To what extent can the themes described in the previous statements be generalized to the construction sector as a whole?

Emp_C indicated having limited insight into what the situation was at other construction companies but indicated that RM was well organized by the construction company where they were previously employmed [5-10] years earlier. However, speaking to former colleagues at that company, it was clear that the attention to RM there has been neglected since the departure of certain former colleagues. Emp_G lamented that this was typical of RM processes not being maintained at companies in general, not just in the construction sector, and that attention to RM processes was often part of a typical cycle where internal crises within companies led to an initial stricter adherence to RM processes and as soon as those periods of crisis passed, the attention to RM then wained. Emp_G also stated having little experience with other construction companies and suggested consulting annual reports of other construction companies to gauge the attitude towards risk and RM at those companies and the extent to which they implemented ERM, though noted that annual reports may not tell the full story. AG followed up by indicating that this was an interesting point due to the fact that at [construction org.] ERM has been mentioned since [2010-2015] in the annual reports, however is only being operationalized as of 2022. AG commented that the form ERM had taken before 2022 appeared to be mostly focused on financial and reporting aspects and since the start of operationalization in 2022 with a strong focus on internal control (IC) aspects. The experts were then asked whether they agreed with this assessment and to what extent the company aimed to focus on the 'risk' side of ERM, with a view to uncertainty management. Emp_G replied that there was indeed much focus on finance and IC and this had to do with these areas also needing attention. They further mentioned that connecting risk and IC more effectively was on the radar of the top management and would be part of future steps. Emp_C had nothing further to add.

6.4. Chapter wrap-up

In this final section the last research sub-question be answered. The question is restated below:

SQ4: How can contextual factors at a construction company be used to shape an ERM implementation that is fit-for-purpose?

The statements and questions were formulated to elicit a discussion on a number of themes that resulted from the research. In general the respondents took a pragmatic view of ERM implementation in light of the existing organizational factors at play. The low maturity of RM practices company-wide, general lack of risk awareness, lack of prioritization of measures to improve RM practices, general lack of competencies and knowledge on RM within all management layers are substantial challenges.

Table 6.3 - Key themes, statements and experts' answers

	Key themes from § 5.5.3	Statement	Expert's answers
1.	Correct allocation of resources	**A Chief Risk Officer (CRO) should be appointed**	Maybe in future but changing behavior and culture at operational level has highest priority
2.	Determining scope and visibility of ERM	**ERM does not exist at project level**	Partially visible, full scope of ERM not needed at project level
3.	Proper prioritization of ERM	**There is no urgency within the company to implement ERM**	Both in agreement. Reason: prioritization of other objectives.
4.	Determining ERM's role in trans-lating organizational strategy	**ERM is crucial for connecting the company strategy to the organization and the projects**	ERM is not crucial. It is important. More for strategy -> organization but less so for strategy -> projects
5.	Determining to what extent ERM and RM are distinct in relation to core processes	**ERM is more than Plan-Do-Check-Act**	Both in agreement. RM is also more than PDCA. Difficult to determine correct positioning due to exploratory phase of ERM.

chapter 7:

Discussion

Structure of this chapter

7.1 Discussion

7.2 Limitations

7. Discussion and limitations

In this chapter, the results will be placed in the context of the extant literature. Additionally, the studies limitations will be discussed

