FROM COOPERATION
TO COLLABORATION

ENHANCING TEAM COLLABORATION IN PARTNERSHIPS FOR CONSTRUCTION PROJECTS

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Enhancing Society Together

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Coming together is the beginning. Keeping together is progress. Working together is success.

Henry Ford

Acknowledgments

This research marks the end of my university life which started eight years ago in my home country and is concluded by two fascinating years in the Netherlands. As a last part of the master's program I had the opportunity to explore a collaboration between different parties on an ongoing project and examine how the full potential of a partnership can be reached.

It has been a great learning journey quite different from the academic part of the studies as theories and methods prescribed on guidelines are not always easily embedded in peoples' behavior. From a personal viewpoint I didn't expect at the beginning of my master's that my very engineering and calculating – oriented mentality would by so much extended so that it includes a people – oriented viewpoint too. In addition I have gained a lot of experience in scientific research by learning to focus on the right issues and not consuming time and energy only for the sake of having a high number page count.

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Executive Summary

Introduction and research approach

Bringing together multidisciplinary teams in order to carry out a construction project is nowadays the norm within the construction industry. Building these teams so that they function in a truly integrated way is a challenging endeavor. Partnering aims at bringing together people and not just processes hence ensuring that the backgrounds, skills, interests and goals of all individuals align is of importance for the team performance. Putting the emphasis on building a true team during a project's front – end development phase can facilitate the early establishment of a collaborative atmosphere and an integrated team with shared goals.

This research aims at identifying which aspects of partnering relationships have the greatest influence on implementing a successful collaboration, either positive or negative, and to provide insight into how a project manager can enable effective team building during the early stages of a construction project. The research approach is founded on the following research question:

How can team collaboration and integration be enhanced within a construction project carried out in the framework of a partnership?

The research design is carried out on the basis of Kolb's cycle according to which drawing learnings from experiences offers the opportunity to create and apply new concepts in the future situations. Firstly, a literature study looks into the theoretical conditions for establishing a partnership. In addition, it provides a theoretical framework which contains the most important characteristics of partnering relationships, the benefits that a partnering agreement can entail and the success factors in relation to project performance.

This framework provides an input to the case study utilized in this graduation. The most relevant elements from the theoretical framework are reflected upon through interviews and questionnaires (RECAP tool) with the project team members. The analysis of these results enables the identification of success factors from the theoretical conditions that should be given attention during the front – end development phase of the project in order to enhance team performance. Some steps are subsequently proposed with relation to team building in the project start – up phase and how putting some more focus on the development of the team relationships could enhance team integration.

Results and conclusions

Among the most important ingredients of a collaborative relationship are trust, integrated team, communication, aligned goals and a joined vision along with support and commitment from top management. Some additional elements are transparency, an absence of blame culture, colocation of teams, openness, joint risk management and problem-solving processes. The role of leadership is also essential in the presence of a competent project team. The project leader and the team are inextricably intertwined and a successful combination raises the chances of reaching the goals set.

The success factors recognized as having the most influence building a collaborative relationship from the experience of practitioners are commitment to mutual benefits, a clearly defined scope and goals, development of mutual trust, an early implementation of integration processes, top management support, an

active client involvement, the overall collaboration between project parties and an integral project approach. The majority of this these factors is related to the management of the relationship development within the project and put the emphasis on the human aspect of the collaboration.

In order to achieve earlier team integration, project managers should put more emphasis on the team building processes by incorporating some more steps in the project start – up phase. The main proposition entails a partnering working session with all the involved project parties. During this session the project participants jointly formulate the vision for the project by aligning the goals of all stakeholders and decide on the core values that the relationship is based on. In addition some norms and ground rules are established with regard to how the collaborative relationship is going to work in the course of the project. A partnering charter is the outcome of this session showcasing the agreements made between the team members. This step can either be a separate session before the first official project meeting or preferably a process integrated in this first session held with all project parties.

