

Managing opportunities in the construction sector

A comparison of theory and practice

MSc Thesis

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SUMMARY

Despite 20 years of research into opportunity management, construction organizations are struggling to capture opportunities in practice. The research is scientifically relevant because research has shown the potential of opportunity management but at the same time research into opportunity management practice is lacking (Johansen et al., 2018; Johansen, 2015). Societal relevance follows from the construction projects that are often funded with public money. These projects should deliver value without going over budget and time and opportunity management can help to improve project performance.

The goal of this research was to improve the management of opportunities in a construction organization. For this, the following research question was defined:

Research question: *How can the current approaches of risk management in a construction organization be improved to manage opportunities?*

Four sub-research questions were used to (1) create an overview of opportunity management theory, (2) create an overview of opportunity management practice in a construction organization, (3) identify gaps by comparative analysis of opportunity management theory and practice, and (4) suggest the steps that need to be taken to improve opportunity management practice.

A literature review was used to create an overview of opportunity management theory for question 1. The literature review presented four themes that are essential for opportunity management that are used to guide the comparison: Language, culture, process, and infrastructure. An exploration in a construction organization, consisting of document analysis, interviews, and observations, was used to create an overview of opportunity management practice for question 2. Comparative analysis was used to identify gaps between theory and practice for question 3. The results from the three sub-questions are presented in Table 1.

Table 1 Summary results sub-question 1, 2, and 3

Theme	Theory (Literature review)	Practice (Exploration)	Gaps (Comparative analysis)
Language	<ul style="list-style-type: none"> - Inclusive definitions - Uniform (meta)language in organization 	<ul style="list-style-type: none"> - Inclusive definitions - Limited use (meta)language 	<ul style="list-style-type: none"> - Knowledge and use of risk and opportunity (meta)language outside PM & RM
Soft skills	<ul style="list-style-type: none"> - Promote and communicate desired behaviour from the top - Practice the desired risk-related behaviour from the bottom up. - Have an inclusive risk attitude & mindset 	<ul style="list-style-type: none"> - Top-down focus on threats - Bottom-up sees it as check the box exercise - Risk attitude & mindset is threat focused 	<ul style="list-style-type: none"> - Risk and opportunity vision and behaviour from the top - Relevance of and attitude towards risk and opportunity management bottom-up
Process	<ul style="list-style-type: none"> - Simple enough to meet objectives - Scalable to project size, complexity, and importance 	<ul style="list-style-type: none"> - Process is simple and complete - Process is more focused on threats towards the end - Process has some additions for large projects, but is not scalable to project size 	<ul style="list-style-type: none"> - Balance between risk and opportunities throughout the process - Scalable process for small projects
Infrastructure	<ul style="list-style-type: none"> - Tools, techniques, templates, and training - Technical support from risk specialist - Organizational learning 	<ul style="list-style-type: none"> - Tools (ROMR/Relatics), Limited techniques (brainstorm, monte carlo) - No training - Technical Support from RM - Templates (ROMR) - Limited organizational learning (generic risk database) 	<ul style="list-style-type: none"> - Opportunity techniques & training - Organizational learning in opportunity management

From the exploration, it was concluded that there is very limited experience in the organization in managing opportunities. To gain experience, new opportunities need to be identified before they can be managed. The gap of opportunity techniques and training was selected to design a detailed improvement as this is expected to be one of the most effective solutions when focused on opportunity identification.

Requirements for a practice guide of an opportunity identification session are formulated using the literature review and exploration. The practice guide describes the preparation, execution, and completion of the opportunity identification session. In the practice guide, language and roles are made explicit, novel identification techniques are used and a onepager format is used to provide simple instruction for project teams. The practice guide is evaluated and improved with two expert groups of project- and risk managers, the final onepager is presented in Figure 1.

Concluding the research, the exploration of practice showed that the construction organization is struggling with the management of opportunities. Literature indicates that by focusing on the four elements of *language, culture, process, and infrastructure*, the practice of opportunity management can be improved. Starting with identification of opportunities, an incremental approach is suggested to gain experience in the management of opportunities. Future research into other construction organizations is needed to generalize the findings of opportunity management practice. Also, future research into the gaps between theory and practice should help to improve the overall practice of opportunity management in the construction industry.

- OPPORTUNITY SESSION -													
PREPARATION													
DEFINITIONS													
<input type="checkbox"/> Opportunity = An uncertainty having a positive effect on project objectives. <input type="checkbox"/> Optimization = An optimization is not an opportunity because there is no uncertainty <input type="checkbox"/> Opportunity description = As a consequence of <one or more definite cause(s)>, <uncertain event> can happen, which leads to <one or more effect(s) on project objectives>.													
ROLES		PROJECT DOCUMENTATION											
<input type="checkbox"/> Project manager - Motivator <input type="checkbox"/> Risk Manager - Chairman <input type="checkbox"/> Team member – Discipline expert		<input type="checkbox"/> Contract documents <input type="checkbox"/> Drawings <input type="checkbox"/> Maps											
METHOD SELECTION		SWOT RESULTS											
<table border="1"> <tr> <td>Basic</td> <td>→</td> <td>Method 1</td> </tr> <tr> <td>Extensive</td> <td>→</td> <td>Method 2</td> </tr> </table>		Basic	→	Method 1	Extensive	→	Method 2	<table border="1"> <tr> <td>Strengths</td> <td>Weaknesses</td> </tr> <tr> <td>Opportunities</td> <td>Threats</td> </tr> </table>		Strengths	Weaknesses	Opportunities	Threats
Basic	→	Method 1											
Extensive	→	Method 2											
Strengths	Weaknesses												
Opportunities	Threats												
EXECUTION													
METHOD 1 – S.C.A.M.P.E.R.		METHOD 2 – BENEFIT TREE ANALYSIS											
Answer the questions for the different elements in the project. Combine disciplines and share answers. Substitute – What could be substituted? Combine – What could be combined? Adapt – What could be adapted? Modify – What could be modified? Put to another use – What could be put to another use? Eliminate – What could be eliminated? Rearrange – What could be rearranged?		The Benefit Tree Analysis (BTA) is a tree that consists of benefits, drivers and opportunities. Benefits are related to project objectives. Start with benefits that are decomposed in drivers. The drivers are subsequently decomposed into opportunities. Examples benefits: - Reduce costs - Reduce time - Improve quality											
COMPLETION													
Tasks													
<input type="checkbox"/> Risk manager collects all opportunities and formulates them correctly <input type="checkbox"/> Session is evaluated and suggestions for improvement are archived by risk manager <input type="checkbox"/> If necessary, a new opportunity session is scheduled by project manager													

Figure 1 Summary of opportunity identification session practice guide

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1 INTRODUCTION

This report is part of the master thesis of Construction Management & Engineering at the TU Delft. The subject of study is opportunity management in the construction industry. In this chapter, first the context for opportunity management is explained, followed by the relevance of the research in Section 1.2. Next, the construction organization that collaborates in the research is introduced in Section 1.3. The problem statement for this research is formulated in Section 1.4. At last, the reading guide is presented in Section 1.5.

1.1 SETTING THE SCENE

Opportunity management emerged from the practice of project risk management. Project risk management became a research topic in the late 1950's together with the introduction of project management (Ward & Chapman, 2011). The Program Evaluation and Review Technique developed by the US Navy was one of the first formal descriptions of a project risk management approach (Malcolm et al., 1959). Since then, project risk management has developed into a professional practice that is described in project management standards like Project Management Body of Knowledge Guide (Project Management Institute), PRINCE2 (Office of Government Commerce) and Project Risk Analysis and Management (Association for Project Management).

The purpose of risk management is to optimize project success by identifying, analyzing, responding to, and monitoring risks (PMI, 2017). The effect of a risk can be negative, a threat, or positive, an opportunity. Risk management is mainly focused on the negative effects of risk (Chapman & Ward, 2003). This is for one reason caused by the common definition of the word risk in society: "*something bad that might happen*" (Cambridge Dictionary, 2021). However, from the early 2000's, research in risk management started to focus on opportunities and their management (Jafaari, 2001; Chapman & Ward, 2003; Hillson, 2002, 2004; Olsson, 2007).

Opportunity management

An opportunity is a risk having a positive effect on project objectives (Chapman & Ward, 2001; Hillson, 2002; PMI, 2017). Managing opportunities is part of project risk management. Research in the last two decades has led to a shift in the risk management approach from threats-only to a combination of both threats and opportunities (Hillson, 2002; Chapman & Ward, 2011; Johansen et al., 2019; Hillson, 2019). Case study research has shown the potential benefits of opportunity management for project organizations (Johansen, 2015; Johansen et al, 2018). This balanced approach to risk management has been adopted by the project management standards from organizations like Association for Project Management and Project Management Institute (PMI, 2017; APM, 2018).

However, implementing the opportunity side in the theoretical standards does not mean that they are adopted and practiced in the real word. Research into opportunity management practice shows that many organizations still use a threat-only approach (Hillson, 2002; Olsson, 2007; Krane et al., 2014; Johansen, 2015). Most of these organizations perform project risk management, but most of the time opportunities receive almost no attention or are completely neglected. Many project organizations also lack the practical tools and methods to support active opportunity management (Hietajarvi et al., 2017). Together, these findings suggest a mismatch between theory and practice of opportunity management.

This research focuses on the practical side of opportunity management and the challenges that project organizations experience in the implementation of opportunity management in their current project

risk management practice. To do this, a literature review and exploration in a Dutch construction company are performed. The findings of the literature review and exploration are used for comparison to identify the obstacles in the practice of opportunity management. The goal of this research is to find solutions for the implementation of opportunity management in already existing risk management of project organizations.

1.2 RELEVANCE

This master thesis is relevant from both a scientific and societal point of view. From a scientific point of view, research into opportunity management has shown the potential for project organizations when using opportunity management practices (Johansen et al., 2018). However, not much research was performed on the implementation of opportunity management in the existing risk management of an organization. Johansen (2015) suggests more research into three aspects of opportunity management: human, models and techniques. Risk and opportunity management has received more attention in the construction industry since the economic crisis of 2008, but the level of competence is still insufficient according to a research of PWC in the Dutch construction sector (PWC, 2016).

From a societal point of view, this thesis explores opportunity management in a Dutch construction organization. These organizations perform large construction projects for the government. These large construction projects in the Netherlands have had problems with risk management which resulted in delays and cost overruns (NRC Handelsblad, 2021). These projects are often paid with taxpayer's money so there is the responsibility to spend it in a good way. If construction organizations can identify and exploit opportunities, this could result in more value for taxpayer's money. Also, contractors have used high mark-ups in contracts to compensate for risks, but as margins have become smaller this is not effective anymore (Serpell et al. 2015). Finding and exploiting opportunities creates the possibility for projects to be more profitable in the future.

1.3 CONSTRUCTION ORGANIZATION

To explore the practice of opportunity management, a construction organization is used as. The construction organization is one of the largest construction companies in the Netherlands. The portfolio varies from small regional projects like regional motorways to megaprojects. The construction organization has its own in-house consulting department. The risk management department is part of this consulting department. A team of risk managers provides most projects with advice and support on risk management. The risk department provides access to documentation, projects, and employees to create an understanding of the practice of risk management in the organization.

1.4 PROBLEM STATEMENT

Many organizations use project management standards like PMBOK, PRAM and ISO for their risk management. In the last decade, all these standards have adopted an inclusive view of risk management. Despite this inclusive view, surveys and case study research found that many organizations use a threat-focused approach to project risk management (Krane et al, 2014; Hillson, 2002, 2019). There appears to be a problem in the application of these project risk management standards to the real world (De Carvalho & Rabechini, 2014). Where the standards have changed to an inclusive approach, the practice within the organizations has not changed. Obstructions need to be identified in the current threat-focused practice and solutions need to be developed to realize an inclusive risk management approach.

1.5 READING GUIDE

This section guides the reader through the report by explaining the content of every chapter.

- | | |
|------------|---|
| Chapter 1 | <i>Introduction</i> – The context for the research is set by introducing opportunity management, the social and scientific relevance, the participating construction organization, and the problem statement. |
| Chapter 2 | <i>Research design</i> – The design for the research is presented which consists of the research objective, research questions and research approach. |
| Chapter 3 | <i>Literature review</i> – The relevant literature for the research is presented. |
| Chapter 4 | <i>Exploring opportunities in practice: Set-up</i> – The set up for the exploration of the construction organization is presented. The exploration consists of document analysis, interviews, and observations. |
| Chapter 5 | <i>Exploring opportunities in practice: Results</i> – The results from the exploration are analysed and presented. |
| Chapter 6 | Comparing theory and practice – The results from the literature review and the exploration are compared to identify the gaps between theory and practice. |
| Chapter 7 | <i>Improving opportunity management</i> – The gap of opportunity techniques and training is selected to design a solution. The practice guide for an opportunity identification session is presented. |
| Chapter 8 | <i>Discussion</i> – In this chapter, the research is evaluated, and the limitations of the research are discussed. |
| Chapter 9 | <i>Conclusion</i> – The research is concluded by answering the main research question and providing suggestions for future research. |
| Chapter 10 | <i>Reflection</i> – The researcher reflects personally on the research project. |

2 RESEARCH DESIGN

In this chapter, the research design is presented based on the problem statement from the previous chapter. First, the research objective is explained in Section 2.1. Next, in Section 2.2 the main research question and sub questions are formulated to guide the research. In Section 2.3, the scope for the research is set to focus the research. In Section 2.4, the research approach is described coupling the research questions with the data to be collected, including a visualization of the research process.

2.1 RESEARCH OBJECTIVE

Research in opportunity management showed that many organizations still use a threat-focused approach to risk management (Krane et al, 2014; Hillson, 2002, 2019). Project organizations seem not able to integrate the management of opportunities in their existing risk management practice and there appears to be a gap between opportunity management theory and practice. This study aims to explore this gap in research empirically to contribute to the scientific body of knowledge and at the same time provide some practical directions for improvement for the current practice in the organization.

The research objective is formulated as follows:

Research objective: To identify the reasons of not (properly) applying opportunity management and coming with recommendations to improve opportunity management implementations in construction projects.

2.2 RESEARCH QUESTION

The research question guides the research and helps to achieve the research objective. The main research question for this study is formulated as follows:

Research question: *How can the current approaches of risk management in a construction organization be improved to manage opportunities?*

To answer the main research question, sub-research questions are formulated that decompose the main research question into smaller parts. The sub-questions help to guide and build the research step by step. The sub-research questions are:

Sub-question 1: *What are the current approaches and methods for opportunity management in literature?*

Sub-question 2: *What are the current approaches and methods used in practice for opportunity management?*

Sub-question 3: *What are the gaps between theory and practice of opportunity management?*

Sub-question 4: *What steps can be taken to improve opportunity management practice?*

The first sub-question aims to develop the theory that is needed to understand opportunity management. The second sub-question explores the current practice of opportunity management in a construction organization with the help of empirical data from the case of a Dutch construction

organization. The third sub-question uses the data from the first and second sub-questions to compare the theory and current practice of opportunity management and identifies the gaps between theory and practice. This comparison provides insights in the challenges and potential direction for improvement. The fourth sub-question builds on the results of sub-question three. From the identified gaps between theory and practice, one is selected that needs to be improved. This improvement is designed and evaluated for sub-question four.

2.3 RESEARCH SCOPE

To prevent the research from drifting of course, the scope of the research needs to be defined and bounded. Opportunity management is part of a wider context in which it operates. It is important to understand the different levels and relationships for opportunity management in its environment. Figure 2 is used to visualise the environment in which opportunity management is situated and the relationships between the different levels in the project organization. Opportunity management is part of project risk management, so this forms the inner ring. Project risk management is part of project management. Project management is performed by the project organization which is the outer ring. All these different layers influence the core of opportunity management. It is important to maintain focus on the topic of opportunity management and not digress in the other broader topics of project risk management and project management. At the same time, it is acknowledged that by focusing on opportunity management and leaving out the wider context, some relevant influences will be missed in the research.



Figure 2 Research scope

2.4 RESEARCH APPROACH

The research approach is described to explain the decisions for certain methods and techniques in this study. The research aims to explore opportunity management in practice. This requires a qualitative research approach according to Fellows and Liu (2015). Limited research is conducted into the implementation and integration of opportunity management in existing risk management. So, an exploratory approach is selected. Furthermore, a social research method is preferred that can deal with people and their behaviour as opportunity management is performed by people in an organization. According to Yin (2017), a case is preferred when the study of a contemporary event is desired, when the behaviours cannot be manipulated and when the research question is of the 'how' form. Concluding, a qualitative research method is selected in combination with an exploratory case to explore the practice of opportunity management.

Next, the link between the research questions and the data to be collected is discussed.

Sub-research question 1 aims to develop an overview of the latest theory about opportunity management. This is needed for the comparison with opportunity management practice in sub-question three. The overview needs to contain influential factors for opportunity management and a theoretical approach with methods and tools. Also, the overview provides some direction and background knowledge for exploration of the practice of opportunity management in the case of the construction organization. To create this overview, a review of opportunity management literature is performed.

Sub-research question 2 aims to develop an overview of the current opportunity management practices in an organization. The overview of opportunity management practiced is used in sub-question three for the comparison with opportunity management theory. The construction organization is used as case to explore the practice of opportunity management in a construction organization. For this exploration, multiple data sources are used in the organization. A combination of document reviews, interviews and observations provide insights and understanding of what happens in reality. The results from sub-research question 1 are used as background information to guide the exploration.

Sub-research question 3 compares the results from sub-research question 1 and 2, respectively the theoretical approach for opportunity management and the practice of opportunity management in reality. From the comparative analysis, gaps between theory and practice are identified. One of these gaps is selected for sub-question four to design an improvement. Also, the factors of influence for improving opportunity management are identified that can help to improve the practice of opportunity management for sub-question four.

Sub-research question 4 aims to design an improvement for an identified gap from sub-question three. The results from sub-question one and two are used to support the decisions in the design process.

The research approach is schematized in Figure 3.

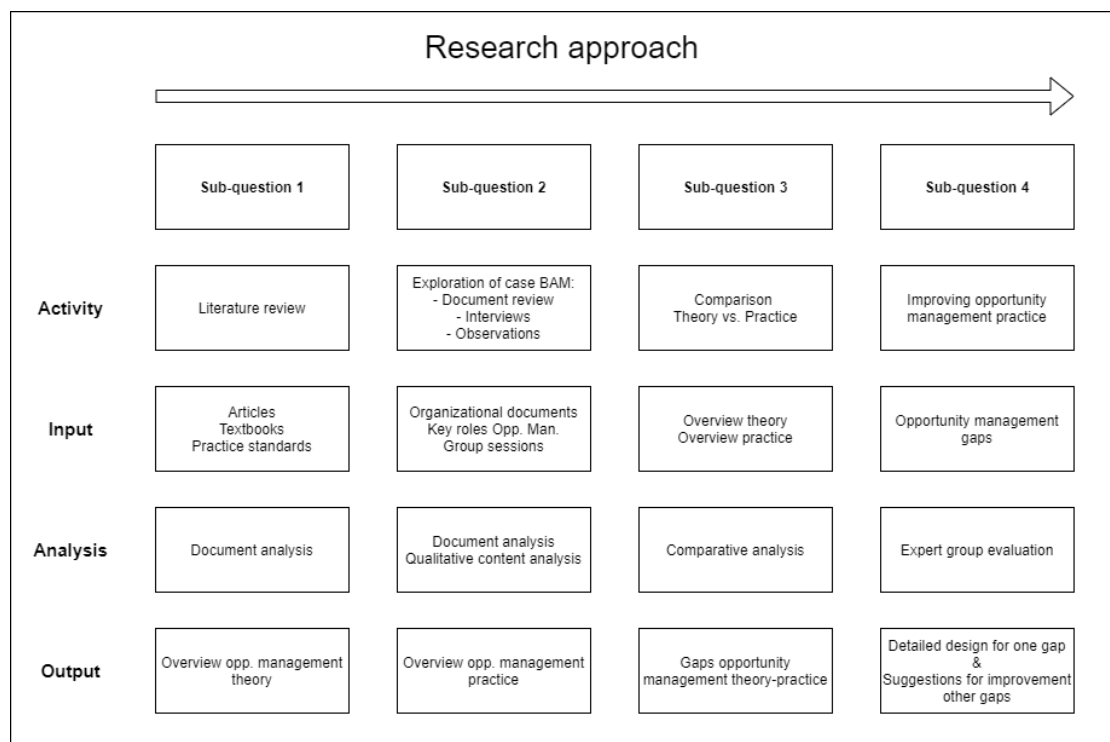


Figure 3 Research approach

3 LITERATURE REVIEW

The literature review is conducted to answer sub-research question 1 and results in an overview of the latest opportunity management theory.

Sub-question 1: *What are the current approaches and methods for opportunity management in literature?*

Research into opportunity management has resulted in scientific articles, textbooks, and practice standards. These sources are collected through databases of the TU Delft Library, Google Scholar and Scopus. Literature from a period between 1995 and 2020 is used since opportunity management research emerged in the early 2000's. The keywords used for the search are combinations of *Risk*, *Uncertainty*, *Opportunity*, *Construction* and *Management*. This resulted in articles, journals, practice standards and textbooks related to opportunity management. Also, the articles that were found were searched for relevant references to extend the literature review. The literature sources are sorted and reviewed to create an overview of the research on opportunity management. From the sources, a theoretical approach of opportunity management is composed and influential factors for opportunity management in organizations are gathered.

In Section 3.1, the basic principles of opportunity management are described. Next, Section 3.2 discusses the factors of influence found in literature. In Section 3.3, a process overview for opportunity management is composed out of textbooks and practice standards. At last, these elements are combined in the conclusion in Section 3.4. The conclusion consists of a theoretical approach for opportunity management consisting of process description and influential factors that can be used for the comparison with sub-question three. At the same time, the insights gathered in the literature review provided a starting point for the exploration in the construction organization.

3.1 RISK- AND OPPORTUNITY MANAGEMENT

Opportunity management is part of project risk management. In the discipline of project risk management, a debate is going on about the terms risk management and uncertainty management (Hillson, 2004, 2019). There are two perspectives; (1) Uncertainty management is the umbrella term for risks (negative) and opportunities (positive) or (2) Risk management is the umbrella term for threats (negative) and opportunities (positive) (Hillson, 2004; Chapman & Ward, 2011). For opportunity management there is no distinction. However, the term *risk* can be interpreted in two ways; Risk is neutral (both positive and negative) or risk is negative. In this research, the neutral definition for risk is used in combination with negative threats and positive opportunities.

Other relevant terms related to opportunity management and their relationships are described and their relationships are presented in Figure 4.

Project:	<i>A group activity with unique scope (including objectives), (limited) resources and constraints (time, cost, and quality). (PMI, 2017)</i>
Uncertainty:	<i>Lack of certainty (Chapman & Ward, 2011)</i>
Risk:	<i>An uncertainty having a positive or negative effect on objectives (Chapman & Ward, 2011; PMI, 2017; Johansen et al., 2019; Hillson, 2019)</i>

Threat:	<i>A risk having a negative effect on objectives (Johansen et al, 2019; Hillson, 2019)</i>
Opportunity:	<i>A risk having a positive effect on objectives (Chapman & Ward, 2011; PMI, 2017; Johansen et al., 2019; Hillson, 2019)</i>

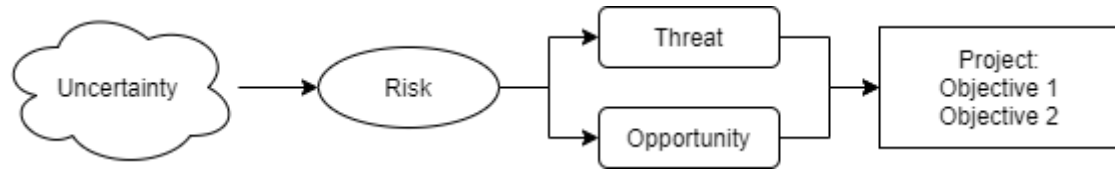


Figure 4 Relationship Uncertainty, Risk, Threat and Opportunity

In a project, risk can be found on two different levels; individual project risks and overall project risk (PMI, 2017). An individual project risk consists of three elements: *Cause*, *Event* and *Effect* (Johansen et al., 2019; Hillson, 2019; PMI, 2017). The relationships are visualized in Figure 5.

Cause:	<i>Definite events or sets of circumstances that exist in the project or its environment which give rise to uncertainty (Hillson, 2019).</i>
Event:	<i>Uncertainties that if they occur would affect project objectives (Hillson, 2019)</i>
Effect:	<i>Unplanned variations (positive and negative) from project objectives that arise as a result from events occurring (Hillson, 2019)</i>



Figure 5 Relationship Cause, Event and Effect

To explain an individual project risk, it is helpful to use risk metalanguage which connects the different elements of a risk together.

*“As a result of <one or more definite causes>,
<uncertain event> may occur,
which would lead to <one or more effects on objective(s)>.” (Hillson, 2019)*

Overall project risk tells how risky the entire project is. The overall project risk is composed of individual project risks and can be positive or negative (PMI, 2017; Hillson, 2019). However, it is not a simple sum of all the individual project risks which result in the overall project risk. The overall project risk can be used within the organization to compare projects and support the strategy of the company to meet a certain level of risk exposure (Hillson, 2019). Where the project manager and his team are focused on the individual project risks, the management of the organization is concerned with the overall project risk.

Concluding, opportunity management is part of project risk management. Risks can be positive, called an opportunity, and negative, called a threat. A risk consists of a definite cause, an uncertain event, and an effect on objectives.

3.2 FACTORS OF INFLUENCE

Research into opportunity management has resulted in factors that affect the practice of opportunity management. First, factors that could lead to failure of opportunity management are discussed in Section 3.2.1. Next, the factors for success of opportunity management are described in Section 3.2.2.

3.2.1 Factors for failure

In opportunity management research, multiple factors for failure are described. This section describes the factors that lead to failure in opportunity management. The factors are: Inertia, Ignorance, Culture, and Psychology.

Inertia

Inertia is a factor for failure in opportunity management (Hillson, 2019). The risk management process is threat-focused so this needs to change (Chapman & Ward, 2002). However, it is easier to keep doing what you have been doing than to learn and do something new. The resistance to change makes it hard to practice opportunity management.

One of the biggest obstructions for opportunity management are the classical project management theories (Johansen, 2015). These old theories stimulate a 'stick to the plan' approach. From the start of the project, change is seen as negative and should be avoided. Johansen et al. (2018) found that sponsors, clients, and contractors in construction projects are reluctant to innovative approaches or novel ideas. They rely on tried and tested techniques or proven technologies to minimize risks. However, the project environment has changed, and awareness has grown that change can be beneficial but needs to be managed.

Most organizations have a risk management process in place, which is often based on the classic project management approach mentioned earlier (Hillson, 2019). The people in the organization are familiar with the process, and some were responsible for implementing the process. The current risk management process can be seen as a legacy which people find difficult to change or leave behind.

The classic project management approach can also be seen in the defensive approach of most project managers. The defensive approach sees external and internal uncertainties as risks, applies risk mitigation concepts with probabilities and contingencies and focuses on monitoring developing major risks. To be able to manage opportunities, an offensive approach of project managers is needed that seeks and exploits opportunities (Rolstadas, 2008; Johansen et al., 2019).