7.1. Discussion

Need for improved risk culture and behavior

The results show that the current risk culture needs improvement, though it has gotten better in recent years. To start, there is a need for an open culture where assumptions can be challenged in an environment characterized by trust and psychological safety. Many writers stress the need for a no-blame culture to improve risk management practices (Jeitziner et al., 2014; Mikes & Kaplan, 2014; Power, 2004). Additionally, risk management competencies should be improved across the board at all organizational levels. The importance of RM competencies and reliable information was stressed by respondents as an important factor in improving risk management practices and by extension project outcomes. This is linked to Giddens's (1984) concept of unintended consequences whereby Giddens argued that the more knowledgeable actors are, the less likely that unintended results will occur. Risk competencies are a critical success factor according to Ching et al. (2021). Competencies are related to the differing RM maturity levels per industrial segment. In general, the RM maturity at the case organization is low and need to be improved. Hillson (2009) argued that when projects and processes are generally well executed, the right people are in place with the right skills and adequate resourcing is provided, risk maturity increases, together with risk awareness. However, when risk management activities are seen as burden, RM practices are often treated as a tick-the-box or compliance exercises, further diminishing RM in relevance and efficacy. Fraser & Simkins (2016) stressed the importance of making ERM enjoyable and meaningful through the use of risk workshops that aim to solve real problems in the business. Kunz & Heitz (2021) concluded that investing in the right people (personal traits) with the desired competencies (knowledge) through hiring and training and focusing on desired leadership characteristics in communication structures has a direct impact on individual behavior and therefore is an important mechanism in changing risk culture.

Allocation of resources

The choice to create a Risk & Control committee in 2019 and a corporate risk function in 2021 have been instrumental in further operationalizing ERM. Creating these entitities is considered an important success factor in ERM implementation (Ching et al, 2021). However, not all middle managers see the urgency of improving RM within the case organization and delay the allocation of time or resources needed to accomplish vertical alignment of ERM and existing RM processes. Lack of cooperation by middle managers can lead to Information asymmetry which influences both the quality of risk management practices as well as the further refinement of ERM processes (Jankensgard, 2021). It also illustrates the idea of practitioners' ability to 'do otherwise' (Harris et al., 2016).

Role of uncertainty experts

The distributed work practices at the case organization underscore the importance of team dynamics and strategic behavior must be monitored (Harris et al., 2016). The advisory function of knowledgeable actors (uncertainty experts) and their role in providing information to decision-makers is characterized by feedback loops and can result in information asymmetry. This is also related to the dialectic of control where organizational actors are able to exert control over processes within their own sphere of influence.

Risk rationalities

There is a strong focus on compliance and reporting risks in the current ERM system design consistent with the original reason for implementing ERM at the case company in the past. Initial ERM system designs determine to a large extent how ERM is viewed afterwards (Arena et al., 2010).

Need for organizational knowledge generation and open dialogue
Respondents indicated a desire for a clear plan for ERM however this is difficult to accomplish in practice as there is no one-size-fits-all solution. The knowledge needed to develop ERM processes at the case organization can partially be found in external templates, best practices and frameworks but mostly through dialogue and trial and error within the organization itself (Jemaa, 2022).

7.2. Study's limitations

Below are limitations of this study.

- **Potential bias of respondents** - The sample of respondents may not represent average opinions on risk management practices at the company. Key respondents during and after the data collection who were not part of the sample group remarked that they experience considerably less enthousiasm for the view that good risk management is important in interactions with practitioners at the company than the sample group presents.
- **Difficulties achieving triangulation of results** - Respondents spoke partially about their own interactions and actions but also to a great extent about the behavior and actions of others. It was difficult to test these views except through comparison with the views of other respondents and the academic literature, therefore triangulation through comparison with other data sources was limited and saturation was used as a reliability technique.

chapter 8:

Conclusions & Recommendations

Structure of this chapter

8. Conclusions and recommendations

In this final chapter of the report, the results and conclusions have been summed up and the answers to the research questions have been summarized in the first section. Following this, recommendations have been made for the construction company as well as for future research on this subject. In the last section, the researcher takes a look back at the ups and downs of this thesis project in a personal reflection.

8.1. Answering the research questions

In this study, the implementation of Enterprise Risk Management was explored at a large construction company in the Netherlands, with a focus on the role of risk culture and behavior. To aid in the analysis and offer a more nuanced view of culture and behavior, Giddens' Structuration Theory (1984) was used. Below is a summary of the results per research sub-question.