As a complementary step to this process it is proposed to include some evaluation moments – in the form of intervisions - in the project that assess the status of the relationship aspects and the agreements made between the teams at the beginning of the project. These evaluation moments can occur at two different levels. Firstly conduct short collaboration checks on a bi- weekly or monthly basis where brief discussions concerning potential conflicts or problems and solutions take place. On a broader level a more integral evaluation is proposed as the project transitions from one phase to the next one. The use of questionnaires looking into intangible aspects of the collaboration is highly advocated by the project managers as it provides a very effective way to have a concrete image on how the collaboration is perceived by the different project parties. Consequently dedicating some time, energy and resources into getting to know each other and start building the relationship before embarking on the more tangible aspects of project management is something indispensable for project managers. In addition monitoring the soft – side of a partnership and looking at how it evolves during the course of the project enables project managers to have an insight on the relationship status and become aware of issues earlier. The focus on the relationship development cannot guarantee a successful project outcome as this depends on a number of factors. However the focus on people can significantly enhance the chances of a successful result as an integrated team is a constituent component of a partnering endeavor.

Recommendations

The recommendations are twofold pertaining to potential research topics in the future and to propositions for Royal HaskoningDHV.

Regarding the research field investigating into success factors that have an impact on the soft aspects of project management is proposed. Furthermore, additional ways of tracking the progress of the relationship development during a project could be a useful tool for project managers during the project's evaluation moments. Formulating the RECAP tool, which forms a good basis for measuring collaboration health, could prove a convenient tool for assessment procedures.

With concern to the implications for RHDHV it is suggested to place more emphasis on effective team building by rendering it an integral part of the project management procedures. Incorporating processes of (inter- and intra-) group assessment of relational aspects could prove useful when adopted by project managers. Realizing the importance of building a true team and putting the emphasis on the non – tangible aspects is of significance for a successful project outcome.

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1. Introduction

Collaboration within the construction industry is nowadays the norm of the industry and one of the cornerstones of the soft side of project management. Getting from cooperation to collaboration as the research title suggests is a step that can either significantly enhance a project's rate of success if achieved or substantially decrease the project performance if it is not realized.

This chapter provides an introduction to the research topic and problem statement as well as the relevance of the topic in the premises of construction projects. The research goal, question and sub-questions are also analyzed. A brief introduction of Royal HaskoningDHV, where the graduation project is carried out, concludes the chapter along with the reading guide of the thesis.

1.1 Background: collaboration in construction projects

Complex projects have been carried out since ancient history, but it wasn't until the 1950s that organizations started to systematicly apply tools and techniques to complex projects. The development of project management methodologies initially put the emphasis on the so-called hard and technical side of project management. Professional bodies of knowledge that provide certifications such as the Project Management Institute (PMI) also usually attribute more emphasis on the hard side aspects of project management (Cardoso dos Santos Durão et al., 2017).

However a shift of the focus of the project management research has been observed from a mostly technical engineering orientation to one that encompasses a broader organizational perspective (Pollack et al., 2015). After all project management, at its core, is concerned with creating an environment where people can work together to achieve a mutual objective, in order to deliver successful projects on time and on budget (Seymour et al., 2014). Without the successful collaboration of people reaching the goals set by the project team is hard.

In addition collaborative teams facilitate accelerated integration of distinct work activities, improve communication, increase knowledge sharing and provide flexibility of work assignments (Cardoso dos Santos Durão et al., 2017). Successful projects are the product of well-integrated teams (Izam Ibrahim et al., 2013) making thus collaboration a constituent and critical element of project success.

Therefore carrying out a project successfully is more than making accurate budget estimations and planning schemes accompanied by detailed designs on design software applications. People are the core of a business operation and managing them is not just a matter of applying established and rigid methodologies (Smits, 2017).

Especially in construction projects the temporary nature of the work mostly entails having teams of professionals from different educational and often cultural backgrounds partnering for a single project. Given the fact that collaboration is based on developing good relationships between the different project parties this one-off project characteristic poses an additional difficulty. Relationship development requires time and resources during the front-end development that are usually hard to find in large projects. It is also an aspect that is overlooked in favor of more tangible results. As a result, issues often related to bad collaboration arise in later stages of the project. These issues could have been prevented if some more attention had been given to appropriate team building during the project initiation phase.