Ignorance

Ignorance is a factor of failure that can be described as the lack of knowledge and awareness about opportunity management. Within organizations, many people are not aware of the concept of opportunities (Hillson, 2019). Johansen (2015) describes this as the blind spot which is the lack of ability to identify and exploit opportunities in projects, especially in the execution phase. According to Serpelli et al. (2014), a lack of knowledge is the main cause of ineffective opportunity management in construction projects.

Culture

Culture can be explained as *the collective programming of the mind that distinguishes the members of one group or category of people from others* (Hofstede, 2003). Culture exists at three different levels: National, organizational and team. These levels can influence the attitude and behaviour of individuals and groups towards risks (Hillson & Murray-Webster, 2007).

Hofstede (2003) compared national cultures and found *Uncertainty Avoidance* to be a differentiating factor. Uncertainty Avoidance is not the same as risk avoidance but cultures with high uncertainty avoidance keep away from ambiguity which can be related to uncertainty. Countries with higher uncertainty avoidance have higher anxiety levels, are more concerned about the future, are driven by fear of failure and resisting change. All these characteristics are not contributing to an inclusive risk management process. An organization in a country that scores high on uncertainty avoidance should be aware of the challenges that arise in opportunity management caused by national culture.

One level below the national culture, the organizational culture is located. Chapman and Ward (2002) found that organizational culture caused significant barriers to effective risk management. The organizational culture impacts the way people within the organization deal with risks. When leadership is only focused on threats it becomes difficult to have an inclusive risk management process. The tone from the top is very important for opportunity management in the organization. Leadership needs to create a safe working environment that encourages their workers to explore opportunities next to threats.

The project team culture has the strongest influence on the attitude and behaviour of individuals (Hillson & Murray-Webster, 2007). A project team is a small group of people that work intensely together and, in that way, can create their own culture. If this culture is not stimulating the inclusion of opportunities in risk management, it becomes almost impossible to identify and exploit opportunities. Krane et al. (2014) found that project teams who believe that they have enough money and time to deliver the project have a limited motivation and interest for opportunities. They see opportunities as a gamble where they must change the original plan.

Psychology

Maslow et al. (1987) developed the *Hierarchy of Needs* pyramid to explain human needs. They found two groups of human needs; *Deficiency* needs and *growth* needs. Deficiency needs must be addressed first, examples include air, food, sleep and safety. Growth needs are 'nice to have', they are not necessary. Growth needs include understanding and self-actualization. With this insight, threats can be seen as deficiency needs because they influence the feeling of safety. Opportunities can be seen as growth needs because they are perceived as optional and not essential. This could explain the findings of Krane et al. (2014) that project teams that feel that the project is safe have no incentive to look for opportunities. Johansen et al. (2019) found that people tend to focus on threats to assure that a project is not jeopardized. When they feel that the project is safe, they can address opportunities. At the same time, when the project is safe there is no direct incentive to look for opportunities as long as the project is going as planned. This suggests that an incentive is needed for opportunity management, top management and clients could help to incentivize the project team.

3.2.2 Factors for success

Success factors for opportunity management are described in this section. The factors are: Language, process, infrastructure, organizational learning, culture, and mindset.

Risk language

In Section 3.1, the different interpretations of the word risk were introduced. Some see a risk only in a negative way as a threat, others see it as both positive and negative. Johansen (2015) found inconsistency in the use of terms related to risk and opportunity management in project risk management standards. The language that we use in risk management is important because we use it to communicate. Furthermore, language reflects our underlying beliefs, which also influences behaviour. Risk specialists face the problem of speaking different languages when talking to each

other and non-risk specialists (Chapman & Ward, 2011; Hillson, 2019). Risk management is dependent on the input of non-specialists. If members of a project team do not speak the same language, it becomes very hard to practice opportunity management.

The factor consists of two elements; First, the risk language needs to use the inclusive definition of risk that includes both threats and opportunities. All researchers agree that opportunities are part of risk management. But the definition and relations of the used terms differ. Some see *uncertainty* as the umbrella for both *risks* and *opportunities* (Chapman & Ward, 2011; Johansen et al., 2019). Others see *risk* as the umbrella for *threats* and *opportunities* (PMI, 2017; Hillson, 2019).

Second, this common language needs to be spoken by all the people in the organization but also by external people that work with the organization. It is less important which precise definitions are used in risk, as long as they are uniform and inclusive. These definitions need to be written down, understood, and spoken by all the people within the organization.

Risk process

Risk management itself is not an objective, risk management is a means for realising project objectives in a controllable way. When the risk management process is complicated and extensive, it becomes a *must do* instead of *wanting to* for individuals. To avoid these problems and improve the process, risk management should be simple and scalable (Hillson, 2019). One should avoid an overly complex process with confusing policies, strategies frameworks, and plans (Chapman, 2011). This means that the risk management process needs to be simple enough while still meeting the needs of the projects and organization. The process needs to be scalable to the different projects in the organization. For the small and less complex projects, a minimal risk management process is sufficient. For a large and complex project, a more elaborate approach is needed to cover the entire project.

Chapman and Ward (2011) advocate an appropriate level of detail and prescriptive approach depending on the context and complexity of the project. The process needs flexibility and lack of limitation or bounds. At the same time, this requires judgement and knowledge from the people involved in the project to determine a suitable process.

The Project Management Body of Knowledge (PMBOK) guide (PMI, 2017) promotes tailoring of the risk management process to the project specifics. It provides characteristics that have to be considered when tailoring the process: Project size, project complexity, project importance, development approach.

Hillson (2019) argues that in the risk and opportunity management process, the techniques used for dealing with threats need to be different from the techniques dealing with opportunities. People associate a certain technique with threats and can find it difficult to apply the same technique to opportunities.

Risk infrastructure

When a simple and scalable risk process is selected, it is necessary to provide an infrastructure to support it. This infrastructure consists of tools, techniques, training, templates and technical support from risk specialists (Hillson, 2019). Many organizations have included some or all of these elements in their risk management process. However, most of these elements are designed and developed for the use of threats, one of the legacies of classic project management. Olsson (2007) observed that most existing risk management processes are aimed at managing 'tame' problems and ignore the 'messes' and 'wicked problems'. At the same time, opportunities are more likely to be found in these messes and wicked problems. When the infrastructure does not support opportunities, it is impossible

for the members of an organization to manage them. Organizations need to have all the elements of a proper risk management infrastructure and at the same time make sure that this infrastructure supports the management of both threats and opportunities.

Organizational Learning

The purpose of organizational learning is that future projects learn from projects in the past. To do this, organizations need to capture lessons to be learned in the risk management process. Risk information that should be part of this system consists of generic risks, effective and ineffective risk responses, commonly encountered secondary risks and risk process elements that work or that don't work. An organization needs to understand behaviour, culture, project owner's role and stakeholder interaction in the risk management process. This requires a focus on learning and knowledge creation and sharing from the mother-organization to develop new tools, methods and techniques to be used in all projects (Johansen, 2015).

But this is only a part of the knowledge that an organization can obtain for its own benefit. There is also a lot of research conducted on the topic of risk management. To collect all this valuable information, a Knowledge Management system needs to be put in place that captures the information and shares it with the organization (Hillson, 2019).

Risk culture

The culture was already introduced as a factor of failure, because an unsupportive culture hinders risk and opportunity management. But it is important to understand how a culture can be a factor for success at the same time when used in good way. Risk culture is of great influence on opportunity management (Chapman & Ward, 2011; Johansen et al., 2019; Hillson, 2019). Johansen et al. (2019) found organizational culture to play the most important role in analyzing and managing project uncertainty. The organizational- and team culture can be influenced and thus need to be managed in the right way to manage opportunities.

To develop a strong and mature organizational risk culture, both a top-down and bottom-up approach are required (Hillson, 2019). Leaders in the organisation need to explain their intent, vision and policy for risk management. This needs to be actively communicated to the entire organisation. Also, the desired risk-related behaviour needs to be promoted and encouraged by the leaders. Hietajarvi et al. (2017) found that contractual arrangement or individual and project-based incentives helped to create a sense of ownership with individuals that increased the willingness of individuals to look for opportunities. These incentives need to be implemented by top management.

Risk culture influences the risk attitude in an organization. The risk attitude is the chosen position towards risk by a group or individual. Figure 6 shows the relation between risk culture and risk attitude according to Hillson (2019). Risk-related behaviour consists of external observable risk-related actions such as decision making, communication and risk processes.

A risk attitude that is threat focused sees risk as avoidable, negative, and something that should be prevented. An opportunity inclusive risk attitude sees risk as natural, potentially good, and something that could be exploited. Johansen (2019) identified three factors that influence how an individual may evaluate risk: Ability, Impact, and role/position.

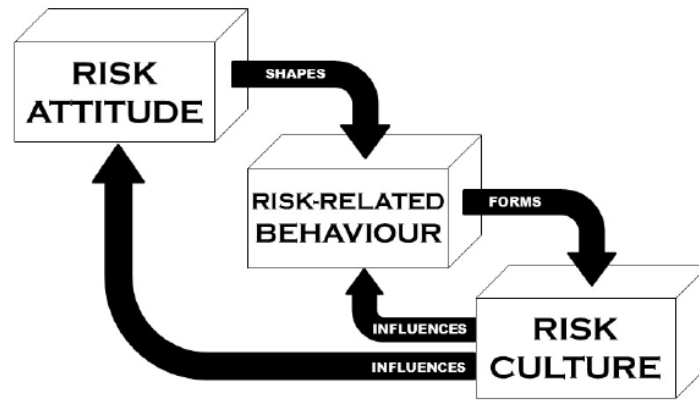


Figure 6 Risk A-B-C Model (Hillson, p.242, 2019)

Opportunity Mindset

The mindset directs the focus of a person in a certain direction. When the characteristics of a mindset for opportunity are known, it becomes possible to influence the mindset to set it up for opportunity management.

To effectively exploit opportunities, a positive attitude towards uncertainty is required (Johansen et al., 2019). This positive attitude needs to see the world as unpredictable and uncertain which is not always bad. Johansen et al. (2019) explain the need for a shift moving away from the old mindset that sees: *“Uncertainties as undesired; Projects as known tasks to be accomplished in known environments; and Deviation from project baselines as inaccurate planning or inappropriate control.”* To a new mindset that: *“Accolades the nature of the project as unique and uncertain which requires dynamic strategies and execution philosophies; Embraces a continuum of known-unknown tasks that have to be executed in unfamiliar and turbulent locations and environments; and Recognizes deviations as the rule instead of the exception, applying dynamic skills to drive and deliver results.”*

According to Chapman and Ward (2011), *high morale* is as crucial for uncertainty, risk and opportunity as the general management of project teams. When the focus is on eliminating threats, the people involved are immersed in negative thoughts and this can negatively influence the project.

Hillson (2019) explains the mindset as *a set of attitudes and beliefs that drive behaviour in a particular direction*. Every person has his own mindset and this is natural for this person. However, the fact that it feels natural to a person makes this person unaware of it. Also, if we want to make use of the mindset for opportunity management, this mindset has to include opportunities. He proposes seven characteristics of an opportunity mindset: Realism, positive thinking, alertness, curiosity, readiness, ‘can do’ attitude, and the visualisation of success.

3.3 OPPORTUNITY MANAGEMENT FRAMEWORK

In this section, an opportunity management framework is created from literature to explain the factors for success of risk process and risk infrastructure. The purpose of the framework is to create an overview of an opportunity management process and the supporting infrastructure based on theory. It is used for the comparative analysis in sub-question 3 and also provides some insights in what to look for during the exploration in terms of process, tools, and techniques. Most organizations use a risk management process based on a practice standard and adapt this to the context of the organization (Chapman & Ward, 2002).

To start composing the framework, it needs to be decided if opportunity management is a separate process or are integrated in the risk management process together with threats. Next, different risk management approaches found in textbooks and practice standards are reviewed to develop a framework with all the steps, tools and techniques that can be used for opportunity management.

3.3.1 Separate or together

Most organizations already have a threat focused risk management process in place. There are two options to combine opportunity management in the existing process. One option is to integrate threats and opportunities in the same process, the other options is to deal with threats and opportunities in a separate process.

Dealing with threats and opportunities separate allows for specific focus on both types but is more restrictive. Furthermore, this creates another dilemma of which of the two goes first (Hillson, 2019). Where some people argue that opportunities need to be addressed first because the team is more energized and fresher in the project, other argue that first threats need to be dealt with because we have a natural tendency to think about threats first.

Dealing with threats and opportunities at the same time can be more effective and efficient, threats and opportunities are often interrelated and it allows participants to address any kind of risk at all times (Chapman & Ward, 2011; Hillson, 2019). For these reasons, a process that deals with threats and opportunities together is preferred.

3.3.2 Composing the framework

To build the framework, three different risk management approaches are selected providing input from different perspectives. The three approaches are selected on the basis of their focus in the risk management process. The first approach, *How to manage project opportunity and risk*, is created by Chapman and Ward (2011) and is focused on managing uncertainties. The second approach, *Capturing upside risk*, is created by Hillson (2019) and is focused on managing opportunities and threats. The third approach is the *Project management body of knowledge* practice standard from the Project Management Institute (2017) and is focused on a general applicable risk management process for all types of projects.

Decomposing each approach

The three approaches are decomposed and analysed based on the same process elements: Process phases, goal of the phase, input of the phase, techniques used in the phase, output of the phase, and process steps of the phase. By using the same elements, the next step for composing the framework becomes easier. In Table 2-4, all the elements per phase are listed for each approach.

Table 2 Analysis of 'How to manage project opportunity and risk' (Chapman & Ward, 2011)

Phase	Goal	Input	Techniques	Output	Steps
Define the project	Define: Provide an effective common understanding	Define: Relevant project information	Define: Seven W's	Define: Written document following the steps	Define: Start the process, Consolidate/Elaborate: project lifecycle, project context, project parties, project objectives, project design, whichway plans, wherewithal plans, project timing, Fit for purpose?, Complete process
Focus the project	Focus: Provide the basis of a clarity efficient process and adapting the process to the project	Focus: Previous phase	Focus: -	Focus: Written document following the steps	Focus: Start, Scope the process:clarify process lifecycle/context/parties/objectives, top down uncertainty appreciation, consolidate process strategy. Assess the process scope?, Plan the process: select process approach, determine resources required, determine timing. Assess the process plan? Next phase
Identify sources of uncertainty, response options and conditions	Common understanding of all the relevant sources of uncertainty facing the project, and what can be done about them to the extent this is relevant, explained at an appropriate level of clarity.	Define phase, Corporate weakness summary list, Process ambiguity summary list, checklist/prompt lists	11 response types (Modify objectives, avoid, influence probability, modify consequences, transfer consequences, develop contingency plans, keep options open, monitor, accept, remain unaware, optimize all the types), Uncertainty source decomposition, Interviews (individual, group), Brainstorming, Decision conferencing, Pondering, Synectics,	Risk list	Search/Classify: clarify immediate priorities, decompose the next priority source if this is appropriate, clarify the relevant primary responses, clarify the relevant secondary sources and responses, clarify the relevant conditions, clarify the immediate need for more breadth or depth. Fit for purpose?
Structure all uncertainty	Structure: The objective is to improve understanding of the relative importance of different sources given a qualitative view of consequences and identified response options, to explore relevant interactions, and to test the assumptions implicit or explicit in all earlier steps.	Structure: Previous phases, Precedence networks, Gantt charts,	Structure: Source-Response diagrams, Decision trees, Fault/event trees, Influence diagrams,	Structure: Qualitative model, diagrams	Structure: 1. Develop orderings, Explore interactions, Refine classifications, Other selective restructuring. 2. review key plan components and associated sources, review other plans and Ws and associated sources, identify general responses and order responses, examine links between sources and responses, develop diagrams and review associated models. Fit for purpose?
Clarify Ownership	Clarify: Making sure that every relevant source of uncertainty and response option has an appropriate owner	Clarify: Previous phases	Clarify: -	Clarify: Contracts	Clarify: Scope the contracting strategy: clarify the objectives of contracting strategy, identify owners for the sources of uncertainty and responses, uncertainty appreciation and contract design. Plan/Re-plan the oncontracts: select a contract approach, select contract terms, contract timing. Strategy fit for purpose? Plans fit for purpose? Overall deliverables fit for purpose?
Quantify Some uncertainty	Quantify: probability estimates of some uncertainty associated with sources of uncertainty and response options	Quantify:	Quantify: Histogram, scenario, probability distribution functions, fractile methods, relative likelihood methods	Quantify: probability estimates of some uncertainty associated with sources of uncertainty and response options	Quantify: Start ordering the sources, Clarify associated conditions, assess the next priority source, Refine and restructure this source, size this source, extend the ordering of the sources, Deliverables fit for purpose?
Evaluate all the relevant implications	The purpose of the evaluate phase is combining the results of the quantify phase in the context of all earlier PUMP phases and evaluating all relevant decisions and judgements.	Documentation previous phases	Common Interval, Discrete probability arithmetic, Sensitivity analysis,	Evaluate report	Select appropriate subset of sources, specify dependence, combine the subset of sources, portray the effect, diagnose the implications, Deliverables fit for purpose?

Table 3 Analysis of 'Capturing upside risk' (Hillson, 2019)

Phase	Goal	Input	Techniques	Output	Steps
Risk Management Planning	To ensure that the risk approach on this project is appropriate & effective	Project charter, Business Case, Stakeholder meetings,	-	Risk management plan	Define objectives at risk and scope of risk process, Reflect risk appetite of key stakeholders in measurable risk thresholds, Tailor risk process to match the risk challenge of the project (Assesment criteria & framework), Create risk management plan
Risk Identification	The purpose of risk identification is to identify knowable risks that otherwise would not be managed	Project documentation, different perspectives	<u>Post-focused techniques</u> : Checklist, Industry knowledge base, Post-project reviews, Lessons-learned database, Historical information <u>Present-focused techniques</u> : Assumption analysis, Cause-and-effect diagram (fishbone), Document review FMEA/Fault tree analysis, System dynamics modelling <u>Future-focused techniques</u> : Brainstorming, Delphi (expert review) technique, Interviews, Futures thinking, Nominal Group Technique Prompt list, Questionnaire, Scenario Analysis, Visualisation	Risk register	Separate risks from non-risk using metalanguage, Use identification techniques, Create risk register
Risk Assessment (Qualitative)	Qualitative : To evaluate key characteristics of identified risks in order to prioritise them for further attention and action	Qualitative : Risk Management Plan, Risk register,	Qualitative : Prioritising: P-I Matrix, bubble chart, risk prioritisation chart, action/impact. Categorising: Breakdown structures, window timeline	Qualitative : Updated risk register, risk report, top risk lists	Qualitative : Define prioritisation dimensions (attention/action), Prioritise, Categorise, Update risk register
Risk Assessment (Quantitative)	Quantitative : To evaluate overall project risk by considering the combined effect of uncertainty on project outcomes	Quantitative : Time schedule, WBS, CBS, risk register	Quantitative : Monte Carlo simulation, decision trees, influence diagrams, system dynamics modelling, multi-criteria decision analysis, real options analysis	Quantitative : S-curve, Sensitivity Analysis, Criticality analysis, overall project risk assessment	Quantitative : Define purpose analysis, develop risk model, generate input data and enter in risk model, initial analysis, secondary analysis, produce and interpret analytical results, decide appropriate course of action and report results, evaluate overall project risk
Risk Response (Planning)	Planning : To identify appropriate ways to address individual threats and opportunities, as well as ways to manage overall project risk	Planning : Risk register	Planning : Strategies (Escalate, avoid, transfer, reduce and accept),	Planning : Updated risk register	Planning : Select preferred strategy, ensure ownership
Risk Response (Implementation)	Implementation : To ensure that agreed risk response strategies and actions are implemented effectively	Implementation : Risk register	Implementation :	Implementation : Updated Risk register	Implementation : Involve action owners, explain benefits/consequences, provide resources, demonstrate required behaviour, celebrate success
Risk Reporting & Communication	Reporting : To provide project stakeholders with timely and accurate risk information to support appropriate risk-informed decision-making and action	Reporting : Risk register, risk report	Reporting : Stakeholder risk information needs analysis	Reporting : Risk communication design	Reporting : stakeholder risk information needs analysis, create risk communication design, communicate
Risk Review	Review : To provide visibility of current risk exposure	Review : Risk register, risk report	Review : Asses, Review, Identify, Review	Review : Updated risk register	Review : Assess status existing risks, Review effectiveness of risk responses, identify new risks, review the effectiveness of the risk process
Risk Related Lessons	Lessons : To capture knowledge and experience in a form that can improve performance in remaining phases of this project and in future similar projects	Lessons : Risk register, risk report, RBS, issue log, project earned value data, project change log	Lessons : Threat related questions, Opportunity-related questions, Risk process-related questions	Lessons : L2BL register	Lessons :

Table 4 Analysis of 'Project management body of knowledge guide' (PMI, 2017)

Phase	Goal	Input	Techniques	Output	Steps
Plan Risk Management	Defining how to conduct risk management activities for a project	Project charter, Project Management Plan (all components), Project documents (stakeholder register), Enterprise environmental factors, Organizational process assets	Expert judgment, Data analysis (stakeholder analysis), Meetings	Risk Management Plan	
Identify Risks	Identifying individual project risks as well as sources of overall project risks and documenting their characteristics.	Project management plan, Project documents, Agreements, Procurement documentation, Enterprise environmental factors, Organizational process assets.	Expert Judgment, Data Gathering (Brainstorming, Checklists, Interviews), Data analysis (Root cause, Assumption and Constraint analysis, SWOT, Document analysis), Interpersonal/team skills (facilitation), prompt lists, meetings	Risk register, Risk report, Project documents updates (assumption log, issue log, lessons learned register)	
Qualitative Risk Analysis	Prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics	Project management plan, Project documents, Enterprise environmental factors, Organizational process assets	Expert judgment, Data gathering, Data analysis, Interpersonal and team skills, Risk categorization, Data representation, Meetings	Project documents upgrade	
Quantitative Risk Analysis	Numerically analyzing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives	Project management plan, Project documents, Enterprise environmental factors, Organizational process assets	Expert judgment, Data gathering, Interpersonal and team skills, Representations of uncertainty, Data analysis	Project documents upgrade	
Plan Risk responses	Developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.	Project management plan, Project documents, Enterprise environmental factors, Organizational process assets	Expert judgment, Data gathering, Interpersonal and team skills, Strategies for threats, Strategies for opportunities, Contingent response strategies, Strategies for overall project risk, Data analysis, Decision making	Change requests, Project Management plan updates, Project document updates	
Implement risk responses	Implementing agreed-upon risk response plans	Project management plan, Project documents, Organizational process assets	Expert judgment, Interpersonal and team skills, Project management information system	Change requests, Project document updates	
Monitor risks	Monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating risk process effectiveness throughout the project.	Project management plan, Project documents, Work performance data, Work performance reports	Data analysis, Audits, Meetings	Work performance information, Change requests, Project management plan updates, Project documents updates, Organizational process assets updates	

The approach of Chapman and Ward (2011) is focused on the uncertainty in projects to manage opportunities and risks. This can be seen in the phasing of the approach where structuring and clarifying the uncertainty plays an important role. Opportunities and threats (called risks in the approach) are treated equally, everything is the same for opportunities as for threats. The approach describes the steps elaborately while the inputs and outputs are described in a minimal way.

The approach of Hillson (2019) is focused on managing opportunities in projects by identifying, analysing and responding. The approach provides many techniques and describes the minimal input and output. Opportunities and threats are integrated in the same process, however certain techniques are applicable to only threats or opportunities.

The approach of PMI (2017) is the most basic and general of the three. It describes project risk management for all types of projects. It uses an integral approach for managing both threats and opportunities and makes no difference in the techniques for opportunities or threats. The approach lists inputs, techniques, and outputs but does not describe clear steps for each phase.

Combining the approaches

Next, all elements of the approaches are used to compose the framework.

First, the phasing of the approaches is compared in Table 5 to identify the general process phases. Five phases can be distinguished: Planning, Identification, Assessment, Risk response, and Monitor & Control.

Table 5 Composing general process phases

General Process	PMBOK (2017)	Hillson (2019)	Chapman & Ward (2011)
Risk management Planning	Plan Risk Management	Risk Management Planning	Define the project
			Focus the project
Risk Identification	Identify Risks	Risk Identification	Identify sources of uncertainty, response options and conditions
Risk Assessment	Qualitative Risk Analysis	Risk Assessment (Qualitative)	Structure all uncertainty
	Quantitative Risk Analysis	Risk Assessment (Quantitative)	Clarify Ownership
			Quantify Some uncertainty
Risk response	Plan Risk responses	Risk Response (Planning)	-
	Implement risk responses	Risk Response (Implementation)	
		Risk Reporting & Communication	
Risk Monitor & Control	Monitor risks	Risk Review	Evaluate all the relevant implications
		Risk Related Lessons	

Next, for each phase the purpose, input, techniques, output, and steps are described in Tables 6-11.

Table 6 Composing the planning phase

Risk Planning				
Purpose:	Input:	Techniques:	Output:	Steps:
Define the project context to tailor the risk management process to project. Provide a common understanding of how the risk process is going to take place and what it is going to achieve in the end.	Project charter/business case, project management plan and involvement of stakeholders.	The seven Ws: Why, What, Who, When, Whichway, Wherewithal. Expert judgment, Data analysis, Meetings.	Risk Management Plan (RMP)	1. Gather all available information on the project. 2. Create a project context that answers the seven W's. 3. Tailor the risk management process to the project

Table 7 Composing the identification phase

Risk Identification				
Purpose:	Input:	Techniques:	Output:	Steps:
Identify and document the characteristics of both individual project risks as overall projects risks	Project documents, PMP, All relevant parties with different perspectives.	<p><u>Past-focused techniques:</u> Checklist, Industry knowledge base, Post-project reviews, Lessons-learned database, Historical information</p> <p><u>Present-focused techniques:</u> Assumption analysis, Cause-and-effect diagram (fishbone), Document review, SWOT FMEA/Fault tree analysis, System dynamics modelling, Root-Cause analysis, facilitation, Decision conferencing</p> <p><u>Future-focused techniques:</u> Brainstorming, Delphi (expert review) technique, Interviews, Futures thinking, Nominal Group Technique Prompt list, Questionnaire, Scenario Analysis, Visualisation. The use of metalanguage is crucial to separate risks from non-risks.</p>	Risk register, Risk Report, Updated RMP	1. Collection of data 2. Application of techniques (preferably the past, present and future technique) 3. Collection of risks in the risk register.

For the identification phase, three different types of techniques are used. The past-focused techniques make use of experience gained in previous projects. The present-focused techniques make use of the information available at that moment. The future-focused techniques tries to predict the future and is thus less precise.

Table 8 Composing the qualitative assessment phase

Qualitative Risk Assessment				
Purpose:	Input:	Techniques:	Output:	Steps:
Prioritize individual risks	RMP, risk register and other project documents.	<u>Prioritising:</u> P-I Matrix, bubble chart, risk prioritization chart, Source-Response diagram, Fault-Event Tree, Influence diagram Reaction/impact. <u>Categorising:</u> Breakdown structures, window timeline, expert judgment, risk categorization	Updated Risk register, Updated Risk report, top risk list.	1. Definition of prioritisation dimensions 2. Prioritisation 3. Categorization 4. Document updates.