Answering research sub-question 1

The first research question was: What concepts are related to ERM implementation in theory? In Chapter 3, a literature review was conducted to explore concepts related to ERM implementation and specifically its relationship to culture and behavior. It was determined that practitioner texts and standards offer an idealized version of ERM implementation that is difficult to translate to practice. Contextual factors together with internal and external influences that lead companies to implement ERM in the first place have a substantial role in initially shaping ERM implementation in practice. Organizational culture and behavioral aspects related to ERM and RM practices in general were explored. A conceptual framework was developed based on three main aspects of practice: the influence of top management, formal ERM elements and risk culture. Connecting these practice themes to Structuration Theory, it was determined that the action realm was where the board and top management make decisions affecting ERM implementation and the institutional realm is the stage where this plays out. The institutional realm elements include formal ERM elements and risk culture. The effects of the actions of top management are visible in the institutional realm, where practices are changed or endure.

Answering research sub-question 2

In the this step of of the research, the first part of empirical research began. The second sub-question was: How are ERM practices represented at a construction company? In this step, a documentation study was conducted, and was supplemented by informal interviews with key respondents and observations. The conceptual model was used as a guide for data collection and it became clear that ERM implementation is still in an early, exploratory phase at the company. Also, the company chose a pared-down version of ERM, characterized mainly through 17 defined risk domains. The document study was limited due to the stage of implementation as there were few official guidelines or process descriptions. Key respondents indicated that RM practices in general differ widely throughout the different industrial segments of the company with differing maturities and stressed that culture and behavior have a big influence on ERM & RM practices. The researcher was able to observe a number of Risk & Control dept. meetings and was able to follow some of the developments real-time. Based on these aspects, it was concluded that the in-depth interviews in the following research step would broadly explore aspects related to new ERM processes, existing risk management processes, interactions between RM levels and the effects of behavior and culture.

Answering research sub-question 3

In the third step of the research, the second main step of the empirical part of the research took place. The sub-question was: What challenges and enablers can be identified in connecting ERM to existing hierarchical levels of RM at a construction company? A number of challenges were

identified related to behavioral biases, lack of knowledge and risk competencies. th lack of prioritization of RM by managers at all organizational levels and the need for better alignment between the RM levels. At the same time, there are ERM drivers present at the organization, such as the presence of a Risk & Control Committee and the recent creation and expansion of a Risk & Control Corporate Function.

Answering research sub-question 4

In the final step of the research, an expert session was held to answer the sub-question: How can contextual factors at a construction company be used to shape an ERM implementation tha tis fit-for-purpose? Based on the results the previous step, five statements and 2 questions were formulated that were used as the basis for discussion with two expert respondents. One respondent was an expert in project risk management and one respondent was an expert in ERM. The five statements generated discussions about the following issues: 1) where in the company hierarchy should the most focus in terms of improving risk competencies be concentrated: at the very top through the appointment of a CRO, or at the operational level? The experts argued that the operational layer had the first priority, and a CRO could come later but would have less impact. The second discussion explored the degree to which ERM should be visible at the operational level. Both experts agreed that there was currently little visibility which mainly had to do with the fact that ERM processes are still a work in progress. The third statement discussed the lack of urgency concerning the changes needed for ERM implementation. The experts indicated that they felt that this was true and the lack of priority for ERM had to do with a lack of focus on risk on the one hand and the prioritization of other activities on the other. The indicated that though process may be slow, they felt it was moving in the right direction. In the fourth discussion, the importance of ERM in translating strategy to the organization and the projects was explored. The experts did not find it crucial, especially not in terms of translating strategy to the projects though they did see more importance for translating strategy to other organizational processes. The last statement centered around the idea that ERM is more than the Deming cycle. The experts were in agreement and remarked that RM in general is more than just the Deming cycle.

Answering the main research question

Finally, the main research question can be answered:

How can the interplay between risk management levels be improved to benefit Enterprise Risk Management?

The results show that the stage of implementation is still in an exploratory phase where dialogue and open communication are key. Processes are currently being developed and improved and the correct mindset and attitude is crucial in achieving this. However the desired risk-aware mindset is not shared by all in the organization. This is due to lack of knowledge and competencies, other priorities and a focus on short-term project goals at the project level.