1.2 Problem Statement

Today's project complexity is constantly increasing as a consequence of multidisciplinary project teams operating on numerous cases internationally. Building a truly integrated team in projects where a partnership is necessary in order to achieve the desired outcome isn't a one-off process that occurs automatically. Partnering is more about establishing an atmosphere and culture of trust and shared understanding which reflects a spirit of cooperation (Bresnen et al., 2000b).

A common phenomenon nevertheless that usually occurs in such projects is the following: teams of employees from different companies are working together and have meetings often by using a common work place area without having a joint approach towards the project. In international projects cultural differences between the different teams are an important aspect that exacerbates the problem. Thus integrated project delivery is required and it is different from traditional project delivery in the sense that more emphasis should be placed on the social aspects throughout the project lifecycle (Chinowsky et al., 2011).

In other words what should be strived for is the highest degree to which the independent entities interact and coordinate their actions to achieve the highest level of integration (Nicholas et al., 2017). This is possible if the problems that hinder the development of successful collaboration are recognized and dealt with. Teams and individuals with substantial diversity in skills, knowledge and expertise and no prior co-working experience make integration more difficult to achieve (B. K. Baiden et al., 2006). Project managers should not only look at assembling teams that have sufficient capability but also perform collaborative practices in the early phase of the project in order to initiate team working processes (Suprapto, Bakker, & Mooi, 2015).

In Figure 1 a visualization of the problem statement is provided whereby the ideal evolution of a collaborative relationship during a project is depicted. The last stage is often the hardest to achieve something that can lead to the aforementioned situation.

FIGURE 1 PROBLEM CONFIGURATION

1.3 Research Objective

As described in the previous paragraphs carrying out a project successfully depends to a great degree on the successful collaboration between the different project parties. Many times the team integration is expected as a logical and natural outcome of the collaborative relationship development. However this situation isn't always realized as the influence of the human aspect of the project is underestimated. The aim of this research is to identify which characteristics of a partnering relationship within a construction project might be problematic and propose a collaboration model which will enable the project manager to build a truly integrated team to the benefit of all the involved parties.

1.4 Research Question

Partnering in construction and integrated project teams are not uncommon terms within the project management field. However most project management methods and techniques rely more on formal tools and contractual relationships for building a successful project team such as organizational charts and work breakdown structure (Project Management Institute, 2017). What is often not taken into account is that collaboration is essentially about relationships which are not only formally agreed but also socially constructed (Suprapto, 2016). Having an integrated team is more than just agreeing to a contractually partnering relationship.

Based on the problem statement and objective described in the previous sections the following research question and sub-questions are formulated as depicted in Figure 2 along with the chapters where each question is predominantly answered.