Table 9 Composing the quantitative assessment phase

Quantitative Risk Assessment				
Purpose:	Input:	Techniques:	Output:	Steps:
Analyse the combined effect of individual risks on overall project risk.	RMP, Risk Register, schedules and breakdown structures.	<u>Simulation:</u> Monte Carlo, system dynamics modelling. <u>Diagrams:</u> Breakdown structures, Decision trees, influence diagrams, multi-criteria analysis, real options analysis, Histogram, Scenario analysis, Fractile Methods, relative likelihood methods. Expert judgment	Updated risk register, updated risk report, Overall project risk assessment (S-curve/Criticality analysis)	1. Definition of goal of the analysis 2. Development of risk model 3. Generation of input data 4. Validation of model 5. Interpretation of results on overall project risk. 6. Document updates

Table 10 Composing the response phase

Risk Response				
Purpose:	Input:	Techniques:	Output:	Steps:
Plan and implement risk responses.	Relevant project documentation, risk register.	<u>Strategies:</u> Escalate, avoid/exploit, transfer/share, reduce/enhance and accept. Contingent response strategies, overall project risk strategies	Updated Risk register, Updated Risk report, Updated RMP, Change requests	1. Selection of strategy 2. Ensuring ownership 3. Involvement of action owners 4. Provision of resources 5. celebration of success.

Table 11 Composing the monitor & control phase

Risk Monitor & Control				
Purpose:	Input:	Techniques:	Output:	Steps:
Monitor the current risks, report to stakeholders and evaluate the risk process.	PMP, Risk register and risk report, project performance data.	<u>Analysis</u> : common interval, data, sensitivity, stakeholder risk information needs, project performance. Risk(-process) related questions, Audits. <u>Cycle</u> : Assess, Review, Identify, Review.	Update Risk register/Risk report, RMP. Risk communication Design, L2BL register, Evaluation report	<ol style="list-style-type: none"> 1. Review of risks and performance information 2. Review stakeholder risk information 3. Evaluate risks 4. Evaluate risk management process 5. Capture lessons learned

Finally, this results in a complete opportunity management framework. The framework is presented in Table 12. The framework provides a starting point for the exploration, the parameters of purpose, input, techniques, output, and steps can be used to analyze the practice of the organization. Later, the framework is used in the comparative analysis where the practice of the organization is compared to theoretical approach of opportunity management.

Table 12 Theoretical opportunity management process framework

Project Risk Management Framework					
Risk Planning	Risk Identification	Qualitative Risk Assessment	Quantitative Risk Assessment	Risk Response	Risk Monitor & Control
Purpose: - Define the project context to tailor the risk management process to project. - Provide a common understanding of how the risk process is going to take place and what it is going to achieve in the end.	Purpose: - Identify and document the characteristics of both individual project risks as overall projects risks	Purpose: - Prioritize individual risks	Purpose: - Analyse the combined effect of individual risks on overall project risk.	Purpose: - Plan and implement risk responses	Purpose: - Monitor the current risks - Report to stakeholders - Evaluate the risk process
Input: - Project charter/business case - Project management plan - Involvement of stakeholders	Input: - Project documents - PMP - All relevant parties with different perspectives	Input: - RMP - Risk register - Other project documents	Input: - RMP - Risk Register - Schedules - Breakdown structures.	Input: - Relevant project documentation - Risk register	Input: - PMP - Risk register - Risk report - Project performance data
Techniques: - The seven Ws: Why, What, Who, When, Whichway, Wherewithal. - Expert judgment - Data analysis - Meetings	Techniques: <u>Past-focused techniques:</u> Checklist, Industry knowledge base, Post-project reviews, Lessons-learned database, Historical information <u>Present-focused techniques:</u> Assumption analysis, Cause-and-effect diagram (fishbone), Document review, SWOT FMEA/Fault tree analysis, System dynamics modelling, Root-Cause analysis, facilitation, Decision conferencing <u>Future-focused techniques:</u> Brainstorming, Delphi (expert review) technique, Interviews, Futures thinking, Nominal Group Technique Prompt list, Questionnaire, Scenario Analysis, Visualisation. The use of metalanguage is crucial to separate risks from non-risks.	Techniques: <u>Prioritizing:</u> P-I Matrix, Bubble chart, Risk prioritization chart, Source-Response diagram, Fault-Event Tree, Influence diagram Reaction/Impact. <u>Categorising:</u> Breakdown structures, window timeline, expert judgment, risk categorization	Techniques: <u>Simulation:</u> Monte Carlo, System dynamics modeling. <u>Diagrams:</u> Breakdown structures, Decision trees, Influence diagrams, Histogram. <u>Others:</u> Multi-criteria analysis, Real options analysis, Scenario analysis, Fractile Methods, Relative likelihood method, Expert judgment.	Techniques: - Strategies: Escalate, avoid, transfer, reduce and accept. - Contingent response strategies - Overall project risk strategies	Techniques: <u>Analysis:</u> Common interval, Sensitivity, Stakeholder risk information needs, Project performance. <u>Cycle:</u> Assess, Review, Identify, Review. - Risk(-process) related questions - Audits
Output: - Risk Management Plan (RMP)	Output: - Risk register - Risk Report - Updated RMP	Output: - Updated Risk register - Updated Risk report - Top risk list	Output: - Updated risk register - Updated risk report - Overall project risk assessment (S-curve/Criticality analysis)	Output: - Updated Risk register - Updated Risk report - Updated RMP - Change requests	Output: - Updated Risk register/Risk report/RMP - Risk communication Design - L2BL register - Evaluation report
Steps: 1. Gather all available information on the project. 2. Create a project context that answers the seven W's. 3. Tailor the risk management process to the project	Steps: 1. Collection of data 2. Application of techniques (preferably the past, present and future technique) 3. Collection of risks in the risk register	Steps: 1. Definition of prioritization dimensions 2. Prioritization 3. Categorization 4. Document updates	Steps: 1. Definition of goal of the analysis 2. Development of risk model 3. Generation of input data 4. Validation of model 5. Interpretation of results on overall project risk 6. Document updates	Steps: 1. Selection of strategy 2. Ensuring ownership 3. Involvement of action owners 4. Provision of resources 5. celebration of success.	Steps: 1. Review of risks and performance information 2. Review stakeholder risk information 3. Evaluate risks 4. Evaluate risk management process 5. Capture lessons learned

3.4 CONCLUSION

The literature review provides an overview of opportunity management theory. Sub-question 1 can now be answered.

Sub-question 1: *What are the current approaches and methods for opportunity management in literature?*

In literature different approaches are described for opportunity management. These approaches are combined to get a complete and general approach to opportunity management that can be fitted to the specifics of the projects and organizations.

The approach consists out of four elements that are essential for opportunity management.

Language

For successful opportunity management, an inclusive and uniform language needs to be used and spoken in the organization. The language is written down in risk- and opportunity management documentation. In these documents the relevant terms are defined such as risk, threat, opportunity, cause, event, and effect. Next to writing down the definitions, these terms are used in the project by people in risk and opportunity sessions or meetings.

Culture

The element of culture describes the soft side of opportunity management. The soft side includes the risk culture, attitude and mindset of individuals in the organization and the organization as a whole. An opportunity supportive risk culture needs to be cultivated in the organization. This starts with top management explaining their vision and policy towards risk management. Also, people in the organization need to understand the concept of risk attitude and how they can influence their risk attitude. Finally, this results in risk-related behaviour that is seen as the result of the culture. The risk-related behaviour influences the risk culture. The feedback loop of culture, attitude, and behaviour needs to be used to build a mature risk culture from both the top-down and bottom-up.

Process

The process needs to include the five phases of risk and opportunity management including planning, identification, analysis, response, and monitor. The approach must be integral to manage both threats and opportunities in the same process. However, the techniques used for dealing with threats are different from those used for opportunities. The process must be simple and scalable to fit every project in the organization. This means that a simple basic process must be described in documentation that consists of the bare minimum for project risk and opportunity management. With increasing project complexity and size, additional elements are added to the risk and opportunity management process. The opportunity management process framework in Table 12 provides an overview of a risk- and opportunity management process.

Infrastructure

The infrastructure for opportunity management consists of tools, techniques and training. Tools for risk- and opportunity management support the process such as templates, databases and automated analysis. Relevant techniques for risk- and opportunity management are listed in Table 12. Training is provided by the organization to educate the project teams on risk- and opportunity management. Also, specialist training is provided for risk and managers to improve their skills.

Furthermore, a system for organizational learning must be present in the organization to learn from projects and improve the management of opportunities in the future.

Together, these four elements provide a general approach for the management of opportunities in an organization. These elements are used to guide the exploration in the construction organization in the next two chapters. Also, the elements are used for the comparative analysis of opportunity management theory and practice in Chapter 6.

4 EXPLORING OPPORTUNITIES IN PRACTICE – SET UP

“In theory, there is no difference between theory and practice. In practice, there is.”

Yale literary magazine (Brewster, 1887)

The quote above illustrates the importance of comparing theory and practice. In this chapter, the set up for the exploration of opportunity management in the construction organization is presented. The purpose of the exploration is to create an overview of opportunity management practice in a construction organization and answer sub-research question 2.

Sub-question 2: *What are the current approaches and methods used in practice for opportunity management?*

Different data sources are used to create a broader understanding of the approaches, perspectives and roles in the opportunity management process of the construction organization. An initial introduction of the organization by a risk manager helps to identify the available sources of data. Triangulation of three different data sources is used for more robust results (Fellows & Liu, 2015). The data sources for this exploration are (1) document review, (2) interviews, and (3) observations. The steps for the collection and analysis of the data are described for each source.

4.1 DOCUMENT REVIEW

Documents are used in an organization to describe processes, roles and methods and provide clarity and uniformity between members of an organization. Organizations can use documents to explain their what, why and how. The document review aims to collect and study the documents relevant for opportunity management within the organization. This results in an overview of the intended and ideal risk and opportunity management approach of the organization. This can be seen as the theoretical approach from the organisation and provides a good starting point for the interviews and observations.

Collection

Documents are collected by searching the internal databases of the organization and with help of a risk manager. The following parameters are used for the search:

Search terms: *Threat (Risico), Opportunity (Kans), Risk management (Risico management), Opportunity management (Kans management), Risk, Opportunity, Threat, Database, Register.*

Search period: *2015-2020*

The results from the search are scanned for duplicates and old versions which have been updated recently, these are removed. When documents refer to other documents, these documents are added to the results. The results are validated with a risk manager to guarantee that all relevant documents are included.

Analysis

The next step is to analyse the collected documents. All the documents are reviewed and the described approach is translated into a process overview, similar to the theoretical framework, based on phases, inputs, outputs, techniques, and steps. Furthermore, each document is analysed on the opportunity management elements in the document.

4.2 INTERVIEWS

Interviews provide insight in the soft elements of opportunity management like culture, mindset and knowledge that were identified as relevant factors for opportunity management in the literature review. Furthermore, risk- and opportunity management is performed by individuals and there is the possibility that an individual deviates from the process prescribed by documents. Interviews are conducted with key players in the risk and opportunity management process. These interviews provide insight about what happens in reality.

Collection

From the documentation and after consultation with a risk manager, it is concluded that project managers and risk managers are the most important key players. The risk managers are responsible for coordinating the risk management process, the project managers are ultimately responsible for risk management. Data collected from the interviewees is based on the individual's perspective and thus subjective. To make the data more robust, three interviews per role are aimed for. It is preferred that the interviewees represent a variety of the perspectives on risk and opportunity management that are present in the organization. With the experience of the head of the risk department, individuals with different perspectives and experiences are selected.

A semi-structured approach for the interviews is selected. This provides the interviewer with the opportunity to explore interesting topics with follow up questions (Yin, 2017). At the same time, the same set of questions is used for all the interviews to allow for comparison. Two sets of interview questions are prepared for the project managers and the risk managers. The difference between the sets is based on the role, responsibility and the corresponding level of knowledge about the risk management process.

The interview protocols are presented in Appendix A. First, the general risk management practices are discussed. Next, the questions focus on opportunity management. The interviews are conducted online using Microsoft teams video meetings. The meetings are recorded and the recording is used to summarise the interviews.

Analysis

The interviews are analysed with a qualitative content analysis using a data structure with first order concepts, second order themes, and aggregate dimensions based on Gioia et al. (2013). Two key roles are interviewed, the risk manager and project manager. For both these key roles a data structure is created to find the dimension from the perspective of the role.

This method of analysis starts with the first order analysis that codes data using the perspective and terms from the interviewees. Next, these codes are categorized and clustered based on similarities in the second order analysis. The researcher interprets the clusters and translates these into themes. From these 2nd order themes, aggregate dimensions are derived resulting in a complete data structure.

4.3 OBSERVATIONS

The documents and interviews provide insights in the risk and opportunity management practices from the internal perspective of the organization. Observations provide the researcher the possibility to see the opportunity management process in practice. However, results from participant-observations have the risk of being biased because the observer is in the middle of the session (Yin, 2017). Also, the observer needs to make sure that he is not distracted from recording the observations

during the session. These two challenges need to be taken into account when conducting the observations.

Collection

One of the most important steps in the risk and opportunity management process is the identification of risks, as it is impossible to manage risks that are not identified. Risks and opportunities are identified in group sessions. These groups sessions are observed to see how a project team deals with risks and opportunities. The researcher is allowed access to observe group sessions of a project.

At least one threat and one opportunity group session from the same project are observed. The group sessions are observed by the researcher himself for the entire duration. Data is gathered about the preparation, execution and completion of the group sessions. Notes are taken and the used documents and tools are collected to substantiate the observations.

Analysis

The data that is collected during the observations is coded and categorized based on the hard and soft elements related to risk and opportunity management found in literature. The elements are language, process, infrastructure, and culture.

5 EXPLORING OPPORTUNITIES IN PRACTICE - RESULTS

This chapter presents the results from the exploration of opportunity management practices. First, the document review is presented, followed by the interviews and lastly the observations. Finally, the second sub-research question is answered.

5.1 DOCUMENT REVIEW

The search is conducted as described in the previous chapter. The following list of documents is retrieved from searching the internal database of the construction organization:

- Project Management Information (PMI) overview
- Guideline Risk Management (Handleiding Risico management)
- Sub-managementplan Risk management (Deelmanagementplan Risico management)
- Risk and Opportunity Management Register (ROMR)

Each document is analysed for elements of opportunity management. The process that is described in the documents is translated into an overview that uses the same inputs from the literature review (Phases, input, output, techniques and steps). The analysis of each document is presented in Appendix B.

Project Management Information (PMI) overview

The PMI provides a strategic overview of the risk and opportunity management process of the construction organization. It is aimed at the activities of the project manager in the process and it does not specify the operational side of risk and opportunity management. The outputs of the PMI are focused on informing the steering group and higher management.

No specific elements of opportunity management are found in the PMI. The descriptions in the process use both threats and opportunities. Looking at the content of the risk report templates, threats to the project have priority in reporting. Threats are analysed on time and money and different types of top threat lists are used. Opportunities are analysed based on money and are presented in one tornado diagram. Table 13 shows the process overview based on the PMI information.

Table 13 Process overview PMI

PHASES	Project control set up	Opportunity & Risk control	Various processes	Reporting
INPUT	Sub-managementplan Opportunity & Risk Management Template	Risk report template	Instruction Monte Carlo Analysis	Risk report
OUTPUT	Sub-managementplan Opportunity & Risk Management (project specific)	Risk report (project specific)	Results of Monte Carlo analysis for Planning and Costs	Quarterly report
TECHNIQUES	-	-	Monte Carlo	-
STEPS	Fill in sub-managementplan opportunity & risk management template	Fill in the risk report	Read the instruction, run the analysis, report the results	Create quarterly report

Sub-managementplan Risk management (SMP)

In the first part of the SMP where the scope is described, opportunities are explicitly mentioned as part of the risk management process. However, along the way the term opportunity disappears and only the term threat remains. This is also the case for the top lists that only focus on threats and mitigation strategies that are only applicable to threats. The KPI's that are used to monitor risk- and opportunity management are using threats for measuring the performance. The SMP is translated into a process overview in Table 14. The different phases are not explicitly mentioned in the document but are used to create an overview.

Table 14 Process overview SMP

PHASES	Implementation	Identification	Analysis & Quantification	Mitigation	Reporting
INPUT	SMP	Integral risk sessions (internal & external)	Risk register	Risk register	Risk register
OUTPUT	-	Risk register	Updated risk register	Updated risk register	Risk report
TECHNIQUES	Presentation Training	Top-down Bottom-up	Semi quantitative	Mitigation strategies (Avoid, Transfer, Reduce, Accept)	Top threat lists PI KPI's (focus on threats)
STEPS	-	-	-	-	-

Guideline Risk Management (GRM)

The GRM is the most detailed description and practical approach for risk management for both the tender and execution phase. In the introduction, it is explicitly stated that with the term risks both threats and opportunities are meant. However, the positive side of risks or opportunities move to the background and a strong focus on threats remains as the described process progresses. This can be seen clearly in the mitigation strategies and reporting templates. The impression is created that the organization desires to manage both risks and opportunities. However, it is not able to maintain this integral approach throughout the guide. Along the way the opportunities disappear to the background. Table 15 shows the process overview based on the information from the GRM.

Table 15 Process overview GRM

PHASES	Planning	Identification	Analysis & Quantification	Mitigation	Monitor & Control	Reporting & Evaluate
INPUT	Generic SMR template Requirements from contract	ROMR from tender phase	ROMR	ROMR Risk database	ROMR	ROMR
OUTPUT	Project specific SRM and accepted by client	ROMR	ROMR update	ROMR with measures Planning with measures Budget with measures	ROMR Verified documents for measures	Top 10 risks and opportunities Risk provision Bandwidth risk provision Bandwidth risk provision for time Lessons learned
TECHNIQUES		Spontaneous Structured brainstorm Unstructured brainstorm Interviews What-if Analysis	Group sessions Interviews Expert groups	Mitigation strategies (Avoid, Transfer, Reduce, Accept)		Monte-Carlo Analysis
STEPS	Create SMR	Identify risks Appoint risk owner	Initial risk quantification	Select mitigation strategy Select mitigation measure Integrate measures in ROMR, Planning, and Budget	Implementing measures Monitoring risks React on risks that occur	Reporting Evaluating risks Capturing lessons learned

Risk and Opportunity Management Register (ROMR)

The risk and opportunity management register (ROMR) is used to collect all the risks and opportunities in a project. The ROMR treats opportunities and threats in the same way. For both, a tab is available with a template for each threat or opportunity to describe it. Furthermore, the ROMR provides automatic templates that make top 5 or 10 lists of risks and opportunities. Here appears to be a slight focus on threats as a top list for impact and for residual volume is used for threats and only a top list for residual volume for opportunities. However, this is to comply with reporting that is used in the PMI. Overall, the ROMR is a balanced register that supports opportunity management.

In addition to the ROMR, Relatics was introduced more recently in the organization. This is an online risk register tool. It has the same functionalities as the ROMR and provides some extra functionalities to couple the risk register to other project management disciplines. As Relatics is similar to the ROMR, it supports opportunity management.

Reflection

Together, all the documents provide an overview of how the organization intends to practice risk- and opportunity management. The documents provide guidance for different levels in the organization

and the process steps are clearly described. An inclusive approach is used and all documents state the inclusive definition of risk from the start.

When looking specifically at the opportunity management elements, the will to practice opportunity management is clear from the start of each document when the goal of risk management is described. However, in most documents the focus on an integral approach disappears towards the end of the document. This can be seen in the reporting templates, mitigation strategies and the words that are used in later stages of the process that focus on threats. For example, in the sub-management plan risk management, the introduction explains that both threats and opportunities need to be addressed. But in the next chapters, no single reference to opportunities is made. In the risk reporting template, only 3 slides are dedicated to opportunities and these slides present only the results from the monte carlo analysis. There are 8 slides for threats that include top 5 and top 10 lists of different threat categories.

Furthermore, when looking for elements that stimulate opportunity management, there appears to be nothing specific aimed at the management of opportunities. A standard risk management approach, based on an ISO standard, is used and all techniques and steps are similar for threats and opportunities throughout the process.

Concluding, a standard risk management process is described that makes no difference in techniques used to manage threats or opportunities. Templates used for reporting tend to focus on the threats with more extensive analysis and top threat lists compared to the simple analysis and single top opportunities list. The documents express a desire to manage opportunities but are not stimulating this inclusive focus throughout the process.

5.2 INTERVIEWS

In total, 3 risk managers and 2 project managers have been interviewed. The profiles are presented in Table 16 and 17. The results from the interviews are summarised in this section and the reports of the interviews are presented in Appendix C.

Three risk managers were interviewed of which two were relatively new to the organization. Risk manager 1 (RM 1) started in March 2020 and had no previous experience in risk management. Risk manager 2 (RM 2) started in October 2020, but had lots of experience in risk management in other organizations. Risk manager 3 (RM 3) was one of the most experienced risk managers in the organization and had also worked as risk manager in previous organizations. This is a diverse group of risk managers that can reflect from different perspectives on the current practice of risk management by using previous experience or by having a 'clean slate'.

Both project managers are very experienced in their role as project managers in the organization. PM 1 has done a lot of tender projects with a focus on integral projects and rail projects. PM 2 had a lot of experience as project manager of public-private-partnership projects.

Table 16 Profiles of risk managers

Risk manager profiles			
	RM 1	RM 2	RM 3
Age	29 years	49 years	52 years
Years in job	Started in March 2020	Started in October 2020	Started in 2016
Previous working experience		3 years at VolkerWessels as Risk manager 4 years at Shell as Risk manager 8 years at Shell as Cost engineer Before at Pro-Rail as Project controller	10 years at Strukton as Risk manager Before KPN Real Estate facility management & KPN Security

Table 17 Profiles of project managers

Project manager profiles		
	PM 1	PM 2
Age	52 years	48 years
Job title	Tendermanager (integral projects and rail)	Project director (PPP)
Years in job	Started in 2014	Started in 2011

Qualitative content analysis

Two types of roles have been interviewed and these roles, project manager and risk manager, are analysed separately using qualitative content analysis (QCA) (Gioia, 2014). The QCA consists of three steps that build a data structure: (1) The data gathered in the interviews is coded and categorized using the perspective of the interviewee. The coding and categorizing results in a list of 1st order concepts from all interviewees. (2) The list of 1st order concepts is clustered and 2nd order themes are distilled from the perspective of the researcher. (3) The 2nd order themes are clustered to create aggregate dimensions. The aggregate dimensions describe the results from an abstract level and help to see the bigger picture of risk- and opportunity management in the construction organization.

The interviews with the risk managers resulted in 213 codes that were categorized into 23 concepts. These 1st order concepts resulted in 10 themes. The 2nd order themes resulted finally in 4 aggregate dimensions.

The interviews with the project managers resulted in 160 codes that were categorized into 18 concepts. The 1st order concepts resulted in 7 themes. The 2nd order themes resulted finally in 4 aggregate dimensions.

The coding of the data is presented together with the interview questions in Appendix D. The steps from the analysis are presented in Appendix E. The data structure for the interviews with the risk managers is presented in Figure 7. The data structure for the project managers is presented in Figure 8.

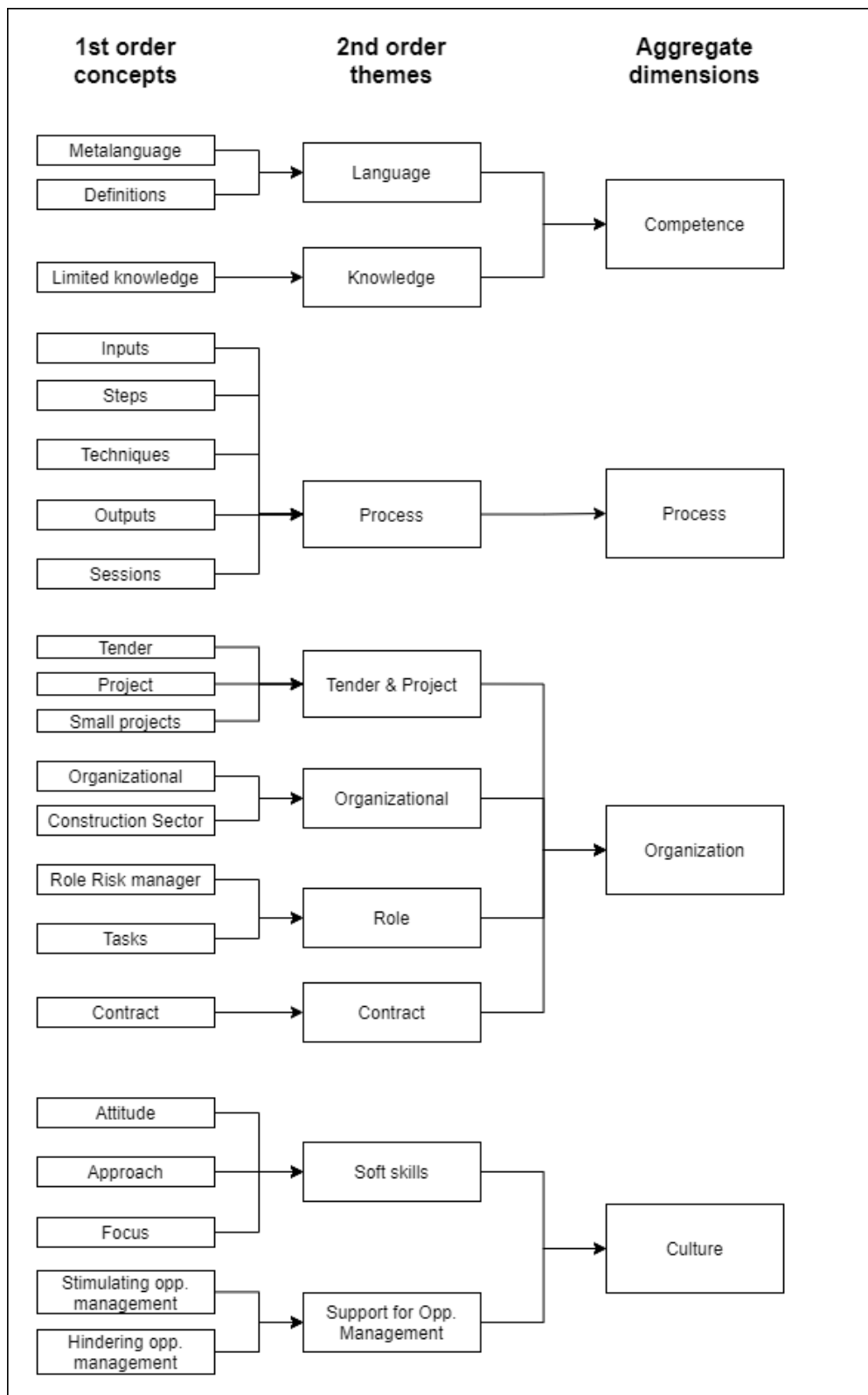


Figure 7 Data structure risk managers following Gioia (2014)

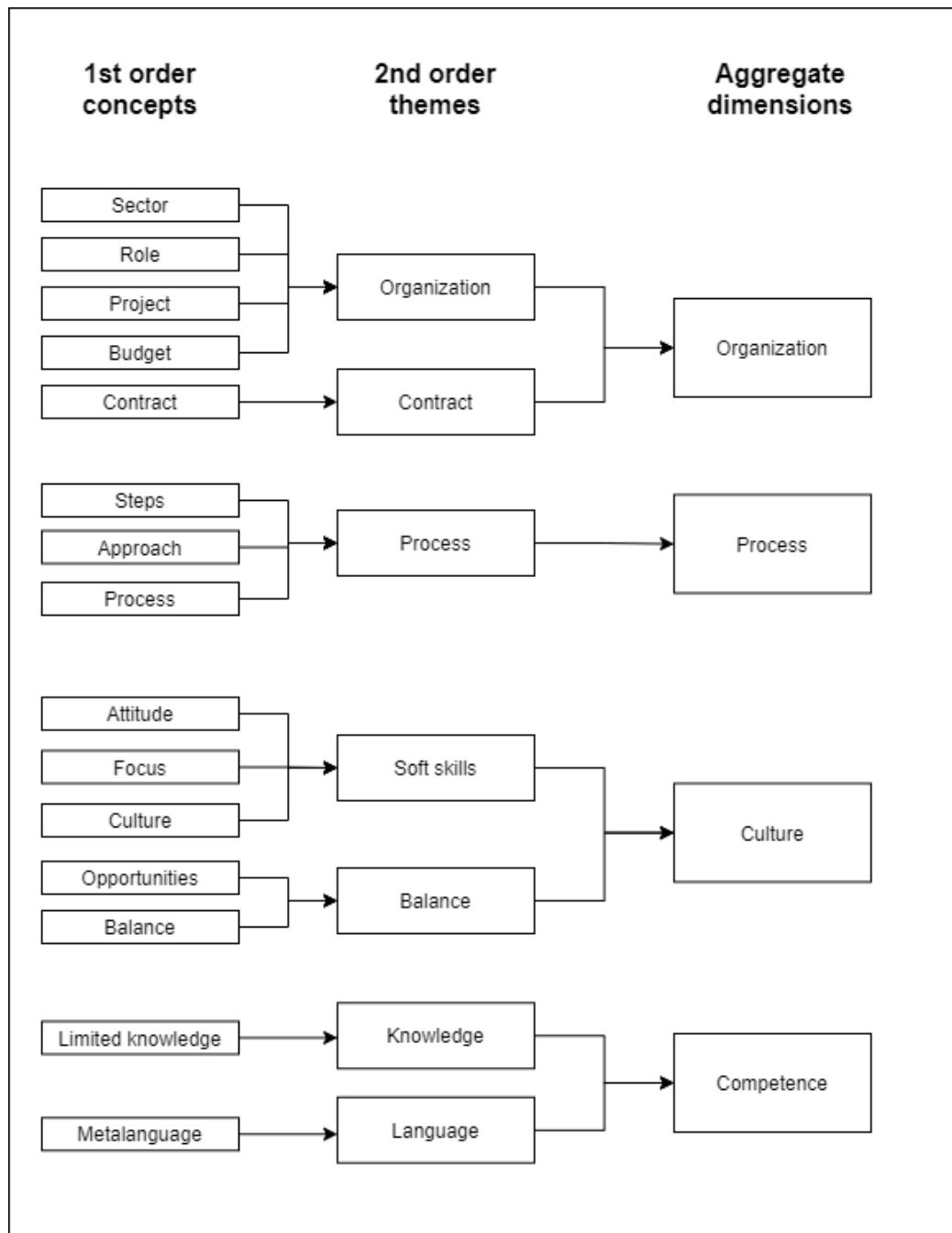


Figure 8 Data structure project managers following Gioia (2014)

Aggregate dimensions

The two data structures are discussed together to combine the perspectives of the risk- and project managers into one overview. The aggregate dimensions are used to explain the key findings of the interviews. These findings are substantiated with quotes from the interviews.