The initial exploratory phase of ERM implementation in the case study shows that existing RM processes and the maturity of these processes are an important factor. How these processes are executed based on individual behavior and group norms, and the associated (lack of) sanctions when RM practices are not integrated properly into management decisions also have an outsized effect on the development and implementation of ERM processes. Leadership styles throughout the organization should be focussed on interaction, alignment and feedback loops that make continous monitoring and improvement of processes possible. Lack of prioritization of risk management hampers this process throughout the organization.

The **agency** of the three actors groups represent three main groups dealing with risk management: the (top) managers who must both approve the system design of ERM and allocate necessary resources, uncertainty experts from different functional background who together advise

on the development of ERM processes and lastly, line managers within the organization who must incorporate risk management into their daily tasks.

Signification structures – Top management wishes to improve risk management practices and risk awareness. This wish must go against deeply ingrained biases against RM. By creating new central risk functions and taking the step to expand ERM to the segments and subsidiaries, RM's increasing importance is stresse. Competencies and lack of knowledge hamper this change to the new way of thinking as well as short-term project objectives ingrained in the current way of working. Risk rationalities at the case organization show a strong focus on compliance and financial reporting risks due to a more mature internal control function.

Domination structures – To underline the importance of RM, top management allocated resources in recent years. Top managers can serve as a catalyst in getting the ball rolling however middle managers in the segments and subsidiaries also have a role to play in the power structures and must collaborate with uncertainty experts in order to effectively create links within the organization. Failure to prioritize ERM at these levels can create blind spots in the organization when creating a full risk profile.

Legitimation structures – The current norms associated with RM (and sanctions when norms are not adhered to) reflect values associated with traditional construction processes centered around unique one-off projects. Due to the shift to modular and standardized construction, the associated values are shifting to innovation and new product development and the organizational norms must change too. There are currently few incentives or sanctions when norms are not adhered to.

As there is no one-size-fits all solution to ERM system design, developing processes will depend on contextual factors at the case organization. External frameworks and best practices can offer clues, however the knowledge needed for effective processes must be obtained through collaboration and open dialogue between uncertainty experts shaping ERM processes and managers throughout the organization. At the case organization, the lack of knowledge and ERM competencies at all organizationl levels hampers the implementation of ERM, together with undesirable risk culture and behavior within the organization. Allocative and authoritative resources must be made available where needed at all levels of the organization and continous knowledge generation equips actors with tools to design and implement ERM more efficiently. The significance of ERM and RM is already clear at the top management level however translating intentions into actionable steps is difficult without a road map. Therefore an open-minded mindset is needed where open conversations with managers at multiple levels can be had and there is room to make mistakes.

8.2. Recommendations for the construction organization

Based on the results of this study, a number of recommendations have been developed to for the construction organization:

Creation of an experimental environment as a catalyst for organizational learning: Risk & Opportunity Lab (RO-LAB)
The results show that new ERM processes must be designed in an efficient and effective way, while competing with conflicting objectives and other priorities in operational and project environments where time and budget pressure is high and mistakes can be costly. Creating new pathways in ERM requires internal knowledge generation, collaboration with and input from stakeholders, learning in iterations and the ability to make mistakes. In addition, external state-of-the-art ERM knowledge in the form of best practices, standards and guidances should be continuousy consulted. As the company is in an initial phase of ERM design and implementation, open discussions and input from the operational levels of the company are crucial for ensuring an efficient and effective ERM system design. In this phase especially, risk management should be made more approachable, meaningful and enjoyable where possible. Conversations should be encouraged with with managers at all levels to determine the specific risk-related problems they face. As a complete mapping of risk capabilities, maturities and current risk culture can take some time, the