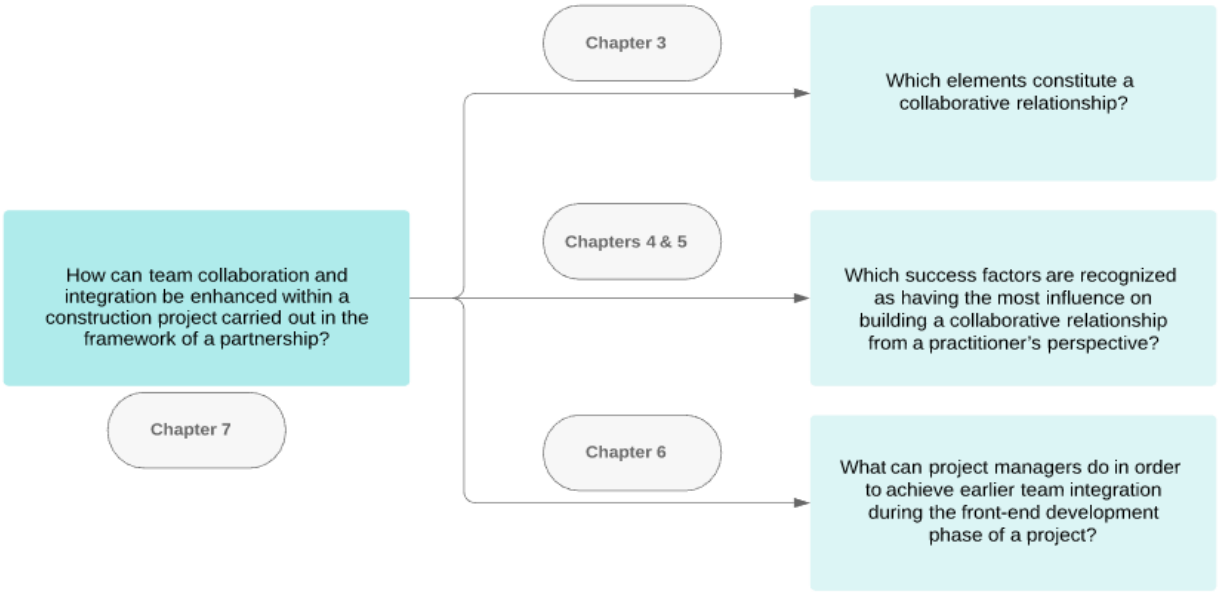


FIGURE 2 RESEARCH QUESTION AND SUB-QUESTIONS SCHEME

Main research question:

How can team collaboration and integration be enhanced within a construction project carried out in the framework of a partnership?'

Sub - questions:

1. Which elements constitute a collaborative relationship?

2. Which success factors are recognized as having the most influence on building a collaborative relationship from a practitioner's perspective?

3. What can project managers do in order to achieve earlier team integration during the front-end development phase of a project?

1.5 Research Relevance

Collaboration in the construction industry is a relatively recent concept taking into account the history of construction projects albeit with a lot of research conducted about it. One critical issue of project management however is the following: with the emergence of project management, methods, tools and formal arrangements were considered the cornerstones of a successful collaborative relationship. The human aspect of a project, the people who are intended to implement the aforementioned techniques and arrangements, were not considered as having a pivotal role. The means to putting together a real and integrated team are considered more as an instinctive skill of the project manager and there aren't so far specific steps or models that could actually be utilized to achieve this goal. In contrast there are a plethora of methods on how to structure a Project Management Organization or how to produce a good planning scheme which are apparently on the hard side of project management (Nicholas et al., 2017; Project Management Institute, 2017).

Research into team integration is a relatively new concept that is lying more on the theoretical side and looking into the benefits thereof without discussing much about the managerial implications (Bernard K. Baiden et al., 2011; Bosch-Rekveldt et al., 2011; Buvik et al., 2015; Costello et al., 2015; Demirkesen et al., 2017; Manu et al., 2015; Suprapto, Bakker, & Mooi, 2015).

With this graduation project an attempt will be made at academic level to provide a theoretical framework encompassing the essential elements of collaboration within a partnership agreement. Moreover the presence of certain collaboration elements or the absence thereof will be linked to the success factors that have an influence on the outcome of the project. At a more practical perspective the proposal of a model which will show what actions can be performed incrementally in order to achieve team integration during the front-end development phase of a project is the desired outcome.

From a practical point of view the developed model can be included in the EPCM (Engineering, Procurement and Construction management) manual of Royal HaskoningDHV which aims to provide a common foundation for project managers working on projects on an international level. Regarding the current project implications the opportunity is given to recognize which areas of the ongoing project have room for improvement taking into account the fact that the collaboration between RHDHV and the client will likely extend to other projects in the near future. Moreover the client has the 'one – team' principle as one of the core values therefore the research aligns with the client's mentality for the case study examined.

1.6 Company information

This graduation project is supported by Royal HaskoningDHV (RHDHV). RHDHV is an engineering and project management consultancy originating in the Netherlands with more than 135 years of experience in project management. It operates on international level and delivers services in the fields of aviation, buildings, energy, industry, infrastructure, maritime, mining, transport, urban and rural development and water.