Organization

The aggregate dimension of organization consists of multiple organizational elements that were mentioned in the interviews about opportunity management. The 1st order concepts related to the roles and tasks, project characteristics, working in a construction organization, and contractual challenges.

The roles and tasks in the organization provide some challenges for opportunity management. One risk manager commented: *"Maybe people want to do more with risk management but they don't have the time available due to other activities they are required to do."* Also, the risk department has an advisory role in the project and no control. This provides the difficult situation sometimes that the project team can decide against the advice of the risk manager.

The focus in the organization is mainly on risks, this is seen from both a top-down as bottom-up perspective. Top management is focused on risks as one project manager commented: *"The management has a strong focus on risks when looking at project reporting, this is probably caused by some failed projects in the past. However, if we want to be successful in the long term, we must not only focus on threats."* From the bottom up, team members in projects tend to focus on risks and have difficulties with identifying opportunities. This results in opportunities becoming the last priority in the risk management process. One risk manager explained that there are not many factors that stimulate the hunt for opportunities: *"I don't see any factors that stimulate opportunity management in the organization. When I do it, it comes from my own experience."*

Another challenge was found in the types of projects. One risk manager said: *"It appears to me that we are very focused on the mega projects and not on the smaller projects. These megaprojects are approximately 20% of the portfolio and the small projects 80%. Also, the risk management of these small projects is often overlooked and does not get the attention it needs because it is a small project, people think the risks are less important and often there is no risk manager but only a team member that is responsible for risk management. If we can focus more on small projects and educate the teams to perform better risk and opportunity management the entire organizations will profit."*

At last, contractual arrangements like the tender budget limit the management of opportunities. One project manager said: *"The tender budget is limiting for opportunities because threats always have priority. Now I exaggerate, but if I make a mess of the threats in my risk register, I get a no-go in the stage gate. But if I make a mess of my opportunities in the risk register, I can get away in the stage gate. So, I need to spend my money first on threats and what remains is spend on opportunities."*

Concluding, the aggregate dimension of organization encompasses very different aspects within the organization that pose challenges to opportunity management.

Competence

The aggregate dimension of competence results from the interviews with both project- and risk managers. The dimension consists of two themes that were derived from the concepts; Language and Knowledge.

All interviewees used the same language for risk and opportunities. The terms risk, opportunity, cause, consequence, and effect are used. In the organization, the spoken language is Dutch. In Dutch, there is no umbrella term that captures both risk and opportunities, so people talk about risk management which refers to the negative impact. Furthermore, both project and risk managers indicate that project team members have difficulties in using the specific metalanguage for risk. This creates problems in formulation of risks and opportunities during identification sessions. One risk manager commented: *"The main problem is a lack of knowledge about opportunity management. Everyone is using the word opportunity 'te pas en te onpas'. For example, when a clever technique is used, people call it an opportunity."* Also, opportunities are mistaken by optimizations as one risk manager said: *"An opportunity is something different than an optimisation."*

The theme of knowledge describes the skills and knowledge present in the organization. For opportunity management, most interviewees agree that the knowledge about opportunities and their management is lacking. One project manager commented: *"I sometimes see people write down risks with a probability of 75% or 100%, this proves that people have difficulties in understanding the systematics of risk management."* This lack of knowledge applies to all individuals in the organization, including risk managers. One risk manager said: *"I think I'm not equipped or trained to host an opportunity identification session tomorrow if that was needed."* There is no organizational learning and training on the topic of opportunities. So, this makes it difficult to increase the knowledge in the organization.

Process

The aggregate dimension of process resulted from both the interviews with project- and risk managers. This dimension consists of many different 1st order concepts that were related to the risk and opportunity management process of the organization. Most interviewees agree that the process of the organization is a solid basis and on paper designed for both risks and opportunities.

In practice, a focus on risks is experienced as one project manager explained: *"In practice, 5% of the time is spent on opportunities and 95% on threats. Threats go first and remaining time is spent on opportunities. Often, no time is left to spent on opportunities. Also, in the reporting the focus is on threats which stimulates this disbalance between threats and opportunities."* This was supported by a young risk manager that said: *"I have never received an opportunity in a risk register from the tender phase."* This risk manager was working less than a year in the organization but still had not received an opportunity in multiple projects.

Furthermore, the process description uses the same techniques for both risks and opportunities which is not logical as one risk manager commented: *"The organization is not organized for opportunity management because it is exactly the same process for both risk and opportunities and that does not work for opportunities."*

Opportunities with a low probability of occurrence are excluded in the process whereas risks with low probabilities, for instance 2,5%, are recorded in the risk register. One project manager said: *"Opportunities are recorded in the register if they have a probability of 25-50%, lower probabilities are left out of the risk register and I think this is unfortunate."*

Culture

The last aggregate dimension found is *culture*. This dimension consists of multiple themes, where the theme of soft skills is found in both interviews with project- and risk managers. The interviews with risk managers found also the theme of support for opportunity management and the interviews with project managers found the theme of balance between threats and opportunities as theme.

The theme of soft skills and support for opportunity management explain the challenges that opportunity management faces with the attitude and focus of individuals. Risk management is perceived as check the box exercise. As one risk manager said: *"There are project teams who see risk as a 'must-do' instead of 'want-to'. They see risks as 'fictional'. These teams require an approach where risk management is translated into relevant targets such as costs to become relevant for them."* A project manager explained: *"People have the feeling that they are being judged on their own work and not on their contribution to the risk register, so they miss a sense of ownership or responsibility."* Another risk manager adds: *"There is a tendency to focus only on technical opportunities and not on financial opportunities. The problem is that an opportunity eventually should lead to an increase in profit to make it worth the effort and technical opportunities do not always result in a profit."*

The balance between threats and opportunities in the organization is skewed. This was already highlighted in the dimension of process but in the dimension of culture this also becomes clear as one project manager explained: *"We need room to speak openly about adding value to the project. Now, we share the risk register late with external parties and we look for opportunities in the interpretation of contract requirements. This is all driven by an overfocus on financial results. I think we need to move from a culture with a focus on costs and risks to a culture with a focus on value and opportunities."*

One risk manager explained that from her experience, projects that face challenges and difficulties in achieving their cost and time targets tend to look for opportunities to 'save' the project. This is contradictory to the theory of Maslow (1987) from Chapter 3 that argued that opportunities are a growth needs and come after the deficiency need dealing with threats. So, if a project looks like it is going to fail, people want to find opportunities because the pressure caused by the potential failure is high. This would suggest that projects that are on track provide no incentive to look for opportunities. If in that situation, the top management is also focused on threats, there is no incentive to look for opportunities. But when a project is under pressure, opportunities become relevant and the team will look for them.

The four aggregate dimensions that were found in QCA of the interviews provide insights in the practice of opportunity management in the organization. Where the documentation showed an inclusive risk- and opportunity management approach, the interviews learn that the practice is different. The interviews with two different key players resulted in many similar concepts and themes. At the same time, a difference can be seen between the two roles as risk managers look at opportunity management from an operational perspective (bottom-up) and project managers from a strategic perspective (top-down). From Top-down, a focus on threats poses a major challenge for opportunity management. From the bottom-up, the limited knowledge and individual attitude pose challenges for opportunity management.

5.3 OBSERVATIONS

The participant-observations provide an external view on the opportunity management practice in the construction organization. The tender used for the observations is a rail infrastructure project. The tender started in September 2020 and finished in December 2020. The client is a rail infrastructure owner in the Netherlands. Observations are made before, during and after the risk and opportunity sessions. The session is conducted online so the online environment is captured in images and notes are taken during the sessions.

The tender process took place during the corona pandemic. Due to the government measures, employees were not allowed to physically come together. For that reason, the risk and opportunity sessions were conducted with online video meetings in MS Teams and with the help of the online brainstorm tool Mural that facilitates online collaboration. Mural was used as a pilot by the Risk manager for online risk and opportunity sessions. Normally, the sessions are performed physically with all participants.

Three sessions were observed. First, a technical risk session was organized with attendees from the engineering departments. Second, an integral risk session was organized with attendees from different disciplines like sustainability, stakeholder management and contract management. Third, a technical opportunity session was organized with the participants from the first technical risk session. The participants had to prepare the session by filling in post-its in mural with risks or opportunities based on the focus of the session.

For each session a detailed report is presented in Appendix F. In Table 18, the key observations of each session are listed.

Table 18 Key observations risk and opportunity sessions

Key observations	
Type	Key observations
Technical risk session (Participants: Calculators, planners, execution specialists, tender managers)	<p><i>Before:</i></p> <ul style="list-style-type: none"> - All participants provided risks in Mural - No use of meta language - All participants are from the engineering disciplines <p><i>During:</i></p> <ul style="list-style-type: none"> - Much time is spent on reformulating risks in first breakout - No structure for discussing risks in first breakout - Participants liked working with breakout groups - No template for plenary presentation of group discussion, results in different approaches - Not enough time to discuss all risks
Integral risk session (Participants: Environment, traffic, execution, permits, sustainability, tender)	<p><i>Before:</i></p> <ul style="list-style-type: none"> - All participants provided risks in Mural - One participant used metalanguage, others did not - Diverse group with all disciplines represented <p><i>During:</i></p> <ul style="list-style-type: none"> - Diverse discussions in breakout due to different disciplines - No structure used for discussion - Much time spent on reformulating risks

Technical opportunity session <i>(Participants: Calculators, execution specialists, design, traffic, planner, tender)</i>	<i>Before:</i> <ul style="list-style-type: none"> - Half of participants provided opportunities in at least one category - No use of meta language - Only participants from engineering disciplines - Many opportunities are actually optimizations <i>During:</i> <ul style="list-style-type: none"> - Very detailed technical discussions, tends to optimizations - No structure for discussion in breakout session - No structure for plenary presentation
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Reflection

The observations are performed by the researcher, these participant-observations are therefore potentially biased by the knowledge and experience from the researcher. However, the researcher has tried to capture and describe the observations as objective as possible. From the observations, the picture arises that team members are motivated to contribute risks and opportunities for the project. In all sessions team members did their preparations. However, the risks and opportunities provided by the team members were all incorrectly formulated. This resulted in long discussions about correctly formulating the risk during the sessions. Time is valuable in these sessions because it is very limited for risk management. When all these team members come together, time should be spent productively on new risks, opportunities or solutions to exploit or mitigate them. Also, the difference between risks and opportunities was obvious. Two sessions for risk were organized and one for opportunities. Before and during the opportunity sessions, team members seemed to experience more difficulties in brainstorming and contributing to the discussion. Team members appeared to be more comfortable in the risk sessions compared to the opportunity sessions. Brainstorming was used as technique in all sessions, the database was used for the risk sessions. For the opportunity session, the same approach was used as for the risk sessions.

5.4 CONCLUSION

The second sub-research question is answered using the results of the exploration. The structure of the exploration, documentation, interviews, and observations, is used to conclude sub-question 2:

Sub-question 2: *What are the current approaches and methods used in practice for opportunity management?*

An integral risk and opportunity management approach is described in the documentation. The process descriptions show the desire of the organization to manage opportunities. However, the documents that explain the process are not consistent in describing this desire to manage opportunities. Especially the reporting is focused on threats. Also, opportunity identification techniques are copied from the risk identification techniques so the process for threats and opportunities is exactly the same.

The interviews provide insights on what happens in practice through the eyes of two key roles: Risk managers and project managers. The project managers provided a strategic perspective that helped to explain the top-down approach to opportunity management. The risk managers provided the operational perspective that helps to understand the bottom-up approach to opportunity management.

The qualitative content analyses of the interviews resulted in four dimensions that explain the practice of opportunity management in the organization. The dimension of *competence* illustrated the limited knowledge in the organization and the lack of clear definitions on the subject of opportunity management in the organization. The dimension of *Organization* explained how organizational elements like roles and tasks, internal focus on threats and different types of projects created challenges in the management of opportunities. The dimension of *Process* highlighted how the process in practice is almost exclusively resulting in threats for the project. The dimension of *Culture* explained how soft skills and a skewed internal balance for threats and opportunities limit the management of opportunities.

The participant-observations of risk and opportunity sessions resulted in several insights about risk- and opportunity management of the construction organization. First, in preparation of the tender it was noticed that the project team found it easy to provide risks as input for the session. For the opportunity session, there were significantly less opportunities provided in preparation of the session. This suggests the difficulties that a project team experiences in dealing with opportunities. Second, for both the opportunity and risk sessions, the same technique and approach was used. This is not supporting the identification of opportunities as these techniques are not suited for the identification of opportunities. Lastly, during the session it became clear that the participants of the sessions did not use a uniform terminology and approach. The knowledge was limited and this led to a lot of wasted time in the sessions.

Concluding, the organization describes an inclusive process that states the ambition of managing opportunities. Attempts are made to identify and manage opportunities, but eventually this results in almost no opportunities. There appears to be room for improvement in the management of opportunities in practice. In the next chapter, the results from this exploration are compared to the approach that was found in the literature review to identify the gaps between theory and practice.

6 COMPARING THEORY AND PRACTICE

In this chapter, sub-question 3 is answered by comparing the results from the literature review and the exploration of the case. From this comparative analysis, potential gaps can be identified between theory and practice. The gaps are used as input for sub-question four to develop improvements for the opportunity management practice of a construction organization.

Sub-question 3: *What are the gaps between theory and practice of opportunity management?*

6.1 COMPARISON PER SUBJECT

From the literature review, it was concluded that Language, Culture, Process, and Infrastructure were the most important themes. These themes are used for the comparative analysis.

For each theme, a table is presented in which the first column contains the results from the literature review. In the second column, the results from the exploration in the construction organization are presented. In the last column, the gap is identified between the first column (theory) and second column (practice).

6.1.1 Language

The first subject for comparison, language, is presented in Table 19. Two topics are used for comparison; Having inclusive definitions and the use of uniform (meta)language by individuals in the organization. One gap is identified in the use of uniform (meta)language in the organization. Individuals in the organization, except for the risk- and project managers, are not using the (meta)language in the correct way.

Table 19 Comparison for theme of Language

Language		
Theory	Practice	Gap
Inclusive definitions	Inclusive definitions	-
Uniform (meta)language in organization	Limited use (meta)language in organization	Knowledge and use of risk and opportunity (meta)language outside PM & RM

6.1.2 Culture (mindset/attitude)

The second subject for comparison, culture, is presented in Table 20. Three topics are relevant for this subject; Top-down behaviour, bottom-up behaviour, and attitude and mindset. For each topic gaps are identified. The tone from the top is threat-focused, it lacks the desired inclusive behaviour necessary for opportunity management. From the bottom-up, risk and opportunity management is experienced as a check the box exercise, and there is a lack of awareness of the relevance of opportunity management. Lastly, the risk attitude and mindset in practice is threat-focused, the risk attitude and mindset lack an inclusive view with opportunities.

Table 20 Comparison for theme of Culture

Culture		
Theory	Practice	Gap
Promote and communicate desired behaviour from the top	Top-down focus on threats	Risk and opportunity vision and behaviour from the top.
Practice the desired risk-related behaviour from the bottom up.	Bottom-up sees it as check the box exercise	Relevance of and attitude towards risk and opportunity management bottom-up
Have an inclusive risk attitude & mindset	Risk attitude & mindset is threat focused	Attitude and mindset are not inclusive

6.1.3 Process

The third subject for comparison, process, is presented in Table 21. For this subject, three topics are relevant: Simple process, scalable process, balanced approach for threats and opportunities. These topics are compared using the framework from Table 12 in Chapter 3 for the theoretical approach.

To compare the topic of simplicity, the theoretical framework provides an overview of the different phases that are needed in a risk- and opportunity management process. The framework provides different techniques that can be used to scale the risk- and opportunity management to the specific project. Lastly, the balanced and inclusive approach can be found in the theoretical framework by using specific techniques for threats and opportunities.

Two gaps are identified for this subject. In practice, the process is not scalable and mainly focused on the large integral projects in the organization. The process needs to be scalable for small projects so that these projects can perform risk and opportunity management in a sufficient way. Also, the process is not balanced because it is focused more on threats as the process progresses. The balance between threats and opportunities needs to be equal throughout the project.

Table 21 Comparison for theme of Process

Process		
Theory	Practice	Gap
Simple enough to meet objectives	Process is simple and complete	-
Scalable to project size, complexity and importance	Process has some additions for large projects, but is not scalable to project size	Scalable process for small projects
Balanced and inclusive approach for risk and opportunities in process	Process is more focused on threats towards the end	Balance between risk and opportunities throughout the process

6.1.4 Infrastructure

The fourth and last subject for comparison, infrastructure, is presented in Table 22. For this subject, three topics are relevant; Tools & techniques, technical support, and organizational learning. Two gaps are identified. In practice, there are no specific techniques and tools for opportunity management. The tools available originate from three

at management and there is no training for opportunity management. The organizational learning is limited to archiving the opportunities from projects in a generic database. No structural organizational learning for opportunity management is implemented.

Table 22 Comparison for theme of Infrastructure

Infrastructure		
Theory	Practice	Gap
Tools, techniques, templates, and training	<ul style="list-style-type: none">- Tools (ROMR/Relatics),- Limited techniques (brainstorm, monte carlo)- No training- Templates (ROMR)	Opportunity techniques & training
Technical support from risk specialist	Support from RM	-
Organizational learning	Limited organizational learning (generic risk database)	Organizational learning in opportunity management

6.2 CONCLUSION

Sub-question 3 can now be answered with the results from the comparison. The identified gaps provide directions for improvement of opportunity management practice.

Sub-question 3: *What are the gaps between theory and practice of opportunity management?*

A summary of all the gaps that were identified is presented in Table 23. The gaps show that theory and practice are not sufficiently aligned. For every theme gaps exist between the ideal approach described in literature and the real world practice. It is logical that theory and practice are not similar due to the context and changing circumstances in the real world that prevent theory from being directly applied.

The gaps differ in size and impact that they have on the organization. The gap of language in itself appears to be simple, there is a need for a uniform risk and opportunity language in the organization and this can be defined and implemented. But at the same time, this gap is practised throughout the whole organization and to close the gap the entire organization needs to cooperate and adapt this language. Next, the gap of culture is a big challenge due to its subjective nature. Culture exists at different levels and is influenced by individuals that are not always aware of how culture influences everything. The gap of process is the gap that is most easy to close. The process is described in documentation and uses templates, these can all be adapted to remove the disbalance. Furthermore, the process can be made scalable by starting with a simple basic process that covers the most essential steps for risk management. With increasing project size and complexity, additional elements such

more extensive analysis techniques or more extensive reporting can be added. The last gap of infrastructure is more difficult to close because it requires implementation of techniques and organization learning in a conservative organization. In the next chapter, one of these gaps is selected to design an improvement.

Table 23 Summary gaps identified in comparison of opportunity management theory and practice

Subject	Gap
<i>Language</i>	<ul style="list-style-type: none"> - Knowledge and use of risk and opportunity (meta)language
<i>Culture</i>	<ul style="list-style-type: none"> - Risk and opportunity vision and behaviour from the top. - Relevance of and attitude towards risk and opportunity management bottom-up
<i>Process</i>	<ul style="list-style-type: none"> - Balance between risk and opportunities throughout the process - Scalable process for small projects
<i>Infrastructure</i>	<ul style="list-style-type: none"> - Opportunity techniques & training - Organizational learning in opportunity management

7 IMPROVING OPPORTUNITY MANAGEMENT

In this chapter, sub-question four is answered. The goal of sub-question four is to improve the current practice of opportunity management. The gaps identified in the previous chapter provide a starting point for improving opportunity management practice. Two types of improvements are presented: (1) a detailed design for improvement for a single gap is presented (2) for the remaining gaps, suggestions for improvement are presented. At last, the answer to sub-question four is given.

Sub-question 4: How can opportunity management practices be improved in a construction organization?

In the previous chapter, seven gaps were identified that can be used to improve opportunity management practices in a construction organization. Only one single gap is selected for a detailed improvement design as time is limited in this research and it is decided to focus attention on one single gap instead of multiple gaps, to improve the quality of the design.

The selection of the gap is based on effectiveness, urgency and personal interest of the researcher for improving the gap. The gap that is selected is *Opportunity Techniques & Training*. From the exploration it became clear that there is very limited experience with opportunities in the organization and that there is no clear instruction how to identify opportunities. By providing a clear and uniform guideline and focusing the techniques on opportunity identification, a start can be made in the management of opportunities as you first have to identify opportunities before you can manage them. This could result in more experience, organizational learning and eventually help to promote a culture for opportunity management. The goal is to operationalise opportunity identification by creating a practice guide for an opportunity identification session.

7.1 PRACTICE GUIDE

To design the practice guide for an opportunity identification session, first the design requirements are formulated. Next the concept design of the practice guide is presented followed by the evaluation of the design in two expert group sessions with risk- and project managers. Lastly, the final practice guide is presented.

7.1.1 Design Requirements

The requirements for the practice guide for an opportunity identification session are formulated based on the literature review from Chapter 3 and the results of the exploration in the construction organization from Chapter 5. The requirements are divided into two categories, content requirements and process requirements. The content requirements address the requirements for the content of the practice guide such as the technique that is used for the identification. The process requirements address the requirements of the form of the process and how it is grounded in the current risk management process of the organization.

Content requirements

- Content requirement 1 – Language

Literature indicates that language is a success factor for opportunity management (Johansen et al., 2019; Hillson, 2019). A common opportunity language is needed for conducting an opportunity identification session. The relevant terms and definitions that are used in the process need to be clearly stated up front to eliminate ambiguity and reduce the possibility for miscommunication. At the

same time, the terminology of the opportunity identification session needs to be in line with the terminology used in the overall risk and opportunity management process.

- Content requirement 2 – Infrastructure

Literature indicates that infrastructure is a factor of success for opportunity management (Chapman & Ward, 2011; Johansen et al. 2019; Hillson, 2019). Infrastructure consists of tools, techniques, and training. For the opportunity identification session, an identification technique needs to be selected. Furthermore, a database with opportunities from previous projects can be helpful to inspire the participants of the identification session to see opportunities in the project.

- Content requirement 3 – Organizational learning

Literature indicated the importance of organizational learning in the risk and opportunity management process (Johansen, 2015; Hillson, 2019). By implementing an evaluation in the identification session, each session can be used to improve the next one and build experience in the organization.

- Content requirement 4 – Technique selection

Literature indicated that the opportunity identification technique must be different from the threat identification technique (Hillson, 2019). When a technique is selected that is new and unknown to people, it becomes possible to associate this technique with opportunities and stay away from thoughts about threats.

- Content requirement 5 – Roles

Literature indicated the need for a multi-disciplinary team in the identification session (Chapman & Ward, 2011; Johansen et al., 2019; Hillson, 2019; PMI, 2017). The best practice needs to make sure that for an identification session, a diverse team is composed that can identify opportunities in all disciplines. It is important that these roles and corresponding tasks are defined and communicated clearly before the session.

Process requirements

- Process requirement 1 – Presentation

The best practice needs to be presented in such a way that it suits the different types of users. From the exploration it becomes clear that some roles like the project- and risk manager need a detailed description and others, regular participants, need a short overview. The best practice needs to consist of a detailed description and summary that describes the process brief but adequate.

- Process requirement 2 – Scalability

Literature indicated that the process needs to be simple and scalable (Chapman & Ward, 2011; Hillson, 2019). For the process requirements, this means that the process needs to be scalable. From the exploration it became clear that current practice does not fit the small projects. So, the best practice needs to be scalable to both small and large projects.

- Process requirement 3 – Infrastructure

The best practice needs to be implemented in the existing risk- and opportunity management process. So, the guideline needs to be in line with the types of documents already used and at the same time be simple enough that it does not become a hurdle for people to read the documentation. The

identification session needs to fit parallel to the threat identification session in the existing process. The opportunity session needs to consume the same amount of time and use inputs and outputs that already exist in the process.

- Process requirement 4 – Implementation

Chapman (2011) states the need for a clear change process. It is important that the new practice is noticed by people in the organization so that the awareness rises and the new method is used.