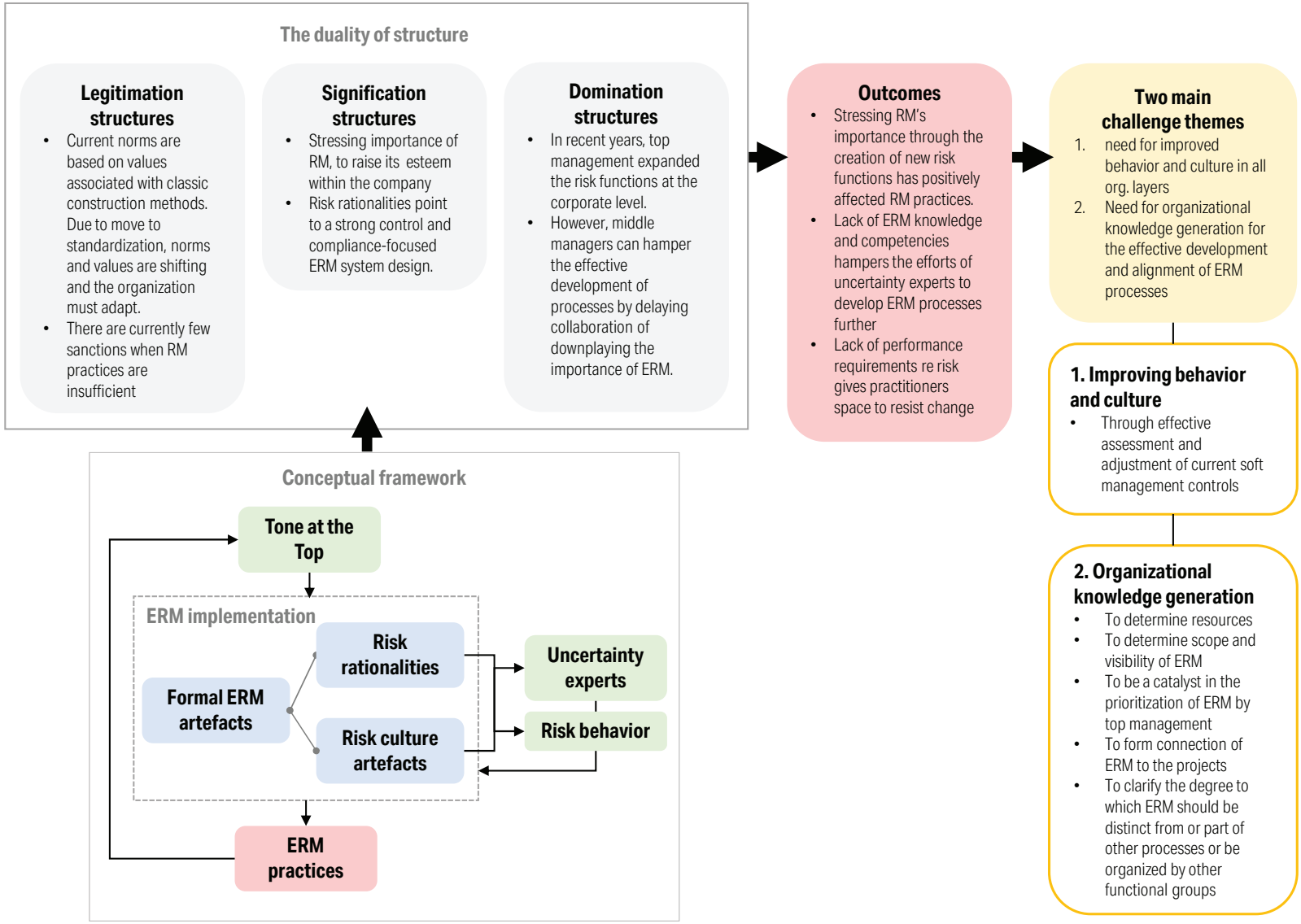

Figure 8.1 - Results

use of a design science method is recommended as outlined by McShane (2018). This approach is similar to that of Jemaa (2022) who studied double embedding of risk managers to promote integration of ERM practices into existing structures and recoupling of RM practices. In this way a safe environment characterized by open collaboration, knowledge sharing and brainstorming is created where solutions can be tried out and mistakes can be made.

Action owners: Division NL Risk & Control function segment risk managers.
In collaboration with: a vertical cross-section from group level down to project level in all four segments, with enthousiastic practitioners from different expertise groups who have active risk issues that are relevant in the development of ERM processes and that can be used as the basis for a proposed intervention. Participants should be chosen who believe in the added value of risk management, are willing participants and are open-minded.
Methodology: brainstorm sessions, risk workshops.