It consists of four different departments in which the different projects are categorized; these are industry and buildings, transport and planning, water and maritime and aviation. The thesis is carried out within the premises of the industry and buildings section. The company also comprises a corporate group focused on project excellence with the aim of professionalizing project management. This is achieved by optimizing project management processes that support the way of working and by sharing lessons learned. Thus the approach of the graduation project aligns with the company's mentality to constantly look for ways to enhance project - and hence company- performance.

1.7 Reading Guide

In the first chapter an introduction to the research topic is provided by presenting the background of the research, the problem context, the research objective and the relevant questions along with some information regarding the company in which the graduation project takes place. In the second chapter the research design is delineated by introducing the research approach, the methods that will be utilized, the gathering of data and the processing thereof. In the third chapter the theoretical framework encompassing the investigated issue is examined by an overview of the relevant literature on the knowledge areas of partnering in construction, collaborative relationships, integrated project teams and success factors.

The fourth chapter elaborates on the examined case study, the reasons for selecting this project and the general context of the case. The results of the research into this case study are also assessed and analyzed in the fifth chapter of the report and suggestions expressed by the project participants are linked to the theoretical framework of the third chapter. In the subsequent chapter a synthesis of the findings is attempted by translating the findings from the case study into a collaboration model that could be operationalized in RHDHV. The model is also validated by experts from the company. The seventh chapter contains the answers to the research questions, the implications and recommendations for RHDHV and the limitations of the research. Moreover some recommendations on both practical and theoretical level are designated. Ultimately in the eighth chapter a reflection on the graduation process is provided.

2. Research Design

This chapter contains the research design process. Firstly the research strategy is delineated in section 2.1 followed by the research framework in which the relevant theory is identified, and the methods used for gathering the necessary information explained. The methods analyzed are literature review in section 2.2, a case – study design in 2.3, the data collection methods in section 2.4 and the synthesis in section 2.5. Finally the research scope in presented in section 2.6. A scheme of the research design is presented in Figure 3.