Summarizing all requirements

The requirements for the design of the opportunity identification session are presented in Table 24 and 25. These requirements form the basis for the design of the best practice for an opportunity identification session.

Table 24 Content requirements for design

#	Type	Content Requirements
1	Language	Common risk and opportunity language for opportunity session: <ul style="list-style-type: none"> - All terms and definitions used in the process are clearly stated up front to eliminate ambiguity. - The terminology matches the risk and opportunity process of the organization.
2	Infrastructure	Tools: <ul style="list-style-type: none"> - Database with opportunities for inspiration - Supportive tool for technique (if applicable)
3	Organizational Learning	<ul style="list-style-type: none"> - Evaluation build in
4	Technique selection	<ul style="list-style-type: none"> - The opportunity technique is not already used in the existing risk and opportunity management
5	Roles	Clear roles and responsibilities: <ul style="list-style-type: none"> - Preferred participant list - Role descriptions

Table 25 Process requirements for design

#	Type	Process Requirements
1	Presentation	<ul style="list-style-type: none"> - Guideline with detailed description - Summary (Onepager)
2	Scalability	Scalable session for small and large projects: <ul style="list-style-type: none"> - Single, easy and time-limited technique for small and large project - One more extensive technique with more depth for large project

3	Infrastructure	<ul style="list-style-type: none"> - Single document for simple implementation - The session is integrated in the existing risk and opportunity management process
4	Implementation	<p>Obvious change process to introduce opportunity session discipline</p> <ul style="list-style-type: none"> - The session is presented as new and different from previous sessions

7.1.2 Concept practice guide

The goal is to design a practice guide for an opportunity identification session using the requirements formulated in the previous section. The opportunity identification session is part of the risk management of the organization. The session can be used for identification in both the tender and execution phase. Two versions of the practice guide are created, the full version that describes the opportunity identification session in detail and the 'onepager' that is used to summarise the session and provide a quick look up for participants.

In this section, the build-up of the concept practice guide is explained. The concept practice guide is presented in Appendix G.

The practice guide consists of four main parts:

1. Introduction – The purpose and context for the guideline are explained
2. Preparation – The necessary preparations for the identification session are explained
3. Execution – The execution of the opportunity identification session is explained
4. Completion – The steps for finishing and completing the session are explained

Introduction

The guideline starts with the introduction of the document. The introduction explains the purpose of the document, the target audience of the document and the contents. Also, the place the practice guide takes in the risk management process of the organization is described.

Preparation

Next, the preparation for the opportunity identification session is explained. The preparation consists of 6 elements that support a successful opportunity identification session:

- Definitions

In this section, the definitions that are relevant for an opportunity identification session are described to meet *Content requirement 1*. These definitions are part of the risk- and opportunity language that need to be defined at the beginning of the process. The terms that are defined for opportunity identification are:

- *Opportunity* = Uncertainty having a positive effect on project objectives
- *Optimization* = An optimization is not an opportunity because it does not involve uncertainty
- *Opportunity description* = As a consequence of <one or more definite causes>, <uncertain event> may occur, which could lead to <one or more positive effects on objective(s)>.

- Roles & Responsibilities

To fulfil *Content requirement 5*, three roles are defined and explained for the identification session:

- *Project manager ('Motivator')*: Final responsibility for the identification session. Tasked with motivating the project team and creating the right group environment for the session.

- *Opportunity manager ('Chairman')*: Responsible for the facilitation of the identification session. Guides the identification session and records the identified opportunities.
- *Team member ('Discipline expert')*: Responsible for individual preparation of the session such as reading project documentation. Active participation during the opportunity identification session.

- **Participants**

A list of participants for the session is proposed for *Content requirement 5*, the advice is given to make the group as diverse as possible. The relevant disciplines are listed below:

- Project manager
- Risk manager
- Calculator
- Planner
- Design
- Environment
- Permits
- Work preparation
- Strategy
- Safety
- (Client)

- **Project documentation**

Relevant project documentation needs to be gathered for the participants to study and use during the session. The project manager and risk manager are responsible for selecting and collecting the documentation. The participants are responsible for studying the documentation before the session. *Content requirement 2* requires the use of a database with opportunities from previous projects. These can be added to the project documentation. A list of potential useful documents is listed below:

- Contract documents
- Project Planning
- Project budget
- Design drawings
- Maps of location
- List with opportunities from comparable projects

- **SWOT Analysis**

The project manager and risk manager perform a simple and quick SWOT-analysis to analyze the strengths and weaknesses of the project and the project team in preparation of the session. This provides information about potential blind spots caused by lack of certain disciplines, missing documentation, or which technique to select. The SWOT is not intended to identify opportunities but only to support the session and creating the best environment possible for an identification session. The results from the SWOT can also be used for the threat identification session.

- **Selection identification technique**

To meet *Content requirement 4* and *Process requirement 2*, two techniques are proposed for the identification of opportunities that are not already used for risk identification. Also, two techniques provide the possibility to select the most suitable method for the specifics of the project. First, different techniques were collected using literature (Siraj & Fajek, 2019). It became clear that most techniques that are used are only focused on threat identification and thus not fit for opportunity identification. To identify opportunities, a mindset for opportunities is needed as explained by Hillson (2019). This mindset needs to be creative and open, so a method that stimulates these characteristics

is needed. By looking at other industries that depend on creative thinking new methods can be found. From a search on the internet using the search terms of *creative brainstorming* the SCAMPER method was discovered that is used as the first method. The second method is found in the textbook of Hillson that is focused on opportunity management (Hillson, 2019).

- Method 1 – SCAMPER

The SCAMPER method was created by Eberle in 1996 to stimulate creative thinking (Eberle, 1996). The method was originally intended for the product design industry but has found its way to other industries because of the simplicity and ease of use. This method can be used for small and large projects, and supports project teams that have difficulties with identifying opportunities by providing a structured and pragmatic approach. The name of the method is the acronym for the seven questions that are used in the method. Each question uses a different lens to look at the project. The lenses are: *Substitute*, *Combine*, *Adapt*, *Modify*, *Put to another use*, *Eliminate*, and *Rearrange*. For the lens of substitute, this leads to the question: What element of the project/design can we substitute?

- Method 2 – Benefit tree analysis

The Benefit tree analysis is introduced by Hillson as the opposite of the Fault event tree (Hillson, 2019). The method can be used by project teams that have some experience with identifying opportunities because the method provides less support in creative thinking compared to the SCAMPER method. Also, this method is better suited for large projects to decompose the project and find opportunities because large and complex project can be difficult to overlook as a whole. The method starts by identifying a potential benefit as top event. This can be a general benefit such as decreased costs or decreased duration of the project (if this is beneficial). The next step is to decompose this benefit into drivers that have an influence on the benefit. The drivers are further decomposed into specific opportunities. This method is performed in a group session with a presentation display to visualize the benefit tree.

The preparation part results in a plan for the opportunity identification session. This plan is shared with the project team in advance of the session.

Execution

Next, the execution phase of the practice guide explains in detail how the two methods have to be executed.

- Method 1 – SCAMPER (Eberle, 1996)

This method uses 7 different lenses from which questions can be formulated about the project. The 7 lenses are:

- Substitute – What can be substituted?
- Combine – What can be combined?
- Adapt – What can be adapted?
- Modify – What can be modified?
- Put to another use – What can be put to another use?
- Eliminate – What can be eliminated?
- Rearrange – What can be rearranged?

Every participant brainstorms individually about each question and the results are discussed in the group. All opportunities that are identified are captured by the opportunity manager.

- Method 2 – Benefit tree analysis (Hillson, 2019)

Based on project objectives, determine the potential benefits such as lower cost, reduced time or increased quality. Write this benefit on the top of a flip over/whiteboard and decompose this benefit into drivers that could contribute to this benefit. Continue till the drivers are decomposed in such a way that clear opportunities remain.

Completion

After the session is executed, the results of the session need to be reported. For this, the opportunity manager captures all the identified opportunities in an overview. The session is evaluated immediately afterwards with the participants and the lessons to be learned are captured by the opportunity manager and used for improving future sessions as required by *Content requirement 3*.

The list with opportunities is used to update the risk register and perform the steps that are described in the existing risk management process. This means that an owner needs to be assigned, the opportunity is analyzed and an exploitation measure is implemented. The project manager and risk manager can decide to perform another opportunity session later in the project to identify new opportunities.

The practice guide is presented in two formats to meet *Process requirement 1 and 3*; A complete practice guide that describes all the steps and a Onepager that summarizes all the steps for the opportunity identification session. The practice guide is presented in such a way, including a attractive design, that it is easy to implement and to introduce as a significant change in management of opportunities as required by *Process requirement 4*.

The concept practice guide is evaluated by expert groups of project managers and risk managers to receive feedback and improve the concept version before finalizing the practice guide.

7.2 EXPERT GROUP EVALUATION

The design is evaluated with two expert groups to test the practical implications of the concept practice guide of the opportunity identification session. The first expert group consists of project managers as they play a key role in risk- and opportunity management process of the project. The second group are risk managers, as they are the future users of the practice guide.

In preparation of the expert group session, the guideline is shared with the participants. The session was conducted online. The session started with a presentation of the development of the guideline. Next, the guideline was evaluated by asking for the different elements if they would be usable based on the content and the presentation form. Lastly, room was provided for additional feedback and discussion. The results from the evaluation are used to improve the concept practice guide.

Project managers

A group of 8 experienced project managers from diverse projects was invited for the expert group session. 5 project managers were unable to attend the session and the session was conducted with 3 project managers. The project managers that were unable to attend the meeting had other meetings planned and it was not caused by a lack of interest in the subject. The concept design was evaluated using Mentimeter, an online survey tool. The project managers were asked to score the elements of preparation, execution, completion and onepager on their content and form on a scale from 1 to 5. The results are presented in Figure 9 and 10.

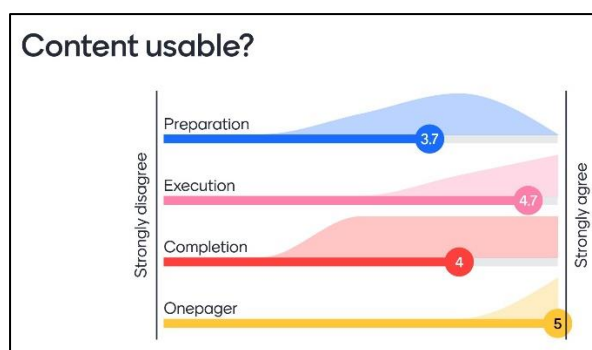


Figure 9 Content evaluation project managers

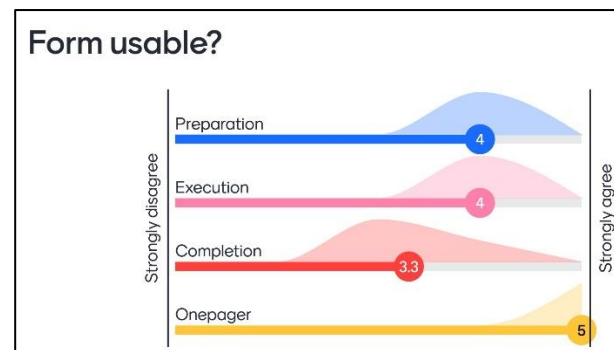


Figure 10 Form evaluation project managers

In Figure 9, the concept practice guide is evaluated on the usability of the content. Most parts have a score of at least 4 out of 5, which suggests that the content is usable. Especially the execution and onepager are perceived to be of added value. The preparation scores lower with a 3.7 out of 5, the project managers found that some elements in the preparation part were not clear.

In Figure 10, the concept practice guide is evaluated on the usability of the presentation format. The onepager is perceived as a very good presentation format. The completion can be made more attractive according to the project managers.

The project managers were asked to comment on the different elements of the practice guide and the results from the survey were used to guide conversation. The comments are presented in Table 26 and used to improve the concept design.

Table 26 Comments expert group evaluation project managers

Element	Comment
<i>Preparation</i>	<ul style="list-style-type: none"> - Purpose of SWOT-analysis is not clear, swot quadrant not necessary - Participants: realisation manager, execution manager, representative management team, external experts from outside the project team - Documentation: Ambition document/Business case - Method selection: Terms “Basic” and “in-depth” are not clear - The headings help to create awareness of the preparation work
<i>Execution</i>	<ul style="list-style-type: none"> - SCAMPER seems like a good and refreshing technique - Benefit tree analysis needs more guidance - Two methods provide variety that can be useful
<i>Completion</i>	<ul style="list-style-type: none"> - Template for completion could be helpful
<i>Onepager</i>	<ul style="list-style-type: none"> - Without explanation difficult to understand - Target of onepager not clear - Onepager is ideal way to present the approach to the organization
<i>Other</i>	<ul style="list-style-type: none"> - Good way to start working uniformly - Implement as quickly as possible

Risk managers

The expert group evaluation was conducted with 7 risk managers. The concept design was evaluated using Mentimeter. The risk managers were asked to score the elements of preparation, execution, completion and onepager on their content and form on a scale from 1 to 5. The results are presented in Figure 11 and 12.

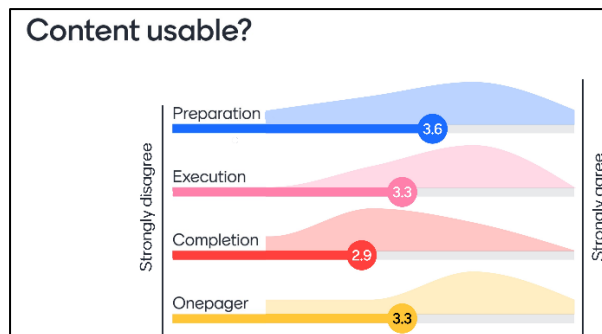


Figure 11 Content evaluation risk managers

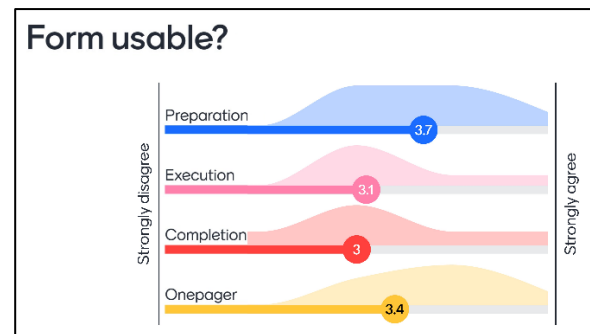


Figure 12 Form evaluation risk managers

In Figure 11, the concept practice guide is evaluated on the usability of the content. The different parts score between 2.9 and 3.6 out of 5, which is not very good. The risk managers found that there was some room for improvement. The completion part was too limited in its content. The preparation part had potential according to the risk managers.

In Figure 12, the concept practice guide is evaluated on the usability of the presentation format. The preparation part and the onepager have the highest scores and found to be good formats. The execution format was in the opinion of some risk managers to elaborate for what the project teams need. It could be better to keep it as simple as possible for the presentation.

The risk managers were asked to comment on the different elements of the practice guide and the results from the survey were used to guide conversation. The comments are used to improve the concept design and presented in Table 27.

Table 27 Comments expert group evaluation risk managers

Element	Comment
<i>Preparation</i>	<ul style="list-style-type: none"> - Definition of an optimization is not clear - Term "Definitions" does not fit well, only one definition is presented, one description and one non-definition - Participants: Contract manager, traffic manager - Defining roles helps to create awareness of the position that you have as risk manager in the session - Preparation is experienced as good
<i>Execution</i>	<ul style="list-style-type: none"> - Execution is experienced as good - Project teams can lose interest if the method is explained to 'scientific', keep it simple - SCAMPER method is a good way to start thinking outside the box
<i>Completion</i>	<ul style="list-style-type: none"> - The session needs to end with a list of opportunities
<i>Onepager</i>	<ul style="list-style-type: none"> - Powerful tool, could be more powerful with less text and more icons (keep it simple stupid)
<i>Other</i>	<ul style="list-style-type: none"> - Can this be used in an online environment like MS Teams?

Reflection

When comparing the results from the expert group sessions, there were some differences between risk- and project managers. The project managers evaluated the practice guide from a more strategic perspective. The risk managers evaluated the practice guide more from an operational perspective. These perspectives follow from the role that they both have in the current process. The project managers evaluated the practice guide as how it could contribute to the entire project. They looked more at it as an opportunity to improve their projects without worrying about the potential problems in execution. The risk managers were focused on how they could use the practice guide to help the project team and the common challenges they experience in current risk- and opportunity identification sessions. The risk managers were more focused on the threats to the practice guide and how it could miss to identify opportunities.

In general, both groups were very positive towards the practice guide. It was seen as a new and simple approach that was clearly different from the threat identification session. Both groups mentioned the challenge of stimulating creativity in identification session. They were not fully convinced that the practice guide would solve that problem. However, they think that especially the SCAMPER-method is very helpful as it helps project teams to think outside the box by asking structured questions.

7.3 FINAL PRACTICE GUIDE

The results from the expert group evaluations and a review by the researcher were used to finish the design of the practice guide. The modifications with respect to the concept version are presented in Table 28.

Table 28 Modifications with respect to concept design

Element	Modifications
<i>Preparation</i>	<ul style="list-style-type: none">- Clarification of definition for optimization- Add participants: Contract, Execution, Traffic, Director, External expert- Add documentation: Business case- Clarification of purpose of SWOT
<i>Execution</i>	-
<i>Completion</i>	-
<i>Onepager</i>	<ul style="list-style-type: none">- Description optimization- Project documentation description- Method selection description- SWOT description- Method 2 description

Not all comments of the expert group sessions are implemented in the revision of the concept practice guide. For the comments of Table 26 and 27, explanations are given if the comment is accepted or rejected.

Accepted comments

For the preparation, the definition of an optimization was not clear for experts. As the purpose of a definition is to provide clarity, the definition is made clearer. The suggestions for participants and project documentation are all accepted because these lists are not meant to inspire and not to restrict. The purpose of the SWOT analysis in the practice guide was not clear, the description is adapted to describe a clear purpose.

For the execution and completion, no changes were made to the practice guide.

For the onepager, multiple comments were accepted. The definition for an optimization is also changed in the onepager. The section for the project documentation is changed into a blank section where project- and risk manager can fill in the required documentation. This is also changed in the SWOT section, as the comments stated that participants already know what a SWOT is. So, the SWOT quadrant is changed into a blank section where the risk- and project manager can list the strengths and weaknesses of the project and the project team. The descriptions of the two methods in the method selection section was not helpful for selection, so the words are changed to be clearer when to use which method. The description for method 2 in the execution section is made simpler as comments explained that this was too 'scientific' for participants.

Rejected comments

For the preparation, the comment was made that the title of definitions does not fit with the content it represents. It is true that only one definition is presented and that the other two are an anti-definition and a description. However, the goal of the section is to provide clarity and uniformity in

the use of language around opportunities. The contents address the problems that often arise in identification sessions by 'defining' some important terms. Other titles for this section could be 'communication', 'language', or 'relevant terms', but these do not provide the clarity that is needed.

For the completion, the comment was made to add a template for the completion phase to capture opportunities and write them down. A template would only be used by the risk manager and the opportunities would be written down and directly transferred to the risk register. So, there is no real advantage of having a special template instead of making a list of the results of the session.

The comments are addressed and the concept practice guide is modified. The onepager of the final design is presented in Figure 13. The final practice guide is presented in Appendix H.

- OPPORTUNITY SESSION -

PREPARATION

DEFINITIONS

- ☐ Opportunity = An uncertainty having a positive effect on project objectives.
- ☐ Optimization = An optimization is not an opportunity because there is no uncertainty
- ☐ Opportunity description =
As a consequence of <one or more definite cause(s)>,
<uncertain event> can happen,
which leads to <one or more effect(s) on project objectives>.

ROLES

- ☐ Project manager - Motivator
- ☐ Risk Manager - Chairman
- ☐ Team member – Discipline expert

PROJECT DOCUMENTATION

- ☐ Contract documents
- ☐ Drawings
- ☐ Maps

METHOD SELECTION

Basic	→	Method 1
Extensive	→	Method 2

SWOT RESULTS

Strengths	Weaknesses
Opportunities	Threats

EXECUTION

METHOD 1 – S.C.A.M.P.E.R.

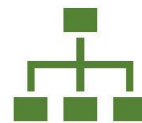
Answer the questions for the different elements in the project. Combine disciplines and share answers.

- Substitute* – What could be substituted?
- Combine* – What could be combined?
- Adapt* – What could be adapted?
- Modify* – What could be modified?
- Put to another use* – What could be put to another use?
- Eliminate* – What could be eliminated?
- Rearrange* – What could be rearranged?

METHOD 2 – BENEFIT TREE ANALYSIS

The Benefit Tree Analysis (BTA) is a tree that consists of benefits, drivers and opportunities. Benefits are related to project objectives. Start with benefits that are decomposed in drivers. The drivers are subsequently decomposed into opportunities.

- Examples benefits:
- Reduce costs
 - Reduce time
 - Improve quality



COMPLETION

Tasks

- ☐ Risk manager collects all opportunities and formulates them correctly
- ☐ Session is evaluated and suggestions for improvement are archived by risk manager
- ☐ If necessary, a new opportunity session is scheduled by project manager

Figure 13 Final design practice guide onepager for opportunity identification session

7.4 CONCLUSION

The goal of this chapter was to improve the opportunity management practice and answer the fourth sub-question.

Sub-question 4: How can opportunity management practices be improved in a construction organization?

The comparison of opportunity management theory and practice presented multiple gaps. These gaps need to be addressed to improve opportunity management practice. The gaps differ in size and complexity, so for this research the decision was made to select one single gap and provide a simple and effective solution. For the other gaps, suggestions for improvement are provided based on the literature review.

To improve the management of opportunities in the construction organization, the four themes derived from literature need to be addressed. The risk and opportunity language must be defined and used in the risk-and opportunity management process in the entire organization. An infrastructure must be implemented that supports the process with tools for both threats and opportunities, provides training for project teams, and captures the lessons to be learned from projects. A risk culture needs to be built that stimulates opportunity management from the top-down by top management with a vision and policy. From the bottom-up, the desired risk behaviour must be practiced by the project teams.

For the risk and opportunity process, a detailed solution was provided. Opportunities have to be identified before they can be managed. Also, experience in opportunity management is gained when opportunity management is practiced. So, to start the cycle of opportunity management, the identification is the first step. To improve the opportunity identification a practice guide was designed for an opportunity identification session. The session can be integrated in the existing risk management and provides the organization with a uniform and novel approach for identifying opportunities. The practice guide describes the preparation, execution and completion of the identification session. The practice guide presents clear definitions, defines roles for the session, and provides two different methods for identifying opportunities. The practice guide is presented in a detailed version for risk- and project managers and a summary for the participants.

The next step is to implement and execute the identification sessions. It may not work perfect immediately but it takes practice and persistence. When the first opportunities are identified, the process of management the opportunities can start. The organization can start to learn from these first opportunities and in the long-term work on the other gaps.

A very important prerequisite for a successful implementation and start in managing opportunities is the support of top management. Top management needs to balance its focus in the risk- and opportunity management process on both threats and opportunities. Opportunities need to be on the agenda in meetings with steering groups for projects and top management must require opportunities in project risk reports. If project teams do not feel the urgency to identify, it becomes impossible to manage opportunities.

8 DISCUSSION

In this chapter, the contribution to research is evaluated and limitations of the research are discussed using the sub-research questions. Furthermore, Suggestions for improvement of the other gaps are presented and implications for the construction organization are discussed.

8.1 EVALUATING THE RESEARCH

In this section, the validity of the research is discussed, followed by the interpretation of the results.

Validity

Two types of validity are discussed, the internal and external validity of the research. The internal validity of the research is based on the procedures and how rigorously the study is performed. For the literature review, a structured approach is used to search in online academic libraries. Different search terms were used in multiple combinations. The references of relevant articles were also searched for additional literature. The number of relevant sources for opportunity management is limited and only a few authors have specialized in the subject.

In the exploration, three different data sources were used: Documentation, interviews, and observations. The validity of the documentation and their analysis is high. All the relevant documentation that described the risk- and opportunity management process was provided. All documents were analyzed using the same approach that was also used for the methods described in literature, using the parameters of purpose, input, output, techniques, and steps. This made the comparison easier as the same parameters were compared.

The validity of the results of the interviews are limited, as a very small number of interviews has been conducted with only two types of roles in the organization. It was effective and efficient to focus on these roles but other roles, such as directors or project team members, that could have helped to create a more detailed overview of opportunity management practice were left out. Also, the 5 interviews that were conducted were people that wanted to cooperate, so these individuals can be expected to have a positive attitude towards the research and thus provide biased answers. The qualitative content analysis helped to structure the different concepts that emerged from the interviews and was performed in a structured and rigorous way.

The last data source concerned the observations of the identification sessions of the tender project. Although the researcher did not participate actively in the session, his presence in the session could have influenced the other participants. Also, the selected tender project was performed by a tender manager who is known for his positive attitude towards opportunities. This would suggest that the observations were made in one of the more opportunity-oriented projects and that other projects are less focused on opportunities. As the observations showed that the opportunity management practice was not very good, one could argue that the observations were actually too positive and that in a 'normal' project the opportunity management practice would have been worse.

The validity of the comparison is high as the overviews from theory and practice were created using the same parameters. This allowed for close comparison and a more precise identification of the gaps.

The validity of the design of the practice guide is high within the context of the research and for the case of the construction organization. The expert group sessions provided valuable feedback and the experts in both sessions were enthusiastic about the practice guide. However, the practice guide is

not tested by facilitating an opportunity identification session with a project team. This is the best way of testing the design.

Concluding, the internal validity of the research is reasonable. The external validity of the research is low, the results cannot be generalized to the whole construction sector because the research was conducted with only one case. Other organizations must be included to increase the external validity.

Interpretation of results

Research into the practice of opportunity management showed that many organizations use a threat-focused approach (Hillson, 2002; Olsson, 2007; Krane et al., 2014; Johansen, 2015). It is a little disappointing to conclude that 5 years later this is still the situation in one of the biggest construction organizations in the Netherlands. The risk- and opportunity management process in practice resulted in almost no opportunities. On the positive side, opportunities are included in the process and the organization is aware that there is potential in managing opportunities.

Based on literature, a process framework was created for opportunity management (Chapman & Ward, 2011; Johansen et al, 2019; Hillson, 2019). In practice, the process was lacking most specific elements for the management of opportunities. Tools, techniques and training for opportunity management are not provided. From the top down, a focus on threats in reporting causes the organization to stay focused on threats.

Apparently, it is not enough to include opportunities in the descriptions of the process. More is needed to make the shift to complete opportunity management. One area that could be promising is that of soft skills and culture. By increasing the selfknowledge of individuals in the organization about their attitude and mindset towards threats and opportunities, it might be possible for individuals to actively steer their mindset towards opportunities. But this is part of psychology and that is a discipline the researcher has no experience with.

Concluding, the research has shown that multiple promising methods are proposed in literature that can be used to manage opportunities. The research has also shown that opportunity management practice is still far behind. Where the process might have been adapted to include opportunities, this is not the case for the people that perform the practice of opportunity management. A focus on threats is still present in practice.