Map the current risk culture(s) and process maturities of the Division NL segments
The company wishes to encourage new behaviors and improve risk awareness as part of the desired risk culture in order to increase the maturity of risk management processes. However, a clear plan on how to accomplish this in practice is currently lacking and the results show substantial differences in risk management maturities in the different industrial segments. In order to create a plan, the current risk cultures and maturities at the organization must be sufficiently mapped and understood as well as the ways in which soft controls currently influence behavior, culture and maurity (Kunz & Heitz, 2021). Also, the desired future state of risk culture and maturity must be specifically defined for the four segments as well as the necessary changes to the associated soft controls in order to accomplish this.

- Based on this, it is recommended that the company first map the current risk cultures of the the company, focusing on the first four steps of the 10-step risk culture change plan as described by IRM (2012). In these steps, 1) the current risk culture and the associated influences are assessed in the four industrial sectors in the Dutch division, preferably using more than one tool to improve the reliability of the results, 2) the presence of a single or multiple cultures is identified, which will increase understanding of the cultural differences between the industrial segments 3) the findings are then analyzed and categorized based on dominant themes of the current culture(s). This then makes it possible to 4) define the desired risk culture and associated changes to the soft controls. Once these initial steps have been taken, a change plan can be created in a later phase for instance as described in steps 6-10 of the IRM guidance.
- Concurrently, it is recommended that maturity assessments be conducted at the four segments.

Action owners: Division NL Risk & Control function in collaboration with the divisional HR team
Sample make-up: Selected line managers, project managers, auditors, legal, IT and other supporting functions concerning current and desired behaviors as it relates to risk. Respondents chosen based on a broad spectrum of attitudes towards risk, including respondents who are very negative to ambivalent to very positive about the added value of risk management.
Population: entire Dutch division
Methodology: mixed methods using surveys followed by in-depth interviews

8.3. Recommendations for researchers

Due to the phase of ERM implementation at the company, a limited amount of data could be gathered and some gaps remained in the conceptual framework developed for this study. The following recommendations are for further research:

- Though it was not the focus of this study, knowledge management emerged as an important theme. Future research could investigate aspects related to recording, consulting, judging and discussing risk information and lessons learned together with the associated role of risk tools.
- The role of portfolio risk management emerged as an important bridge between ERM and project risk management. In future research, this aspect could be examined further to better understand how risk-related decision-making at different managerial levels interact with ERM.

8.4. Researcher's reflections on this thesis project

When starting this project a year ago, I originally was interested in exploring a subject closer to what we had been focussing on during the CME courses: project complexity. More specifically, I was interested in the connection of complexity to risk management, which was a subject that we tended to misunderstand and keep at arms length during the CME courses. The discussion on risks during the courses often ended up being reduced to generalities, where a paragraph dedicated to the allocation of risks amongst project stakeholders usually sufficed. When I went to my meeting with my future company mentor, we discussed the possibilities concerning my thesis subject. He mentioned that the company was currently reorganizing and they were working on extending their enterprise risk management processes to better connect internal control and project risk processes to the corporate level of the company. I was immediately interested in this perspective as I have always been drawn to a bird's eye view of things and studying the interaction between the corporate top and the projects very much appealed to me.

However, I was studying construction management, where the focus was mostly on the project level in my college courses and I didn't know much about risk management, let alone enterprise risk management. But I believed that I could figure it out along the way. After all, how difficult could it be? On top of that, I was inspired to use Anthony Giddens' Structuration Theory in my project as an analytical lens, based on a suggestion of of my thesis committee chairman. Another subject that I did not know a lot about but based on what I initially read, a really interesting way to approach research on risk management. Once again, I figured I would just dive in.