8.2 LIMITATIONS OF THE RESEARCH

The first sub-question created an overview of opportunity management theory using a literature review. When looking at the sources of literature, it becomes clear that there is a low variety in sources and authors. Most of the literature is provided by the authors Hillson, Chapman & Ward, and the Norwegian research group of Johansen and Olsson. Especially the work of Hillson is not all academically peer reviewed work and this makes the literature review less strong. At the same time, it became clear that the subject of opportunity management is still not studied at large and that more research is needed to build a strong theoretical base. Also, research into the practical side of opportunity management is very limited. This must increase to confirm the theoretical findings and expand the current available literature.

In general, the exploration is performed in a single construction organization. This makes the exploration very limited as only one example is not representative for the whole construction sector. Multiple organizations must be explored to create a complete overview of opportunity management

practice in the construction sector. The limitations of the exploration are discussed for each of the sources.

In the review of the documentation, only the formal risk management description and templates are used. No real project documentation is reviewed. Ongoing projects were not eager to share their risk registers for confidentiality reasons and also old project documentation was not easily available. These documents could have helped to establish a better picture of the opportunity management results in the past.

A limited number of interviews was conducted with only two roles in the organization. The interviews presented a subjective perspective on the risk and opportunity management practice of the organization so more interviews would result in a more complete representation. The semi-structured interview provided enough room for extra questions to explain certain topics more in depth. Additional roles like the director and project team members could be added to complete the overview of the entire organization. The analysis of the interviews using the qualitative content analysis provided the researcher with some challenges as experience was lacking in this method.

The observations were made by the researcher and this adds a bias. To increase the quality of the observations, another observer could have been used to compare the observations with. Furthermore, only three sessions were observed in one project. The observations could have been extended to other projects and more opportunity sessions.

For all sources it is clear that expanding the search and work could have led to a more complete representation of the opportunity practice in the organization. However, the research is part of a master thesis and time is restricted for the research so decisions had to be made on what was included and what not. The decision was made to use multiple sources to triangulate instead of looking into one source in depth.

The comparison on elements eliminates the nuances of the practice of the organization. In the organization opportunities are managed but sometimes it is not made explicit. This makes it very difficult to measure it and thus it is left out of the comparison. The result is a somewhat harsh judgement of the opportunity management practice in the organization.

The design for the practice guide is evaluated by two groups consisting of experts, but not tested in a real setting. Feedback of a project team that has tested the practice guide would be valuable for improving the practice guide. Also, a crucial element for an opportunity session is not discussed in the practice guide; Facilitation skills. The skills to facilitate a creative session are very important but this is something that has to be learned separately because it also applies to the risk sessions.

8.3 SUGGESTIONS FOR IMPROVEMENT OF OTHER GAPS

For the gap of opportunity techniques and training a solution was designed. For the other gaps, suggestions for improvement are presented in Table 29.

Table 29 Suggestions for improvement per gap

Subject	Gap	Suggestion for improvement
<i>Language</i>	- Knowledge and use of risk and opportunity (meta)language	- Make risk and opportunity language uniform and explicit (documentation, training, meetings)
<i>Culture</i>	- Risk and opportunity vision and behaviour from the top.	- Management must require a balanced report for projects with attention for opportunities

	<ul style="list-style-type: none"> - Relevance of and attitude towards risk and opportunity management bottom-up 	<ul style="list-style-type: none"> - Support opportunity management from the top with resources (budget, time, etc.) - Create awareness of risk attitude and mindset in project teams
<i>Process</i>	<ul style="list-style-type: none"> - Balance between risk and opportunities throughout the process - Scalable process for small projects 	<ul style="list-style-type: none"> - Restore the balance throughout the process between threats and opportunities in the guidelines (especially after identification) - Make the risk and opportunity management process fit for purpose for small projects with quick and easy identification, analysis and reporting methods.
<i>Infrastructure</i>	<ul style="list-style-type: none"> - Organizational learning in opportunity management 	<ul style="list-style-type: none"> - Provide risk and opportunity management training for project teams - Implement organizational learning and a knowledge base for the risk and opportunity management

8.4 MANAGERIAL IMPLICATIONS

The results from the research can be used to improve the opportunity management practice of the construction organization that was studied. The implications for the construction organization are divided into quick wins and long-term improvements. The quick wins are more pragmatic suggestions for improvement that are relatively easy to implement. The long-term improvements are more challenging and require more energy and persistence to improve the management of opportunities.

The quick wins are summarised as:

- Implement the practice guide for the opportunity identification session in the Guideline Risk Management, evaluate it for every session and update the practice guide with feedback from the sessions.
- Define an explicit and uniform risk and opportunity language that is listed in documentation, learned in training, and used in meetings.
- Review specific opportunity elements in each process phase and add specific elements when they are not present in the process. Examples include:
 - Opportunity management planning in the planning phase
 - Opportunity management qualitative/quantitative analysis techniques
 - Opportunity response strategies in the response phase (Exploit, Enhance, Share)
 - Opportunity management reporting templates in all phases
 - Opportunity management evaluation
- Start risk management training for project teams
- The attitude of top management should support opportunity management. Top management must require opportunities in reporting, and add opportunities as a topic to the agenda of the meeting.

The organization needs to make a start with opportunity management and learn while doing it, the quick wins help to make the start. At the same time, it is not something that is changed in one moment, it takes time and especially the long-term implications.

The long-term implications include:

- Build a mature risk culture. This starts with the risk attitude of top management and a clear vision and policy on the role of opportunities in the organization. The next step is to increase the awareness of individuals about risks and opportunities, their attitude, and their mindset

for opportunities. This results in the desired risk-related behaviour, which in turn will support the risk culture following the ABC-model from Hillson (2019).

- Implement a system for organizational learning and start capturing lessons to be learned from projects. This will slowly improve the practice of opportunity management as experience slowly increases while performing projects.

9 CONCLUSION

The goal of this research is to improve the management of opportunities in a construction organization. Four sub-questions were used to guide the research and help to answer the research question. For each sub-question, the conclusion is presented. Finally, the conclusion for the research question is presented.

Sub-question 1: *What are the current approaches and methods for opportunity management in literature?*

Literature provides multiple approaches for opportunity management that have small differences. The approaches found in literature are combined to create an overview of the essential elements of opportunity management. The four elements are Language, Culture, Process, and Infrastructure.

Language: To manage opportunities, a clear, inclusive, and uniform risk language is needed in the organization. Clarity is achieved by defining and writing down the relevant terms for risk- and opportunity management. Inclusivity is realized by having terms for both threats and opportunities and uniformity is achieved by requiring all project teams to learn and use the risk language.

Culture: A mature risk culture needs to be built that supports the management of opportunities. This starts from the top down and is realized with a vision and policy that is supportive of opportunities. Next, from the bottom-up, the corresponding risk behaviour needs to be practiced which will help to build the risk culture. Building a risk culture is a challenge and does not happen overnight, this is the biggest challenge in opportunity management that takes time and requires persistence of the whole organization.

Process: The process for risk- and opportunity management needs to be simple, scalable and integral. Simplicity is achieved with a basic process that includes five phases of planning, identification, analysis, mitigation, and monitoring. In addition to the phases, all the essential inputs, outputs, and techniques need to be described. Next, scalability is created by providing some options to add elements in the process based on project size and complexity. This depends on the organization and different types of projects that are executed. Lastly, the process for risk- and opportunity management must be integrally approached in the organization. Threats and opportunities must be addressed in the same process, but it is important to have different techniques for threats and opportunities.

Infrastructure: An infrastructure that supports opportunity management consists of tools, training, and a system for organizational learning. The tools need to be fit for the management of opportunities instead of using the conventional tools for threats. Training must be provided in the organization to increase the knowledge and skills in risk- and opportunity management of project teams. Lastly, a system for organizational learning must be implemented. This system captures the lessons to be learned from all projects and improves the risk- and opportunity management practice with feedback from the organization.

Sub-question 2: *What are the current approaches and methods used in practice for opportunity management?*

The opportunity management practices of a large Dutch construction organization were explored using a review of risk documentation, interviews with risk- and project managers, and observations of threat and opportunity identification sessions of a tender project. The elements of the literature review are used to guide the exploration and allow for comparison in sub-question 3.

Language: There is no uniform and inclusive risk language described or used in the organization. Risk- and project managers know the relevant terms but other members of the project do not use a risk language.

Culture: There is no vision statement about risk- and opportunity management from top management. From the interviews, it became clear that top management has a strong focus on threats. From the interviews and observations, it was found that risk- and opportunity management is seen as an obligation that individuals must do instead of want to do. So, the risk culture is not supportive of opportunity management in the organization.

Process: The organization describes a simple, inclusive, and complete process in the documentation. However, the process is focused on threats, opportunities have no priority and receive limited attention. The process is intended for large projects and not scalable to small projects.

Infrastructure: The organization has tools implemented such as an online risk register, automated Monte Carlo analysis and reporting templates. In the organization, no risk- and opportunity management training is provided. There is no system implemented for organizational learning to capture lessons to be learned, only a generic database that collects all threats and opportunities of every project is present.

Concluding, attempts are made in practice to identify and manage opportunities, but eventually this results in almost no opportunities. When opportunities are identified, they are often neglected in the project because they have a low chance of being realized.

Sub-question 3: What are the gaps between theory and practice of opportunity management?

The next step in the research was to compare the results from literature with the results of the exploration. The comparative analysis was based on the themes identified in literature being *Language*, *Culture*, *Process*, and *Infrastructure*. Several gaps were identified in the practice of opportunity management in the construction organization. The gaps are summarized in Table 30.

Table 30 Gaps resulting from comparative analysis of theory and practice

Theme	Gap
<i>Language</i>	<ul style="list-style-type: none"> - Knowledge and use of risk and opportunity language
<i>Culture</i>	<ul style="list-style-type: none"> - Risk and opportunity vision and behaviour from the top - Relevance of and attitude towards risk and opportunity management bottom-up
<i>Process</i>	<ul style="list-style-type: none"> - Balance between risk and opportunities throughout the process - Scalable process for small projects
<i>Infrastructure</i>	<ul style="list-style-type: none"> - Opportunity techniques & training - Organizational learning in opportunity management

Sub-question 4: *What steps can be taken to improve opportunity management practice?*

In the last part of the research, the gap of *opportunity techniques and training* was selected for a detailed solution design. The rationale for selecting this gap was that opportunities first must be identified before they can be managed.

A practice guide for an opportunity identification session was designed. The practice guide describes the preparation, execution and completion of an opportunity identification session and provides a summary of the practice guide in a onepager format. The practice guide was evaluated and improved with two expert groups of project- and risk managers.

The steps to improve the management of opportunities consists of implementing the practice guide, and adjusting the process to make it scalable and balanced in its focus on threats and opportunities. A system for organizational learning and training must be implemented that educates members of the organization in the uniform risk language and how to manage threats and opportunities. Finally, it all has to start with top management having a vision and policy that stimulates the management of opportunities to start building the desired risk culture.

Finally, the research question can be answered using the results from the sub-questions:

Research question: *How can the current approaches of risk management in a construction organization be improved to manage opportunities?*

Organizations that want to improve their management of opportunities need to make sure that the four elements of language, culture, process, and infrastructure are present and supportive of opportunities. The elements of language, process, and infrastructure are easier to implement in the organization. The element of culture is the biggest challenge in managing opportunities. The risk culture must be cultivated from the top down and from the bottom up.

Opportunity management practice is not changed overnight, it requires deliberate effort and persistence from all levels in the organization. It is important to make a start by identifying opportunities and starting to manage these in projects. This will lead to experience that can be captured with organizational learning to improve the management of opportunities to fit the organization. This research presented the essential elements for opportunity management practice in a construction organization and provides a practice guide that can be used to make a start with managing opportunities by helping to identify them.

Recommendations for future research

Research into the practice of opportunity management in the construction sector is limited and this research shows that there are topics left for future research. Suggestions for further research include:

- Multiple construction organizations need to be studied to generalize the findings of opportunity management practice.
- The identified gap of *culture* needs more exploration to better understand the practical implications of this theme.
- Effect of project phase (Tender/Execution) on opportunity management
- When opportunities are more often identified, it becomes possible to study how they best can be exploited in practice.

Recommendations for practice

Construction organizations that want to improve their opportunity management can use the results from this research to start evaluating their risk- and opportunity management practices. By comparing their own practices with the theoretical approach, gaps can be identified. By focussing on the elements, language, process, and infrastructure, they can create an organizational environment that supports the management of opportunities. The element of culture needs to be cultivated and this will take time. Implementing a system for organizational learning is crucial to monitor and improve the management of opportunities. At last, construction organizations should open their doors for researchers to show what happens in practice. By letting researchers in, the theory can be further improved based on practical experience.

10 REFLECTION

In this chapter, I will personally reflect on my research project. Before starting the research project, I had heard a lot about the highs and lows of a graduation research project. So, when I started, I was hoping that I would not make the same mistakes that others had made before me, but unfortunately it was not that easy. Some expectations became reality, and others were completely different. But in the end, I have learned a lot about conducting academic research, the topic of opportunity management in combination with the construction industry, and finally about myself.

During my time at the University of Technology in Delft, I did not conduct many research projects. So, looking back at the start of my project, I was not fully prepared and aware of what I was going to do. I underestimated the importance of having a good proposal, and this chased me during the first months of the project. The proposal was not very specific and this vagueness caused some delay in the first few months. For too long I studied articles and textbooks without creating something of it, mostly because I did not know what I specifically had to do. Luckily, every graduate student gets the help from a graduation committee with supervisors that are experienced in dealing with inexperienced researchers. In the beginning, I did not fully use the experience and knowledge of my supervisors and wanted to find out things myself, but as my project progressed, I started to use the help of my supervisors. In combination with actually reading about different research methods I was able to create a research approach that was usable and I could start to make real progress. So, I would describe the progress of the research project and my academic development both as being exponential instead of linear.

I wanted to do my research project at a construction organization to get the experience of working in a construction organization. This would help me to make a better decision of what would be my next step after graduation when searching for a job. So, I was very enthusiastic about the opportunity to conduct my research in a large Dutch construction organization. Unfortunately, the corona pandemic changed my plans completely and required me to work from home. I am very thankful for the efforts of my colleagues of the risk department to include me in their work and meetings during my time at the organization. I did not have the full experience of working in a construction organization but I have learned a lot about the industry and I enjoyed my time in the organization. However, I discovered that my next step after graduation will most likely be not in a construction organization.

I have learned a lot about myself during my research projects. For over 6 months, I have worked on the same project on my own and I found it hard to keep myself motivated. I learned that I need deadlines and pressure to get things done. I do not like to work on my own and prefer to collaborate with a group of people. I like to have varying activities instead of performing the same activity day in and out. The interactive moments with my colleagues and supervisors were the highlights of my week. But I also learned that I am not ready to go sit behind a desk five days a week. I need to be with my feet in the mud and have physical activities in my work. These lessons about myself will help to find a job after graduating.

Lastly, I want to thank my supervisors Marian, Hans, Martijn, Bas, and Erfan for all their advice, help, and support in the last 6 months. I have found the collaboration with the committee very pleasant and I hope that in the future more graduate students will get the opportunity to work with you in this combination of the university and construction organization.

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APPENDIX A – INTERVIEW PROTOCOL

Interview protocol - Project managers

Interview goal:

1. To understand the practice of risk management at BAM
2. To understand the challenges in opportunity management in practice
3. To identify influential factors in opportunity management practice

Interview script

Introduction:

- Bedankt voor de medewerking
- Doel van het interview: Een beeld krijgen van het risico management process in de uitvoering door medewerkers van BAM
- Vertrouwelijkheid: zonder naam in rapport, opname voor het transcriberen, daarna wordt deze gewist
- Gebruik van resultaten: Het uitgewerkte interview wordt in de bijlage gebruikt van mijn onderzoek.
- Overzicht van interview:
 - o Persoonlijke informatie
 - o Algemeen/Terminologie
 - o Risico management process
 - o Opportunity Management
 - o Duur 1 uur
- Zijn er nog vragen?
- OPNAME STARTEN

Personal information

- o Leeftijd:
- o Functie:
- o Ervaring in functie:
- o Eerdere ervaring:

Onderwerpen

Algemeen

1. Wat is uw terminologie voor risico management? (Bijv. Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)
2. Wat is de rol/verantwoordelijkheid van een projectmanager met betrekking tot het risico management proces in een project?

Risk management process:

3. Hoe verhoudt risico management zich ten opzichte van andere activiteiten in uw projecten? (welke prioriteit heeft risicomanagement in uw projecten)
4. Op welke manier verhoudt uw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?
5. Wat is in uw ervaring de algemene houding van leden van het project team ten opzichte van risico management? (bijv. *moetje/waardevolle toevoeging/geen interesse*)
6. Wat is in uw ervaring de algemene houding van het top management ten opzichte van kans en risico management?

Opportunity Management:

7. Hoe ziet u opportunity management in relatie tot uw projecten? Kun u hier een voorbeeld bij geven?
8. Hoeveel tijd word er besteed aan opportuniteiten in een project? Hoeveel tijd word er besteed aan de risico's (risicosessies) in een project? In het geval van een verschil, waarom?
9. Wat ziet u aan opportunity management gerelateerde activiteiten bij BAM? Heeft u een voorbeeld?
10. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM hinderen?
 - 10.1. Zo ja, welke?
 - 10.2. Zo ja, hoe zou u deze wegnemen?
11. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM stimuleren?
 - 11.1. Zo ja, welke?
 - 11.2. Zo ja, hoe kan dit bevorderd worden?
12. Wat kan er in uw ogen verbeterd worden aan opportunity management bij BAM?

Closing:

- Einde van vragen
 - Heb jij nog vragen of dingen die je wilt toevoegen?
 - Evaluatie: Wat vond jij van het interview? Tips?
 - Bedankt voor je deelname
 - Resultaten zullen gebruikt worden voor mijn onderzoek naar opportunity management bij BAM.
 - Je ontvangt via mail een transcript/samenvatting van het interview voor jouw goedkeuring
-

Interview protocol - Risk managers

Interview goal:

4. To understand the practice of risk management at construction organization
5. To understand the challenges in opportunity management in practice
6. To identify influential factors in opportunity management practice

Interview script

Introduction:

- Bedankt voor de medewerking
- Doel van het interview: Een beeld krijgen van het risico management process in de uitvoering door medewerkers
- Vertrouwelijkheid: zonder naam in rapport, opname voor het transcriberen, daarna wordt deze gewist
- Gebruik van resultaten: Het uitgewerkte interview wordt in de bijlage gebruikt van mijn onderzoek.
- Overzicht van interview:
 - o Persoonlijke informatie
 - o Algemeen/Terminologie
 - o Risico management process
 - o Opportunity Management
 - o Duur 1 uur
- Zijn er nog vragen?
- OPNAME STARTEN

Personal information

- o Geslacht:
- o Leeftijd:
- o Functie:
- o Ervaring in functie:
- o Eerdere ervaring:

Openingsvraag

3. Hoe omschrijf je jouw rol in het risico management proces?

Onderwerpen

Terminologie

4. Wat is jouw terminologie voor risico management? (Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Risk management process

5. Hoe ziet jouw risico management process eruit?
 - 5.1. Welke stappen gebruik je?
 - 5.2. Welke input gebruik je?
 - 5.3. Welke technieken gebruik je?
 - 5.4. Welke outputs volgen uit het proces?
6. Op welke manier verhoudt jouw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Opportunity Management:

7. Wat is voor jou opportunity Management in het algemeen? Kun je hier een voorbeeld bij geven?
8. Zit er een verschil tussen tender en executie fase? Kun je hier een voorbeeld bij geven?
9. Welke elementen van opportunity management zie je bij de organisatie? Waar blijkt dat uit? Heb je een voorbeeld?
10. Zit er een verschil tussen tender en executie fase in het opportunity management bij de organisatie?
11. Zijn er factoren/elementen/dingen die opportunity management bij de organisatie hinderen? Zo ja, welke? Zo ja, hoe zou jij deze wegnemen?
12. Zijn er factoren/elementen/dingen die opportunity management bij de organisatie stimuleren? Zo ja, welke? Zo ja, hoe kan dit bevorderd worden?

Closing:

- Einde van vragen
- Heb jij nog vragen of dingen die je wilt toevoegen?
- Evaluatie: Wat vond jij van het interview? Tips?
- Bedankt voor je deelname
- Resultaten zullen gebruikt worden voor mijn onderzoek naar opportunity management.
- Je ontvangt via mail een transcript/samenvatting van het interview voor jouw goedkeuring

APPENDIX C – INTERVIEWS

Risk manager 1

Risk manager 2

Risk manager 3

Project manager 1

Project manager 2

APPENDIX D – CODED INTERVIEWS

Risk manager 1

Interview report

13. Hoe omschrijf je jouw rol in het risico management proces? Wat zijn je belangrijkste verantwoordelijkheden?

Codes: Process Responsibility, Point of contact, Promoting risk management

14. Wat is jouw terminologie voor risico management? (Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Codes: Goal to control risks, Risk is an event with negative impact on project objectives, mostly time, cost, and money. Opportunity is a possibility to improve the project, potential event for a better project. Opportunity is the opposite of a risk. Cause is factual. Consequence is an effect on objectives. Risk management is relation management, fears and worries of project members need to be translated into causes.

15. Hoe ziet jouw risico management process eruit?

Codes: ROMR received from tender phase, meetings with client, appointing risk owners, identification new risks, risk provision calculation, monte carlo analysis, 4-week cycle.

DD: Is het een 4 weeks proces?

Codes: Use of KPI's

15.1. Welke inputs gebruik je?

Codes: Risk report, Individual meetings, creative role, follow project flow

15.2. Welke technieken gebruik je?

Codes: Monte Carlo analysis, translating complex problems into risks.

DD: Gebruik je dan meer kwalitatieve dan kwantitatieve technieken?

Codes: Mostly qualitative analysis, calculator for quantitative analysis

15.3. Welke outputs volgen uit het proces?

Codes: Risk report, beta distribution graph, risk provision

DD: Schrijf jij ook risico rapporten of maak je lijsten met top risico's?

Codes: Risk report, Top 10, risk, cause, consequence, probability, impact, mitigation, owner, actions

16. Op welke manier verhoudt jouw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Codes: BAM Baseline, No soft elements in baseline, project specific approach

DD: Wat is jouw persoonlijke aanpak?

Codes: Project team with no interest in risk management, make it relevant to project team, trial and error, project control is not a goal but a means, sometimes don't mention risk management.

DD: Ervaar je weerstand met risico management?

Codes: Risk management is seen as check the box (moetje), project team too busy for risk management, ignorance about risk management.

17. Wat is voor jou opportunity Management in het algemeen? Kun je hier een voorbeeld bij geven?

Codes: Less relevant for small projects, close relation risks and opportunities, opportunities for contractor, opportunities mostly related to efficiency, uncertainties create opportunities, opportunities are realized easier by project team, recent opportunity is cost reduction.

18. Zit er een verschil tussen tender en executie fase? Kun je hier een voorbeeld bij geven?

Codes: Tender and project similar, opportunities in tender aimed at client, opportunities in execution aimed at project and organization, opportunities in tender to win bid.

DD: Je neemt het risicodossier over vanuit de tender en ontwerpfase, hoe zie jij de kansen die je vanuit dat risicodossier door krijgt?

Codes: Never received opportunity from tender

DD: Hoe identificeer jij zelf kansen als je ze niet krijgt vanuit de voorgaande fases?

Codes: Risk and Opportunity sessions, new risks based on themes, opportunities arise when talking about risks, opportunity not always describes as opportunity

DD: Je organiseert dus risico's sessies en daarin behandel je tegelijk opportunities?

Codes: Risk sessions with opportunities, not able to organize opportunity session at the moment, difficult to come up with opportunities, most opportunities are already exploited without being made explicit.

19. Welke elementen van opportunity management zie je bij BAM? Waar blijkt dat uit? Heb je een voorbeeld?

Codes: No specific elements for opportunity management, list with opportunity themes from colleague.

20. Zit er een verschil tussen tender en executie fase in het opportunity management bij BAM?

Codes: Most opportunities already exploited in tender and design phase

21. Zijn er factoren/elementen/dingen die opportunity management bij BAM hinderen? Zo ja, welke? Zo ja, hoe zou jij deze wegnemen?

Codes: No elements that obstruct opportunity management

22. Zijn er factoren/elementen/dingen die opportunity management bij BAM stimuleren? Zo ja, welke? Zo ja, hoe kan dit bevorderd worden?

Codes: No elements that promote opportunity management, opportunities are intangible for me, opportunities are always mentioned after risks.

DD: In de literatuur worden factoren beschreven die opportunity management verhinderen (Ignorance, Meta language, Culture,) Herken jij deze factoren bij BAM?

Codes: Ignorance is problem for me, ignorance is problem for project team, identification of opportunities is problem, opportunities in tender phase sometimes opportunistic, processes seem unfit for magnitude of organization.

DD: Heb jij het gevoel dat het bij het hoger management op de agenda staat? Als ik de handleiding risico management lees krijg ik het idee dat kansen erin benoemd staan omdat het moet vanwege de iso norm maar dat het vervolgens niet verder wordt gebruikt.

Codes: Low margins in tender to win lead to limited space for opportunities

DD: Je werkt nu een halfjaar bij BAM, hoe ben je daarin opgeleid op het gebied van risico management en opportunity management? Heb je hier specifieke tools, technieken of training voor gehad?

Codes: No training for opportunity management available, limited knowledge about opportunity management.

DD: Heb je wel eens een kansen sessie georganiseerd?

Codes: Never opportunity sessions organized

DD: Hoe staat risicomangement buiten de afdeling in BAM ervoor?

Codes: Rapid growth of organization but processes lag behind

DD: Hoe zie jij het mandaat van de risico manager bij BAM?

Codes: Risk manager is hired by project manager, need to be included in staff of project

Theorie Framework feedback:

Codes: DMP is bureaucratic, use of project brief, some techniques consume too much time which is not available

Risk manager 2

Interview RM2

1. Hoe omschrijf je jouw rol in het risico management proces?

Codes: Qualitative risk register, actively managing risk and opportunity, deliver monte carlo analysis, motivating, monitor process, create action, improve risk culture, integral approach

2. Wat is jouw terminologie voor risico management? (Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Codes: No use of threats, risk is negative, opportunity is positive, impact on objectives, cause is event

3. Hoe ziet jouw risico management process eruit?

3.1. Welke stappen gebruik je?

Codes: Document analysis, individual meetings, group sessions

3.2. Welke input gebruik je?

Codes: Documents, Meetings, News, Management updates, Conversations

3.3. Welke technieken gebruik je?

Codes: Brainstorm, interview, facilitation (groupsessions), monte carlo cost, monte carlo time

3.4. Welke outputs volgen uit het proces?

Codes: Risk register, top 10, risman, risk report, monte carlo graph, both integral and sepeare for risk and opportunities.

4. Op welke manier verhoudt jouw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Codes: Relation between risk management and other disciplines is described insufficient, process lacks demand of quality for input.

5. Wat is voor jou opportunity Management in het algemeen? Kun je hier een voorbeeld bij geven? Zit er een verschil tussen tender en executie fase? Kun je hier een voorbeeld bij geven?

Codes: Integral approach, identified but not exploited, focus on threats, important to resource, different from optimisation, opportunities mostly in design phase, early decision making, opportunities taken for granted in tender creates risk.

6. Welke elementen van opportunity management zie je bij BAM? Waar blijkt dat uit? Heb je een voorbeeld? (Defintion phase, identificatie, assessment, response, monitor, evaluation)

Codes: Metalanguage is not clear

7. Zit er een verschil tussen tender en executie fase in het opportunity management bij BAM?

-

8. Zijn er factoren/elementen/dingen die opportunity management bij BAM hinderen? Zo ja, welke? Zo ja, hoe zou jij deze wegnemen?

Codes: Metalanguage is not clear, description quality of measures insufficient

DD: Ligt het probleem dan vooral bij het project team?

Codes: Risk register is communication tool

DD: Is het bewustzijn rond risico's laag bij team leden?

Codes: Project team overloaded and opportunities come after risks, do it good or don't do it

9. Zijn er factoren/elementen/dingen die opportunity management bij BAM stimuleren? Zo ja, welke? Zo ja, hoe kan dit bevorderd worden?

Codes: Focus on technical opportunities, limited focus on financial opportunities, lack of opportunities that result in profit.

DD: Je gaf aan dat er soms op de raakvlakken tussen verschillende disciplines iets mis gaat, denk je dat dat hier ook een rol speelt?

Codes: Opportunity management should be in tender phase, no opportunity management in execution and stick to the plan, important to make sure that opportunity results in profit, team has to be interdisciplinary.

DD: boek doorgestuurd, wat vond je ervan?

Codes: Construction sector uses boxes (cause, event, and effect) for description of risk and literature uses a sentence.

DD: voor mijn gevoel heeft de risicomanager bij bam een begeleidende rol waardoor hij niet het mandaat heeft om het risicomanagement proces naar een hoger niveau te krijgen? Herken jij dit?

Codes: Risk manager must make himself relevant, over focused on mega projects, small projects get little attention and risk management is not seen as important, small projects risk management is task of team members instead of risk manager, risk department should train project team members.

DD: Als je opportunity management in de bouw vergelijkt met andere sectoren, wat valt je dan op?

Codes: Expected high quality risk management due to low margins in construction sector but in reality not always the case, high level of detail in construction risk management, BAM processes are good for construction industry, BAM practice of risk management has room for improvement, peer review, career path from junior to senior misses.

Risk manager 3

Interview RM3

1. Hoe omschrijf je jouw rol in het risico management proces?

Codes: Risk coordinator

2. Wat is jouw terminologie voor risico management? (Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Codes: Opportunities, Risks, Uncertainties, Risk is negative, Opportunities are possibilities to improve or optimize, impact on objectives, improvement within solution space is no opportunity but certainty, opportunities arise in collaboration with client, opportunities arise when requirements are changed, uncertainties are related to budget

DD: Gebruik je ook de termen oorzaak en gevolg?

Codes: Cause, consequence, relevant for mitigation measures

3. Hoe ziet jouw risico management process eruit?

Codes: Identification in group sessions, Integral sessions with core team, appointing of risk owners, assessment based on time, cost and probability. Mitigating measures, opportunities in tender underexposed due to limited design freedom. Design and construct contract provides possibilities for opportunities, opportunities are related to interpretations of requirements, it is not effective to do risk and opportunities in the same session, risks go before opportunities, execution starts with existing risk register, review of risk register, identification sessions related to activities, tendency to focus on risks, more difficulties with opportunities and thus less attention.

3.1. Welke stappen gebruik je?

3.2. Welke input gebruik je?

Codes: Checklist, documents, team meetings, brainstorm

3.3. Welke technieken gebruik je?

Codes: Monte carlo cost, Monte carlo time, Brainstorm, checklist, no post-its, not many techniques

3.4. Welke outputs volgen uit het proces?

Codes: risk file, monte carlo result planning, monte carlo result cost, sub-management plan risk management, spread of cost and quantities.

4. Op welke manier verhoudt jouw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Codes: BAM baseline

5. Wat is voor jou opportunity Management in het algemeen? Kun je hier een voorbeeld bij geven?

Codes: Opportunity management are the possibilities to create new solutions with client, less strict interpretation of requirements, sessions with client about requirements, difficult how to split the profits, opportunity management is supportive of design management.

6. Zit er een verschil tussen tender en executie fase? Kun je hier een voorbeeld bij geven?

Codes: Opportunities are identified in the tender phase, opportunities are exploited in the execution phase.

7. Welke elementen van opportunity management zie je bij BAM? Waar blijkt dat uit? Heb je een voorbeeld?

Codes: BAM is not structured for opportunity management, for risk and opportunities the same process is used and this is not logical, project don't actively work on opportunities, projects under high financial pressure use opportunity management.

8. Zijn er factoren/elementen/dingen die opportunity management bij BAM hinderen? Zo ja, welke? Zo ja, hoe zou jij deze wegnemen?

Codes: Lack of knowledge, the term opportunity is used for the wrong things, lack of definitions, no clear working method.

9. Zijn er factoren/elementen/dingen die opportunity management bij BAM stimuleren? Zo ja, welke? Zo ja, hoe kan dit bevorderd worden?

Codes: No elements stimulate opportunity management, use own experience for opportunity management.

DD: De volgende factoren komen vanuit de literatuur naar voren die opportunity management belemmeren, herken je deze?

Codes: People tend to think in problems and threats, sometimes too opportunistic, problems with definitions, in the past too much risk taken because of risk culture, opportunity management requires different approach and this is change difficult for people.

Project manager 1

Interview PM1

1. Wat is uw terminologie voor risico management? (Bijv. Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Codes: Risks, opportunities, ROMR, Risk management includes risks and opportunities, indexation, design growth, management reserve, schedule risk analysis, production risks, identification, quantification, mitigation measures, residual risk, time cost quality, image/environment.

2. Wat is de rol/verantwoordelijkheid van een projectmanager met betrekking tot het risico management proces in een project?

Codes: highly involved in risk report, high focus tenderboard on risk management with stage gate process, manage the risk manager directly, goal of tender is to win within the bam baselines, reporting together with risk manager, project manager and risk manager form a team.

4. Hoe verhoudt risico management zich ten opzichte van andere activiteiten in uw projecten? (welke prioriteit heeft risicomanagement in uw projecten)

Codes: Internal benchmark is missing, risk management plays dominant role for new projects, stage gate process is one big risk accountability, you have to be in control to get a go, daily to weekly activity, risk management is my most involved activity, I keep the risk management tasks with myself with help of risk manager.

5. Op welke manier verhoudt uw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Codes: follow the bam baseline, specific approach per tender depending on risk manager, differences like group sessions or individual meetings, combination of group and individual sessions is best, people have difficulties with quantification.

6. Wat is in uw ervaring de algemene houding van leden van het project team ten opzichte van risico management? (bijv. moeite/waardevolle toevoeging/geen interesse)

Codes: Big differences in attitude to risk management in project team, every discipline has its own perspective, important to cluster risks and remove duplicates for the risk provision, people tend to feel being judged on their role and risk management is no primary part of that role, risk register becomes a side task, low feeling of responsibility for risk management with team members, identifying risks can be hard but finding opportunities is even harder, risks have priority and opportunities follow after, with 100 risks it is hard to get at least 15 opportunities, problems with understanding systemics of risk management by team member (probability of 75%), small tenders don't have a risk manager, medium tenders have limited resources for risk manager, project team fills register and risk manager reviews the register.

DD: Is er een gebrek aan kennis bij teamleden op het gebied van risico management?

Codes: lack of knowledge with team members, difficulties with quantification, knowledge to create basic register, risk management needs to get a different place in the organization

7. Wat is in uw ervaring de algemene houding van het top management ten opzichte van kans en risico management?

Codes: boardmembers have experience that is usefull for risk management, more demand for traffic light reports with go/no-go decisions, tenderboard is improving risk management, steering groups focus to much on risks sometimes, promises are made in tenders that have far reaching consequences for the execution phase and this is missed by the steering groups, important to not let risk management dominate everything, awareness that risk management is a tool and not a goal, sometimes it feels like it is more important to have a solid tender instead of a winning tender.

8. Hoe ziet u opportunity management in relatie tot uw projecten? Kun u hier een voorbeeld bij geven?

Codes: opportunities and risks have equal weight, we can identify the risks quickly with help of databases, opportunities are a big search and come in last place, risk are always first finished in the register and opportunities follow after, tenderboard weighs risks and opportunities equal, in practice all risks are included for the next phase and opportunities are excluded, we can improve mindset and eagerness for opportunities, we need courage to take opportunities into the next phase, I see opportunities in the execution phase that we did not include in the tender, entrepreneurship could be better.

DD: Zie je verschillen tussen het kansen management in de verschillende tenders die je hebt gedaan? Welke?

Codes: differences between projects based on intensity and people involved, design freedom provides opportunities in projects.

DD: Je zei dat het ook van mensen af hangt, kan je dan op voorhand ook al zeggen welk team opportunity management goed oppakt?

Codes: Small tenders use part timers that are less involved, fulltimers are more involved and this is beneficial for risk register, BAM has many experts but this makes a team dispersed, I prefer a tender with 5 full timers instead of 10 part timers.

9. Hoeveel tijd word er besteed aan opportuniteiten in een project? Hoeveel tijd word er besteed aan de risico's (risicosessies) in een project? In het geval van een verschil, waarom?

Codes: risk/opportunity balance is 75/25 or 80/20, risk registers show a skewed balance, we include many small risks but we do not include small opportunities, we tend to look only for big opportunities, projects can have limited room for opportunities because of technical limits.

DD: Je gaf het voorbeeld van een tender waar een buitendiensteling een kans opleverde om het project een jaar eerder af te krijgen. Op voorhand hadden jullie dit al gezien maar jullie namen dit niet mee als kans omdat het een hele lage kans van optreden had. Maar op het moment dat je kansen die een lage kans van optreden niet meer mee neemt en alleen maar kansen mee neemt die een hoge kans van slagen hebben hou je enkel optimalisaties over en laat je veel mogelijkheden liggen, hoe zie jij dit?

Codes: opportunities with a probability of 2.5% are not included,

DD: Als je de situatie omdraaid en kijkt naar risico's met een hele kleine kans van optreden, worden die dan wel meegenomen?

Codes: Opportunities are included but 'buitenkansjes' happen to us

10. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM hinderen?

Codes: Baselines are good for opportunity management, entrepreneurship is lost, old behaviour is a limiting factor, opportunities are not taken into the bid, opportunities only priced when they are over 25% probable, tender budget is limiting factor, opportunities don't matter if risks are managed well, culture from the top is focused on risks.

DD: Dus kun je dan stellen dat de prioriteit van boven (directie) bij risico's ligt?

Codes: too much focus on risks from top management, design freedom is limiting factor for opportunities

11. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM stimuleren?

Codes: BAM baseline provides good basis for opportunity management

12. Wat kan er in uw ogen verbeterd worden aan opportunity management bij BAM?

Codes: go 100% for tender, best for project decision making, important to have enough risk management capacity, we need to focus on winning a tender instead of participating, use risk management as tool and not as goal,

DD: Als ik het mag relateren aan kansen management dan is het voor mijn gevoel; Door beter te focussen en er vol voor te gaan creëer je ruimte binnen je tender om evenwichter je kansen en risico management uit te voeren en dus ook je tender naar een hoger niveau te tillen?

Codes: More focus in tender provides more budget for balanced risk management, sometimes baselines followed to avoid questions, check the box exercise,

Project manager 2

Interview PM2

1. Wat is uw terminologie voor risico management? (Bijv. Uncertainty, risk, threat, opportunity, cause, effect, etc./ Onzekerheid, risico, bedreiging, kans, oorzaak, gevolg)

Codes: Risk management includes risks and opportunities, uncertainties, events

2. Wat is de rol/verantwoordelijkheid van een projectmanager met betrekking tot het risico management proces in een project?

Codes: planning risk management process, reporting to steering group, dbfm contract relates to clients, epc contract more focused on project risks,

3. Hoe verhoudt risico management zich ten opzichte van andere activiteiten in uw projecten? (welke prioriteit heeft risicomanagement in uw projecten)

Codes: risk management is somewhat neglected compared to regular project management, risk management is single separated activity, it becomes a mandatory activity that is separated from the rest, risk management in construction sector is ad hoc and short term oriented and reactive, risk management lags behind events.

4. Op welke manier verhoudt uw aanpak in de praktijk zich ten opzichte van het formele proces door BAM beschreven? Voorbeelden van verschillen?

Codes: same baseline, risk manager coordinates process

5. Wat is in uw ervaring de algemene houding van leden van het project team ten opzichte van risico management? (bijv. *moetje/waardevolle toevoeging/geen interesse*)

Codes: project team sees risk management as separate activity, project team sees risk management as mandatory, way of reporting makes it a goal instead of a means.

DD: Is er een gebrek aan kennis over risico management bij de teamleden?

Codes: no problem with competencies, problem is about risk culture

6. Wat is in uw ervaring de algemene houding van het top management ten opzichte van kans en risico management?

Codes: top management focused on risks in reports, general tendency within BAM to focus on avoiding mistakes, I think we should not only focus on mistakes

7. Hoe ziet u opportunity management in relatie tot uw projecten? Kun u hier een voorbeeld bij geven?

Codes: opportunity management is creating added value in collaboration with client, trust between client and contractor is crucial, low trust in many projects, low trust causes search for opportunities in vague contract formulations, dbfm contracts have no room for opportunities,

8. Hoeveel tijd word er besteed aan opportuniteiten in een project? Hoeveel tijd word er besteed aan de risico's (risicosessies) in een project? In het geval van een verschil, waarom?

Codes: risk/opportunity balance 95%/5%, first priority are risks in register, spare time is used for opportunities, in practice no spare time remains for opportunities, focus in reporting is on risks.

9. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM hinderen?

Codes: bam cultures is focused on avoiding mistakes, strong tendency to focus on mistakes and costs, culture is counterproductive for opportunity management, no mindset for opportunities, mindset related to culture, most people only think about risks, management is focused on risks in reporting so projects reports are focused on risks, management should shift priority to balanced risk management and project can follow, as long as focus in steering groups on risks the projects will focus on risks.

10. Zijn er factoren/elementen/dingen die het huidige opportunity management bij BAM stimuleren?

Codes: expert group for risk management, processes designed for both risks and opportunities, risk department from consultant to staff role, formats are supportive of opportunity management and help as reminder.

11. Wat kan er in uw ogen verbeterd worden aan opportunity management bij BAM?

Codes: Culture must be changed, there must be space to talk openly about value creation, we share risk register late, we seek opportunities in the interpretation of requirements, we are focused on avoiding mistakes, too much focus on financial results, from a focus on risks and costs to focus on value and opportunities.

DD: Herken je de factoren ignorance, language en cultuur?

Codes: knowledge is present but not made explicit, we are immature, this could help to involve client, direct input of team members in risk register is sloppy, team members responsible for input and risk manager responsible for distilling specific risks, big projects have dedicated risk manager which makes it more easy, in small projects the team itself is responsible for risk management and risk and opportunities are often formulated wrong, culture is the main problem, tone from the top less focused on mistakes.

APPENDIX E – QUALITATIVE CONTENT ANALYSIS

Risk managers

1st order concepts	2nd order themes	Aggregate dimensions
Role RM	Roles	Language/Definition
Process Responsibility	Risk manager is responsible for process	Risk and Opportunities, no umbrella term
Point of contact	Risk manager has advisory role	Cause, consequence and effect used
Promoting risk management		Opportunities mistaken by optimizations
Risk coordinator		Metalanguage not clear
Risk manager is hired by project manager need to be included in staff of project		
Risk manager must make himself relevant		
Tasks		
Goal to control risks		Organization
Risk management is relation management		Small projects have insufficient means for risk management
fears and worries of project members need to be translated into causes		Most potential for opportunities in tender
actively managing risk and opportunity		Organization has outgrown its processes
motivating		Mistakes from the past influence present risk management
monitor process		Contract influences potential for opportunity management
create action		D&C has potential
improve risk culture		Lack of clarity about profits of opportunities with client
integral approach		Role RM
Integral approach		
Metalanguage	Langauge	
Risk is an event with negative impact on project objectvies	Risk and Opportunities, no umbrella term	Process
Opportunity is a possibility to improve the project	Cause, consequence and effect used	Baseline is basic solid process
potential event for a better project	Opportunities mistaken by optimizations	Focus on risks

Opportunity is the opposite of a risk		Metalanguage not clear		Limited techniques
Cause is factual				Opportunity management is not supported by working method
Consequence is an effect on objectives				
No use of threats				
risk is negative				
opportunity is positive				
impact on objectives				
cause is event				Competencies
Opportunities				Limited interest from project team
Risks				check the box exercise
Uncertainties				Focused on risks, opportunities follow after
Risk is negative				Knowledge about risk management is limited
Opportunities are possibilities to improve or optimize				Knowledge about opportunity management is absent
impact on objectives				No training available
improvement within solution space is no opportunity but certainty				
opportunities arise in collaboration with client				
opportunities arise when requirements are changed				
Cause				
consequence				
Metalanguage is not clear				
Metalanguage is not clear				
lack of definitions				
Inputs		Process		
ROMR received from tender phase		Baseline is basic solid process		
meetings with client		Focus on risks		
Individual meetings		Limited techniques		
Document analysis				
individual meetings				
group sessions				
Documents				
Meetings				
News				

Management updates			
Conversations			
Checklist			
documents			
team meetings			
brainstorms			
checklist			
Steps			
appointing risk owners			
identification new risks			
risk provision calculation			
4-week cycle			
follow project flow			
translating complex problems into risks			
both integral and sepeare for risk and opportunities			
Identification in group sessions			
Integral sessions with core team			
appointing of risk owners			
assessment based on time			
cost and probability			
Mitigating measures			
it is not effective to do risk and opportunities in the same session			
risks go before opportunities			
execution starts with existing risk register			
review of risk register			
identification sessions related to activities			
Techniques			
monte carlo analysis			
Use of KPI's			
Monte Carlo analysis			
Mostly qualitative analysis			
Brainstorm			
interview			
facilitation (groupsessions)			
monte carlo cost			
monte carlo time			
Risk register			

top 10			
risman			
risk report			
monte carlo graph			
Monte carlo cost			
Monte carlo time			
Brainstorm			
no post-its			
not many techniques			
Outputs			
Risk report			
Risk report			
beta distribution graph			
risk provision			
Risk report			
Top 10			
risk			
cause			
consequence			
probability			
impact			
mitigation			
owner			
actions			
risk file			
monte carlo result planning			
monte carlo result cost			
sub-management plan risk management			
spread of cost and quantities			
Process			
BAM Baseline			
No soft elements in baseline			
Relation between risk management and other disciplines is described insufficient			
process lacks demand of quality for input			
BAM Baseline			
Sessions			
Risk and Opportunity sessions			
new risks based on themes			

opportunities arise when talking about risks			
opportunity not always describes as opportunity			
Risk sessions with opportunities			
not able to organize opportunity session at the moment			
difficult to come up with opportunities			
Outputs			
Qualitative risk register			
deliver monte carlo analysis			
Tender	Tender/Project		
Opportunity management should be in tender phase	Small projects have insufficient means for risk management		
no opportunity management in execution and stick to the plan	Most potential for opportunities in tender		
opportunities in tender underexposed due to limited design freedom			
opportunities in tender phase sometimes opportunistic			
Low margins in tender to win lead to limited space for opportunities			
Expected high quality risk management due to low margins in construction sector but in reality not always the case			
opportunities in tender aimed at client			
opportunities in tender to win bid			
Opportunities are identified in the tender phase			
Project			
opportunities in execution aimed at project and organization			
Never received opportunity from tender			

opportunities are exploited in the execution phase			
Tender and project			
Tender and project similar			
opportunities taken for granted in tender creates risk			
most opportunities are already exploited without being made explicit			
Small projects			
small projects get little attention and risk management is not seen as important			
small projects risk management is task of team members instead of risk manager			
Less relevant for small projects			
over focused on mega projects			
Attitude	Soft side		
Project team with no interest in risk management	Limited interest from project team		
project control is not a goal but a means	check the box exercise		
Risk management is seen as check the box (moetje)	Focused on risks, opportunities follow after		
project team too busy for risk management			
Approach			
project specific approach			
make it relevant to project team			
trial and error			
sometimes don't mention risk management			
Focus			
Focus on technical opportunities			
limited focus on financial opportunities			

use own experience for opportunity management			
opportunities are always mentioned after risks			
tendency to focus on risks			
more difficulties with opportunities and thus less attention			
focus on threats			
People tend to think in problems and threats			
sometimes too opportunistic			
opportunity management requires different approach and this is change difficult for people			
Opportunities	Opportunities		
opportunities for contractor	Opportunities often seen as optimizations		
opportunities mostly related to efficiency	Opportunities sought in interpretation of requirements		
uncertainties create opportunities	Opportunities miss profitability		
opportunities are realized easier by project team			
recent opportunity is cost reduction			
different from optimisation			
opportunities mostly in design phase			
Opportunity management are the possibilities to create new solutions with client			
less strict interpretation of requirements			
sessions with client about requirements			
opportunity management is supportive of design management			
lack of opportunities that result in profit			

important to make sure that opportunity results in profit			
Limited knowledge		Competence	
Ignorance is problem for me		Knowledge about risk management is limited	
ignorance is problem for project team		Knowledge about opportunity management is absent	
No training for opportunity management available		No training available	
limited knowledge about opportunity management			
Never opportunity sessions organized			
risk department should train project team members			
career path from junior to senior misses			
problems with definitions			
opportunities are intangible for me			
identification of opportunities is problem			
ignorance about risk management			
Lack of knowledge			
Organization		Organizational	
processes seem unfit for magnitude of organization		Organization has outgrown its processes	
Rapid growth of organization but processes lag behind		Mistakes from the past influence present risk management	
Sector			
Construction sector uses boxes (cause event and effect) for description of risk and literature uses a sentence			
high level of detail in construction risk management			
BAM processes are good for construction industry			
in the past too much risk taken because of risk culture			

Support for opportunity management		Support for opportunity management	
No elements that obstruct opportunity management		Opportunity management is not supported by working method	
No elements stimulate opportunity management			
projects under high financial pressure use opportunity management			
list with opportunity themes from colleague			
description quality of measures insufficient			
Project team overloaded and opportunities come after risks			
the term opportunity is used for the wrong things			
no clear working method			
No elements that promote opportunity management			
No specific elements for opportunity management			
BAM is not structured for opportunity management			
for risk and opportunities the same process is used and this is not logical			
project don't actively work on opportunities			
Contract		Contract	
Design and construct contract provides possibilities for opportunities		Contract influences potential for opportunity management	
opportunities are related to interpretations of requirements		D&C has potential	
difficult how to split the profits		Lack of clarity about profits of opportunities with client	

Project managers

1st order concepts	2nd order themes	Aggregate dimensions
Culture	Organizational	Organization
problem is about risk culture	Sector	Organization
general tendency within BAM to focus on avoiding mistakes	Role	Contract
we need courage to take opportunities into the next phase	Project	
entrepreneurship could be better	Budget	Culture
trust between client and contractor is crucial		Soft skills
low trust in many projects	Culture	Balance
entrepreneurship is lost	Attitude	
old behaviour is a limiting factor	Focus	Competence
culture from the top is focused on risks	Culture	Language
bam cultures is focused on avoiding mistakes		Knowledge
culture is counterproductive for opportunity management	Process	
Culture must be changed	Steps	Process
there must be space to talk openly about value creation	Approach	Process
we share risk register late	Process	
we are immature		
culture is the main problem	Knowledge	
	Knowledge	
Organization		
risk management needs to get a different place in the organization	Balance	
tenderboard is improving risk management	Opportunities	
management should shift priority to balanced risk management and project can follow	Balance	
expert group for risk management		
risk department from consultant to staff role	Contract	
	Contract	
Project		
small tenders don't have a risk manager	Language	
medium tenders have limited resources for risk manager	Metalanguage	

differences between projects based on intensity and people involved				
Small tenders use part timers that are less involved				
projects can have limited room for opportunities because of technical limits				
big projects have dedicated risk manager which makes it more easy				
in small projects the team itself is responsible for risk management and risk and opportunities are often formulated wrong				
Role				
risk manager coordinates process				
fulltimers are more involved and this is beneficial for risk register				
BAM has many experts but this makes a team dispersed				
I prefer a tender with 5 full timers instead of 10 part timers				
Process				
bame baseline				
more demand for traffic light reports with go/no-go decisions				
Baselines are good for opportunity management				
BAM baseline provides good basis for opportunity management				
processes designed for both risks and opportunities				
formats are supportive of opportunity management and help as reminder				
Sector				
risk management in construction sector is ad hoc and short term oriented and reactive				
risk management lags behind events				
Challenges				
Internal benchmark is missing				

people have difficulties with quantification			
identifying risks can be hard but finding opportunities is even harder			
Contract			
dbfm contract relates to clients			
epc contract more focused on project risks			
design freedom provides opportunities in projects			
dbfm contracts have no room for opportunities			
design freedom is limiting factor for opportunities			
Goal			
goal of tender is to win within the bam baselines			
opportunity management is creating added value in collaboration with client			
Focus			
high focus tenderboard on risk management with stage gate process			
risk management plays dominant role for new projects			
stage gate process is one big risk accountability			
you have to be in control to get a go			
risk management is somewhat neglected compared to regular project management			
risk management is single separated activity			
risks have priority and opportunities follow after			
way of reporting makes it a goal instead of a means			
steering groups focus too much on risks sometimes			
important to not let risk management dominate everything			

sometimes it feels like it is more important to have a solid tender instead of a winning tender			
top management focused on risks in reports			
I think we should not only focus on mistakes			
tenderboard weighs risks and opportunities equal			
focus in reporting is on risks			
opportunities don't matter if risks are managed well			
too much focus on risks from top management			
strong tendency to focus on mistakes and costs			
management is focused on risks in reporting so projects reports are focused on risks			
as long as focus in steering groups on risks the projects will focus on risks			
go 100% for tender			
best for project decision making			
we need to focus on winning a tender instead of participating			
we are focused on avoiding mistakes			
to much focus on financial results			
from a focus on risks and costs to focus on value and opportunities			
tone from the top less focused on mistakes			
Approach			
highly involved in risk report			
manage the risk manager directly			
reporting together with risk manager			
project manager and risk manager form a team			
reporting to steering group			
daily to weekly activity			
I keep the risk management tasks with myself with help of risk manager			
follow the bam baseline			
specific approach per tender depending on risk manager			

differences like group sessions or individual meetings			
combination of group and individual sessions is best			
risk management is my most involved activity			
we can identify the risks quickly with help of databases			
risk are always first finished in the register and opportunities follow after			
in practice all risks are included for the next phase and opportunities are excluded			
opportunities are not taken into the bid			
opportunities only priced when they are over 25% probable			
use risk management as tool and not as goal			
sometimes baselines followed to avoid questions			
team members responsible for input and risk manager responsible for distilling specific risks			
Steps			
identification			
quantification			
mitigation measures			
residual risk			
time cost quality			
image/environment			
planning risk management process			
important to cluster risks and remove duplicates for the risk provision			
project team fills register and risk manager reviews the register			
Metalanguage			
Risks			
opportunities			
indexation			
design growth			
management reserve			
schedule risk analysis			
production risks			

uncertainties				
events				
Risk management includes risks and opportunities				
Attitude				
it becomes a mandatory activity that is separated from the rest				
Big differences in attitude to risk management in project team				
every discipline has its own perspective				
people tend to feel being judged on their role and risk management is no primary part of that role				
risk register becomes a side task				
low feeling of responsibility for risk management with team members				
project team sees risk management as separate activity				
project team sees risk management as mandatory				
awareness that risk management is a tool and not a goal				
we can improve mindset and eagerness for opportunities				
low trust causes search for opportunities in vague contract formulations				
no mindset for opportunities				
mindset related to culture				
most people only think about risks				
check the box exercise				
Opportunities				
with 100 risks it is hard to get at least 15 opportunities				
promises are made in tenders that have far reaching consequences for the execution phase and this is missed by the steering groups				
opportunities and risks have equal weight				
opportunities are a big search and come in last place				

I see opportunities in the execution phase that we did not include in the tender			
we tend to look only for big opportunities			
Opportunities are included but 'buitenkansjes' happen to us			
we seek opportunities in the interpretation of requirements			
Knowledge			
problems with understanding systemics of risk management by team member (probability of 75%)			
lack of knowledge with team members			
difficulties with quantification			
knowledge to create basic register			
no problem with competencies			
boardmembers have experience that is usefull for risk management			
knowledge is present but not made explicit			
direct input of team members in risk register is sloppy			
Balance			
risk/opportunity balance is 75/25 or 80/20			
risk registers show a skewed balance			
we include many small risks but we do not include small opportunities			
opportunities with a probability of 2,5% are not included			
risk/opportunity balance 95%/5%			
first priority are risks in register			
spare time is used for opportunities			
in practice no spare time remains for opportunities			
Budget			
tender budget is limiting factor			
important to have enough risk management capacity			
More focus in tender provides more budget for balanced risk management			

APPENDIX F – OBSERVATION REPORTS

Session 1 observation summary	
Type	Technical risk
Date	08-10-2020
Duration	2 hours
Participants	<ul style="list-style-type: none"> - Project manager - Risk manager - Calculator - Calculator - Calculator - Technical project planner - Advisor tenders - Advisor project execution - Nico van Ooijen? - External project manager - External contractor
Key observations	<p><i>Before:</i></p> <ul style="list-style-type: none"> - Check list standard risks provided by risk manager - All participants provided new risks in Mural - No use of meta language - All participants are from the engineering disciplines <p><i>During:</i></p> <ul style="list-style-type: none"> - Much time is spent on reformulating risks in first breakout - No structure for discussing risks in first breakout - Participants liked working with breakout groups - No template for plenary presentation of group discussion, results in different approaches - Not enough time to discuss all risks

Session 2 observation summary	
Type	Integral risk
Date	13-10-2020
Duration	2 hours
Participants	<ul style="list-style-type: none"> - Project manager - Risk manager

	<ul style="list-style-type: none"> - Senior advisor traffic management - Specialist sustainability - Specialist sustainability - Specialist environmental management - Specialist permits - Advisor permits - Advisor project execution - External advisor
Key observations	<p><i>Before:</i></p> <ul style="list-style-type: none"> - All participants provided risks in Mural - One participant used metalanguage, others did not - Diverse group with all disciplines represented <p><i>During:</i></p> <ul style="list-style-type: none"> - Diverse discussions in breakout due to different disciplines - No structure used for discussion - Much time spent on reformulating risks

Session 3 observation summary	
Type	Opportunity
Date	20-10-2020
Duration	2 hours
Participants	<ul style="list-style-type: none"> - Project manager - Risk manager - Design manager - Senior advisor traffic management - Technical project planner - Calculator - Calculator - Calculator - Advisor project execution - Advisor tenders - External contractor - External advisor - External advisor
Key observations	<p><i>Before:</i></p> <ul style="list-style-type: none"> - Only participants from engineering disciplines - Mural template provided with categories for opportunities - Half of participants provided opportunities in at least one category - No use of meta language

	<ul style="list-style-type: none"> - Many opportunities are actually optimizations <p><i>During:</i></p> <ul style="list-style-type: none"> - Very detailed technical discussions, tends to optimizations - No structure for discussion in breakout session - No structure for plenary presentation
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WERKMETHODE KANSEN-SESSIE

1. Introductie

Het proces van kans en risicomanagement is beschreven in de handleiding risicomanagement. Deze werkmethode is een uitbreiding op deze handleiding die zich richt op de processtap van het identificeren van kansen. Het doel van deze werkmethode is om het identificeren van kansen uniform en formeel te beschrijven binnen het bestaande kans- en risicomanagement.