Oh, how naive I was. And how ironic it proved to be as well, because a bit more knowledge of risk management would have sensitized me to the potential hazards of these decisions further down the road in my project. Of course, my assumptions about the ease with which I would pick up these new concepts on risk management and Structuration theory were completely wrong. There were some connections to the courses I had done at CME but not many. I noticed during early conversations with the Risk and Control Team that they were speaking a language that I didn't completely understand. In order to make sense of it all, I had to record conversations and jot down notes so that I could go back and listen and/or look things up. Slowly but surely I was able to boost my own knowledge levels on the various subjects and got steadily better at putting it all together in order to be able to develop a critical view of what I was researching. However this process of learning the basics of risk management, ERM and internal control practices slowed down my progress considerably. Together with delays due to some health issues, it became clear that finishing my thesis in 6-7 months was not going to be possible.

The question after the fact is how much of that extra knowledge was truly necessary to successfully complete the project. I find that difficult to judge as I am a perfectionist and very detail-oriented. If left to my own devices, I do things thoroughly, at times to the extreme. During the CME courses there was plenty of opportunity to be checked in this behavior as there was a lot of group work. My fellow students were quick to indicate when they thought 'good was good enough'. Yet I find it difficult to see on my own. What drives me is the need to understand how something works, to undercover the mechanisms, to understand the working parts, to deconstruct it and look at all the pieces. The complexity of the subject matter made that very difficult. My project, and my need to understand the phenomena I was looking at, became a bit of an obsession if I am honest. I heard the advice of my mentors to 'keep it simple' yet I had a lot of trouble translating that to practice. How do you simplify something

without at the same time losing important nuances? That was a struggle: making compromises, making choices.

I worked really hard during the project, speaking to practitioners, reading academic articles, making analyses and having discussions with my committee. In spite of this, the first three quarters of the project were characterized by confusion and the feeling that I was not quite understanding the full picture of what I was seeing. This also had to do with the limited contact with colleagues at the internship company due to busy schedules of all contacts working from various locations or from home, myself included. In the final stage, when the data was collected and the internship had ended, I was able to take stock of all that I heard, seen and done and was able to gain more perspective on the project. In this phase, thanks to regular check-ins with my first supervisor and her mantra of 'keep it simple' playing in the back of my mind I was able to find the thread of my report and cut out the unnecessary parts. That process led, finally, to a 'eureka' moment when I felt that I had at least attained my personal learning goal of understanding how the puzzle pieces of ERM theory, project management theory and social theory all fit together and how it could and should be translated to the data. This was of course based in that moment only on my own estimation and would ultimately be judged by my committee, but it was a moment of triumph for me regardless. After a lot of brain fog and confusion, it was just really great to have some feeling of clarity.

In terms of the process, if I could do it all over again with the intention of completing the project within 6-7 months it would be wiser to choose a topic that made better use of the knowledge I had gained in my courses at CME. If I were to do this specific subject again with that goal of a set time limit I would probably have left out the Structuration theory. I am happy I did incorporate it though, and the extra time needed to understand it properly feels well worth it as I felt it gave me a much better understanding of the organizational processes I was analyzing. My personal desire to really understand the phenomena I was dealing with was the most important criterium looking back and though this acted as a major barrier at times it also led me to deeper insights and understanding. A point for improvement is that I could have been more accepting of the fact that some aspects of the thesis project would not have the depth of other parts which would may have sped up the progress. Also, I could have forced myself to just start writing more and see where I end up instead of keeping things in my mind. And perhaps most importantly, during moments when choices had to be made, I would take more time to consider the importance of what I was doing in the bigger picture and prioritize better leading to a more efficient use of my time. In terms of the content, I really had a blast with it. All the topics I researched were interesting to me and I often had to stop myself from diving back into the literature to read even more. There was just so much to know, so many clues and puzzle pieces to find and to fit into the story that was shaping up in the data. I enjoyed collecting the data even though processing and analyzing it was a daunting task. In sum, doing this project was very rewarding and I look forward to putting this knowledge of ERM, risk culture and behavior (and Structuration Theory of course!) to the test after graduation.

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Appendices

A. Field notes / Informal conversations
B. Interview guide
C. Interview transcripts
D. Expert sessions transcript