Dit document is in eerste instantie bedoeld voor project- en risicomanagers die verantwoordelijkheid dragen voor het kans- en risicomanagement binnen projecten. Het projectteam kan voldoen met de samenvatting en kan deze werkmethode als extra naslagwerk gebruiken.

De werkmethode bestaat uit de volgende onderdelen:

- Voorbereiding
- Uitvoering
- Afronding
- Samenvatting (Onepager)

2. Voorbereiding

Voor het identificeren van kansen moeten voorbereidingen getroffen worden die de identificatie makkelijker maken. Eerst worden de definities rondom kansen geformuleerd en worden de rollen en verantwoordelijkheden toegelicht. Vervolgens wordt de deelnemerslijst opgesteld, relevante project documentatie verzameld en de methode voor identificatie geselecteerd. Als laatst wordt een SWOT-analyse uitgevoerd op het project en het projectteam. De resultaten van de SWOT-analyse worden meegenomen naar de uitvoering van de kansen sessie en kunnen tevens ook gebruikt worden voor de risico sessies.

Definities

Wanneer er over kansen wordt gesproken is het belangrijk om dezelfde termen en definities te gebruiken om verwarring en miscommunicatie te voorkomen. Hieronder worden de relevante termen en definities geformuleerd.

- Kans = Een onzekerheid met een positief effect op project doelstellingen
- Optimalisatie = Een optimalisatie is geen kans omdat het geen onzekerheid heeft.
- Kans beschrijving =

*Als het gevolg van <een of meer oorzaken>,
<onzekere gebeurtenis/gevolg> kan plaatsvinden,
Dat leidt tot <een of meer effect(en) op project doelstellingen>.*

Rollen & verantwoordelijkheden

De rollen en verantwoordelijkheden voor een kansen sessie zijn als volgt gedefinieerd.

- Projectmanager ('Motivator')

Eindverantwoordelijke voor het plaatsvinden van de kansen sessie. Verantwoordelijk voor het motiveren en enthousiasmeren van het zoeken naar kansen tijdens de sessie. Zorgen voor een veilige en creatieve omgeving waarin gezocht kan worden naar kansen.

- Kansenmanager = ('Voorzitter')

Verantwoordelijk voor het faciliteren van de kansen sessie. Heeft de leiding tijdens de kansen sessie en begeleidt de deelnemers door de methode. Verantwoordelijk voor het vastleggen van de geïdentificeerde kansen gedurende en na afloop van de sessie.

- Teamlid = ('Discipline expert')

Verantwoordelijk voor de individuele voorbereiding zoals het inlezen van project documenten. Actief bijdragen aan de kansen identificatie gedurende de sessie.

Deelnemers

Voor het identificeren van kansen is het noodzakelijk dat een *diverse* groep deelnemers aan de kansen sessie meedoet. Dat betekent dat de deelnemers verschillende disciplines vertegenwoordigen. Kansen kunnen vaak gevonden worden in de combinatie van verschillende disciplines en de overlap daartussen.

- Projectmanager
- Risicomanager
- Calculator
- Planner
- Ontwerp
- Omgeving
- Vergunningen
- Werkvoorbereiding
- Strateeg
- Veiligheid
- (Opdrachtgever)

Project documenten

Ter voorbereiding op de kansen identificatie sessie worden de relevante project documenten met de deelnemers gedeeld. De deelnemers dienen de documentatie vooraf door te nemen om te zorgen dat de beschikbare tijd optimaal benut kan worden. De risicomanager en projectmanager kiezen gezamenlijk welke documenten relevant zijn voor de sessie. Bruikbare documenten zijn onder andere (maar niet beperkt tot):

- Contractdocumenten
- Planning
- Begroting
- Ontwerptekeningen
- Omgevingstekeningen
- Lijst met kansen uit vergelijkbare projecten

Selecteren identificatie techniek(en)

Afhankelijk van de grootte, complexiteit en beschikbare tijd kan er tussen twee technieken gekozen worden. Dit zijn de SCAMPER-methode en de Benefit Tree Analysis, beiden worden hieronder kort toegelicht.

Methode 1 – SCAMPER

Gebruik: Deze methode is geschikt voor zowel kleine als grote projecten. Deze methode helpt teams die moeite hebben met kansen identificeren door een gestructureerde en praktische aanpak.

Duur: 90 minuten

Uitvoering: Het gestructureerd identificeren van kansen door het gebruik van 7 verschillende 'lenzen'. SCAMPER is het acroniem voor Substitute, Combine, Adapt, Modify, Put to another use, Eliminate en Rearrange.

Benodigdheden:

- Kladpapier
- Pennen
- Flipover/Whiteboard

Method 2 – Benefit tree analysis

Gebruik: Deze methode is met name geschikt voor grote projecten. Deze methode is geschikt voor projectteams met meer ervaring en die kansen binnen het project dieper willen ontleden.

Duur: 120 minuten

Uitvoering: Op een grafische en systematische manier kansen per project doelstelling of deelproject identificeren.

Benodigdheden:

- Whiteboard/Flipover
- Markers

SWOT-analyse

Voorafgaan aan de identificatie sessie wordt door de risicomanager en de projectmanager een SWOT-analyse uitgevoerd op het project en het team. Het doel van de SWOT-analyse is om de sterke en zwakke punten van het project en het projectteam in kaart te brengen.

Duur: 30 minuten

Doel: In kaart brengen van sterktes, zwaktes, kansen en gevaren van het team en het project.

Benodigdheden:

- Pennen + Marker stiften
- Flipover
- Post-its

Hoe:

1. Schrijf individueel in 5-10 minuten minimaal 2 elementen op post-its per vak, dus 2 sterktes etc. Focus hierbij op de specifieke eigenschappen van het project en het projectteam.
2. Voeg alle post-its samen op de flipover en discussieer over de uitkomsten voor 20 minuten (5 min per vak). Welke gelijkenissen komen naar voren en welke verschillen?
3. Vul de flipover definitief in met de belangrijkste elementen per vak.

3. Uitvoering

De volgende stap is het uitvoeren van de kansen identificatie sessie. Elke methode wordt in deze sectie beschreven. Daarnaast worden de verschillende rollen in de kansen sessie toegelicht.

Methode 1 – SCAMPER

Duur: 90 minuten

Doel: Het gestructureerd identificeren van kansen door het gebruik van 7 verschillende 'lenzen'. SCAMPER is het acroniem voor Substitute, Combine, Adapt, Modify, Put to another use, Eliminate en Rearrange.

Benodigdheden:

- Kladpapier
- Pennen
- Flipover/Whiteboard

Hoe:

1. Iedere deelnemer krijgt kladpapier en een pen, daarnaast is het belangrijk om te zorgen voor een mindset en omgeving die gericht is op kansen. Niks is te gek in deze fase, het gaat om het genereren van ideeën. Oordeel dus nog niet in deze fase over ideeën van jezelf en anderen.
2. Er zijn twee manieren om de vragen te behandelen, kies de manier die past bij het project en de voorkeur van de groep.
 - a. Deel het project op in verschillende onderdelen, dit kan bijvoorbeeld op het gebied van planning of delen van het ontwerp. Elke deelnemer beantwoordt de vragen die horen bij de 7 lenzen voor dat onderdeel. Vervolgens worden de uitkomsten besproken in de groep.
 - b. Bekijk het project als geheel. Laat elke deelnemer vanuit zijn eigen discipline nadenken over elke lens. Bespreek de antwoorden van elke lens alvorens door te gaan naar de volgende.

7 Lenzen met voorbeeldvragen:

- Vervangen (Substitute) – Wat is te vervangen?
 - Welke materialen of middelen kunnen worden vervangen?
 - Welke processen of procedures kunnen worden vervangen?
 - Welke afspraken kunnen vervangen worden?
- Combineren (Combine) – Wat is te combineren?
 - Welke onderdelen kunnen we combineren?
 - Welke activiteiten kunnen we combineren?
 - Kunnen we ons project met een andere partij combineren?
- Aanpassen (Adapt) – Wat is aan te passen?
 - Kunnen we de omgeving aanpassen?
 - Kunnen we een bestaand product aanpassen?
 - Kunnen we de eisen aanpassen?
- Modificeren (Modify) – Wat is te modificeren?
 - Wat kunnen we uitvergroten of vergroten?
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 - Kunnen we extra functies toevoegen?
- Op een andere manier gebruiken (Put to another use) – Wat is op een andere manier te gebruiken?
 - Kunnen we onderdelen uit eerdere projecten gebruiken?
 - Kunnen we onderdelen uit dit project voor andere projecten gebruiken?
 - Kunnen we onderdelen of materialen opnieuw gebruiken?
- Elimineer (Eliminate) – Wat is te vereenvoudigen?
 - Welk onderdeel kunnen we weglaten zonder kwaliteit te verliezen?

- Kunnen we het ontwerp vereenvoudigen?
- Wat zouden we doen als we met de helft van de middelen moesten werken?
- Herschikken (Rearrange) – Wat is te herschikken?
 - Kunnen we elementen in de planning herschikken?
 - Kunnen we elementen in het ontwerp herschikken?
 - Kunnen we (delen van) het proces omkeren?
- 3. Verzamel alle kansen die volgen uit de discussie en schrijf deze op. De risicomanager werkt de kansen verder uit met eigenaren.

Methode 2 – Benefit tree analysis

Duur: 120 minuten

Doel: Op een grafische en systematische manier kansen per project doelstelling identificeren.

Benodigheden:

- Whiteboard/Flipover
- Markers

Hoe:

1. Bepaal aan de hand van de project doelstellingen wat de gewenste effecten zijn.
Voorbeelden van effecten op project doelstellingen zijn:
 - Verkorte projectduur
 - Lagere project kosten
 - Hogere project kwaliteit
2. Kies een gewenste doelstelling als top event en schrijf deze aan de bovenkant van het werkblad.
3. Start de brainstorm voor het identificeren van onderliggende elementen of gebeurtenissen die aan dit top event bijdragen. Voeg deze toe aan het niveau onder het top event.
4. Duik waar mogelijk een niveau omlaag om mogelijke kansen zo specifiek mogelijk te definiëren.
5. Herhaal vervolgens stap 2, 3 en 4 voor de overige doelstellingen.
6. Verzamel de kansen uit de laagste niveaus die zijn geïdentificeerd.

4. Afronding

De geïdentificeerde kansen worden door de risicomanager verzameld aan het einde van de sessie. Deze kansen worden vervolgens opgenomen in het reguliere kans- en risicomanagement proces. De sessie wordt kort geëvalueerd en een mogelijke vervolgsessie wordt gepland.

- KANSEN SESSIE -

VOORBEREIDING

DEFINITIES

- ☐ Kans = Een onzekerheid met een positief effect op project doelstellingen
- ☐ Optimalisatie = Een optimalisatie is geen kans omdat het geen onzekerheid heeft.
- ☐ Kansbeschrijving = Als het gevolg van <een of meer oorzaken>, <onzekere gebeurtenis/gevolg> kan plaatsvinden, dat leidt tot <een of meer effect(en) op project doelstellingen>.

ROLLEN

- ☐ Project manager - Motivator
- ☐ Risico Manager - Voorzitter
- ☐ Teamlid - Discipline expert

PROJECT DOCUMENTEN

- ☐ Contract documenten
- ☐ Tekeningen
- ☐ Omgevingskaarten

METHODE SELECTEREN

Basis	→	Methode 1
Verdiepend	→	Methode 2

SWOT UITVOEREN

Strengths	Weaknesses
Opportunities	Threats

UITVOERING

METHODE 1 – S.C.A.M.P.E.R.

Beantwoord de vragen voor verschillende elementen in het project. Combineer disciplines en deel je antwoorden.

- Substitute* - Wat kun je vervangen?
- Combine* - Wat kun je combineren?
- Adapt* - Wat kun je aanpassen?
- Modify* - Wat kun je veranderen?
- Put to another use* - Wat anders gebruiken?
- Eliminate* - Wat kun je verwijderen?
- Reverse* - Wat kun je herschikken?

METHODE 2 – BENEFIT TREE ANALYSIS

De Benefit Tree Analysis (BTA) is een boom die bestaat uit benefits, drivers en kansen. Benefits hebben betrekking op project doelstellingen. Begin met benefits die ontleedt worden in drivers. De drivers worden vervolgens ontleedt in opportuniteiten.

- Voorbeelden benefits:
- Verlagen kosten
 - Verkorten tijdsduur
 - Verhogen kwaliteit



AFRONDING

Taken

- ☐ Verzamelen en correct formuleren van kansen door risico manager
- ☐ Korte evaluatie van sessie
- ☐ Eventueel vervolg sessie plannen

WERKMETHODE KANSEN-SESSIE

1. Introductie

Het proces van kans en risicomanagement is beschreven in de handleiding risicomanagement. Deze werkmethode is een uitbreiding op deze handleiding die zich richt op de processtap van het identificeren van kansen. Het doel van deze werkmethode is om het identificeren van kansen uniform en formeel te beschrijven binnen het bestaande kans- en risicomanagement.

Dit document is in eerste instantie bedoeld voor project- en risicomanagers die verantwoordelijkheid dragen voor het kans- en risicomanagement binnen projecten. Het projectteam kan voldoen met de samenvatting en kan deze werkmethode als extra naslagwerk gebruiken.

De werkmethode bestaat uit de volgende onderdelen:

- Voorbereiding
- Uitvoering
- Afronding
- Samenvatting (Onepager)

2. Voorbereiding

Voor het identificeren van kansen moeten voorbereidingen getroffen worden die de identificatie makkelijker maken. Eerst worden de afspraken gedefinieerd die nodig zijn om met elkaar te kunnen samenwerken zoals definities. Daarna worden de rollen en verantwoordelijkheden tijdens de kansen sessie toegelicht. Vervolgens wordt de deelnemerslijst opgesteld, relevante project documentatie verzameld en de methode voor identificatie geselecteerd. Als laatste wordt een SWOT-analyse uitgevoerd op het project en het projectteam. De resultaten van de SWOT-analyse worden meegenomen naar de uitvoering van de kansen sessie en kunnen tevens ook gebruikt worden voor de risico sessies.

Definities

Wanneer er over kansen wordt gesproken is het belangrijk om dezelfde termen en definities te gebruiken om verwarring en miscommunicatie te voorkomen. Hieronder worden de relevante termen en definities geformuleerd.

- | | |
|---------------------|--|
| - Kans | = Een onzekerheid met een positief effect op project doelstellingen |
| - Optimalisatie | = Een optimalisatie is geen kans want het heeft een 100% zekerheid, wel meenemen maar niet in het kansendossier. |
| - Kans beschrijving | = |

*Als het gevolg van <een of meer oorzaken>,
<onzekere gebeurtenis/gevolg> kan plaatsvinden,
Dat leidt tot <een of meer effect(en) op project doelstellingen>.*

Rollen & verantwoordelijkheden

De rollen en verantwoordelijkheden voor een kansen sessie zijn als volgt gedefinieerd.

- Projectmanager ('Motivator')

Eindverantwoordelijke voor het plaatsvinden van de kansen sessie. Verantwoordelijk voor het motiveren en enthousiasmeren van het zoeken naar kansen tijdens de sessie. Zorgen voor een veilige en creatieve omgeving waarin gezocht kan worden naar kansen.

- Kansenmanager = ('Voorzitter')

Verantwoordelijk voor het faciliteren van de kansen sessie. Heeft de leiding tijdens de kansen sessie en begeleidt de deelnemers door de methode. Verantwoordelijk voor het vastleggen van de geïdentificeerde kansen gedurende en na afloop van de sessie.

- Teamlid = ('Discipline expert')

Verantwoordelijk voor de individuele voorbereiding zoals het inlezen van project documenten. Actief bijdragen aan de kansen identificatie gedurende de sessie.

Deelnemers

Voor het identificeren van kansen is het noodzakelijk dat een *diverse* groep deelnemers aan de kansen sessie meedoet. Dat betekent dat de deelnemers verschillende disciplines vertegenwoordigen. Kansen kunnen vaak gevonden worden in de combinatie van verschillende disciplines en de overlap daartussen. De volgende lijst is ter inspiratie, er moet een juiste balans zijn tussen diversiteit in disciplines en het aantal deelnemers.

- | | |
|------------------|---------------------|
| ○ Projectmanager | ○ Werkvoorbereiding |
| ○ Risicomanager | ○ Uitvoering |
| ○ Calculator | ○ Verkeer |
| ○ Planner | ○ Strateeg |
| ○ Contract | ○ Veiligheid |
| ○ Ontwerp | ○ Directielid |
| ○ Omgeving | ○ Externe experts |
| ○ Vergunningen | ○ (Opdrachtgever) |

Project documenten

Ter voorbereiding op de kansen identificatie sessie worden de relevante project documenten met de deelnemers gedeeld. De deelnemers dienen de documentatie vooraf door te nemen om te zorgen dat de beschikbare tijd optimaal benut kan worden. De risicomanager en projectmanager kiezen gezamenlijk welke documenten relevant zijn voor de sessie. Bruikbare documenten zijn onder andere (maar niet beperkt tot):

- | | |
|---------------------------------|--|
| ○ Contractdocumenten | ○ Ontwerptekeningen |
| ○ Business case (opdrachtgever) | ○ Omgevingstekeningen |
| ○ Planning | ○ Lijst met kansen uit vergelijkbare projecten |
| ○ Begroting | |

Selecteren identificatie techniek(en)

Afhankelijk van de grootte, complexiteit en beschikbare tijd kan er tussen twee technieken gekozen worden. Dit zijn de SCAMPER-methode en de Benefit Tree Analysis, beiden worden hieronder kort toegelicht.

Methode 1 – SCAMPER

Deze eenvoudige methode is geschikt voor zowel kleine als grote projecten. Deze methode helpt teams die moeite hebben met kansen identificeren door een gestructureerde en praktische aanpak. Duur: 90 minuten

Uitvoering: Het gestructureerd identificeren van kansen door het gebruik van 7 verschillende 'lenzen'. SCAMPER is het acroniem voor Substitute, Combine, Adapt, Modify, Put to another use, Eliminate en Rearrange.

Methode 2 – Benefit tree analysis

Deze gevorderde methode is met name geschikt voor grote projecten. Deze methode is geschikt voor projectteams met meer ervaring en die kansen binnen het project dieper willen ontleden.

Duur: 120 minuten

Uitvoering: Op een grafische en systematische manier kansen per project doelstelling of deelproject identificeren.

SWOT-analyse

Voorafgaand aan de identificatie sessie wordt door de risicomanager en de projectmanager een SWOT-analyse uitgevoerd op het project en het team. Het doel van de SWOT-analyse is om de sterke en zwakke punten van het project en het projectteam in kaart te brengen. De focus ligt niet op de threats and weaknesses aangezien deze aan bod komen in de kans en risico sessies.

Duur: 30 minuten

Doel: In kaart brengen van sterktes en zwaktes van het team en het project.

Benodigheden:

- Pennen + Marker stiften
- Flipover
- Post-its

Hoe:

1. Schrijf individueel in 5-10 minuten minimaal 2 elementen op post-its per vak, dus 2 sterktes etc. Focus hierbij op de specifieke eigenschappen van het project en het projectteam.
2. Voeg alle post-its samen op de flipover en discussieer over de uitkomsten voor 20 minuten (5 min per vak). Welke gelijkenissen komen naar voren en welke verschillen?
3. Vul de flipover definitief in met de belangrijkste elementen per vak.

3. Uitvoering

De volgende stap is het uitvoeren van de kansen identificatie sessie. Elke methode wordt in deze sectie beschreven. Daarnaast worden de verschillende rollen in de kansen sessie toegelicht.

Methode 1 – SCAMPER

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1. Iedere deelnemer krijgt kladpapier en een pen, daarnaast is het belangrijk om te zorgen voor een mindset en omgeving die gericht is op kansen. Niets is te gek in deze fase, het gaat om het genereren van ideeën. Oordeel dus nog niet in deze fase over ideeën van jezelf en anderen.
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 - a. Deel het project op in verschillende onderdelen, dit kan bijvoorbeeld op het gebied van planning of delen van het ontwerp. Elke deelnemer beantwoordt de vragen die horen bij de 7 lenzen voor dat onderdeel. Vervolgens worden de uitkomsten besproken in de groep.
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- Wat zouden we doen als we met de helft van de middelen moesten werken?
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 - Kunnen we (delen van) het proces omkeren?
- 3. Verzamel alle kansen die volgen uit de discussie en schrijf deze op. De risicomanager werkt de kansen verder uit met eigenaren.

Methode 2 – Benefit tree analysis

Doel: Op een grafische en systematische manier kansen per project doelstelling identificeren.

Benodigdheden:

- Whiteboard/Flipover
- Markers

Hoe:

1. Bepaal aan de hand van de project doelstellingen wat de gewenste effecten zijn.
Voorbeelden van effecten op project doelstellingen zijn:
 - Verkorte projectduur
 - Lagere project kosten
 - Hogere project kwaliteit
2. Kies een gewenste doelstelling als top event en schrijf deze aan de bovenkant van het werkblad.
3. Start de brainstorm voor het identificeren van onderliggende elementen of gebeurtenissen die aan dit top event bijdragen. Voeg deze toe aan het niveau onder het top event.
4. Duik waar mogelijk een niveau omlaag om mogelijke kansen zo specifiek mogelijk te definiëren.
5. Herhaal vervolgens stap 2, 3 en 4 voor de overige doelstellingen.
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4. Afronding

De geïdentificeerde kansen worden door de risicomanager verzameld aan het einde van de sessie. Deze kansen worden vervolgens opgenomen in het reguliere kans- en risicomanagement proces. De sessie wordt kort geëvalueerd en een mogelijke vervolgsessie wordt gepland.

- KANSEN SESSIE -

VOORBEREIDING

DEFINITIES

- ☐ Kans = Een onzekerheid met een positief effect op project doelstellingen
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- ☐ Kansbeschrijving = Als het gevolg van <een of meer oorzaken>, <onzekere gebeurtenis/gevolg> kan plaatsvinden, dat leidt tot <een of meer effect(en) op project doelstellingen>.

ROLLEN

- ☐ Project manager - Motivator
- ☐ Risico Manager - Voorzitter
- ☐ Teamlid - Discipline expert

PROJECT DOCUMENTEN

- Lezen (invullen door project manager):
- ☐ ...
 - ☐ ...

METHODE SELECTEREN

Eenvoudig	→	Methode 1
Gevorderd	→	Methode 2

SWOT UITVOEREN

Resultaten SWOT:

Sterktes team	Zwaktes team
Sterktes project	Zwaktes project

UITVOERING

METHODE 1 – S.C.A.M.P.E.R.

Beantwoord de vragen voor verschillende elementen in het project. Combineer disciplines en deel je antwoorden.

Substitute - Wat kun je vervangen?
Combine - Wat kun je combineren?
Adapt - Wat kun je aanpassen?
Modify - Wat kun je veranderen?
Put to another use - Wat anders gebruiken?
Eliminate - Wat kun je verwijderen?
Reverse - Wat kun je herschikken?

METHODE 2 – BENEFIT TREE ANALYSIS

Begin bovenaan met een voordeel, ga steeds een niveau lager om de mogelijke oorzaken van het voordeel te vinden.



AFRONDING

Taken

- ☐ Verzamelen van kansen door risico manager
- ☐ Korte evaluatie van sessie
- ☐ Eventueel vervolgsessie plannen