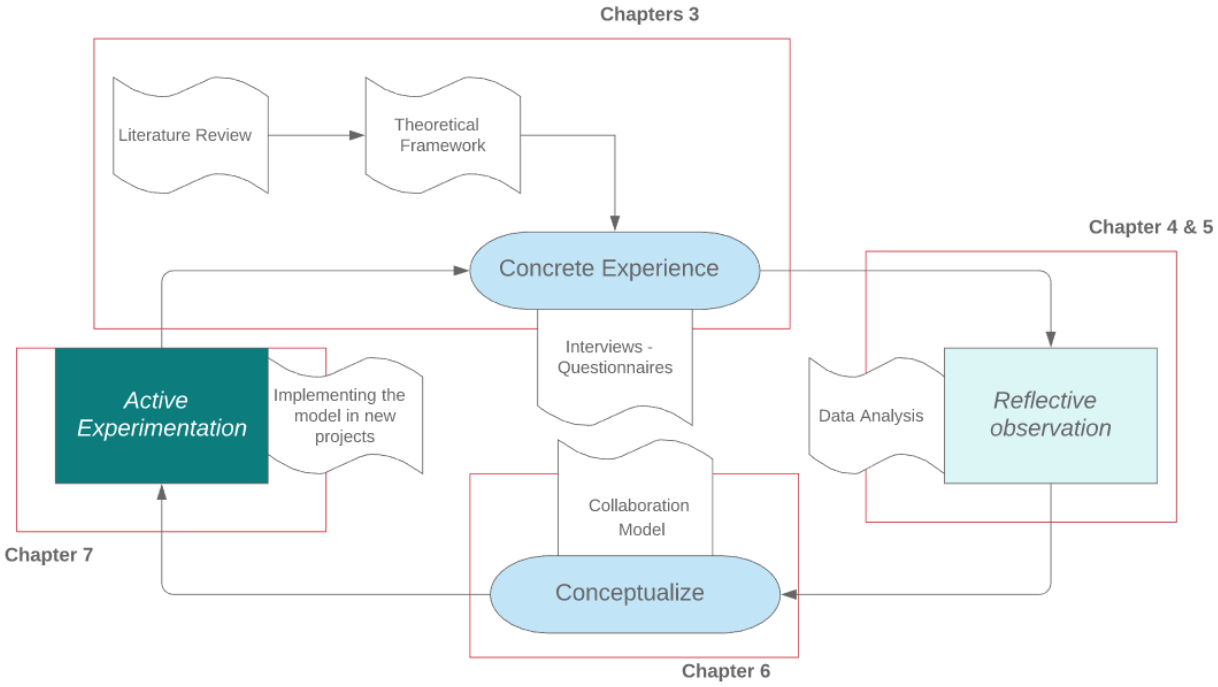


FIGURE 3 RESEARCH APPROACH SCHEME

2.1 Research Approach

A visualization of the process that will be followed can be done on the basis of the learning cycle of David Kolb (Kolb, 1984) represented by the four main blocks of the research scheme in Figure 3. According to Kolb learning from experiences provides the opportunity to create and apply new concepts. Hence Kolb's learning cycle has been used extensively as a tool in the process of individual and organizational learning and development for managers. It provides the opportunity to show the importance of experiential knowledge as well as the link between theory and practice (Vince, 1998).

This thesis follows albeit loosely a similar pattern. Firstly the point of view of the different project managers towards the collaboration within the teams that work together in an ongoing project is evaluated. Secondly their responses are reflected upon and analyzed with the intention of reaching some conclusions regarding their view on the project collaboration. Afterwards new concepts are proposed that address the issues raised by the project managers. Ultimately the new ideas or frameworks are applied and tested in similar situations in future projects (the last part constitutes part of the recommendations that will be made at the final part of the thesis).

Linking the cycle of Kolb to the graduation report structure the first step which contains describing concrete experience is carried out in chapters 3 and 4. In the third chapter the most important elements for a collaboration are identified from the literature study and a theoretical framework is created and linked to the examined case study. Then in the fourth chapter the most relevant elements for the case study are used to formulate the interview protocol. The stage of reflective observation corresponds to the analysis of the results which is conducted in the fifth chapter. The conceptualization stage is reflected in the sixth chapter in which a synthesis of the conclusions drawn from the previous step and from a comparison to the theoretical findings result in the proposition of a model that would enhance team integration in the first steps of a construction project. Ultimately some more general conclusions and recommendations for future project and perhaps research are included in the seventh chapter.

2.2 Literature Review

The first step of the research design is an in-depth literature study reviewing relevant literature about:

- the partnering concept within the construction industry
- the importance of collaboration between the different project parties
- the elements that either enhance or hinder taking advantage of the full potential of collaboration
- project success factors related to team collaboration

The findings of the literature study will be utilized to develop a theoretical framework which will be used as an input for formulating the appropriate interview questions. Theory development is essential as it provides a "blueprint" for the research and helps in determining what kind of data to collect and how to analyze them (Yin, 1994). This step will answer the first research sub-question.

The sources for collecting the required information are TU Delft library database, Google Scholar, Science Direct as well as books and lecture notes from the courses of Construction Management and Engineering Master. The doctoral thesis of Suprapto (2016) is utilized in the beginning of the research as it provides a useful overview of relevant articles regarding collaboration in projects and forms a good starting search point in the very rich field of project collaboration.

2.3 Case – study design

For this graduation project a single case study is selected for further investigation. The selected project takes place in a setting and stakeholder environment that offer an abundance of relationships and interactions that can be utilized for the research topic.

Taking into consideration the fact that the purpose of this research is to propose a collaboration model to be applied in various projects one could argue that generalizing on the basis of a single case could be considered devastating to the case study as a scientific method (B. Flyvbjerg, 2006). The reason is that a particular case could represent the critical case in testing a well formulated theory. This case can then be used to determine whether relevant theoretical concepts are correct or whether some alternative set of explanations might be more relevant (Yin, 1994). As B. Flyvbjerg (2006) suggests a generalization on the basis of a single case is also possible if it is utilized as supplement or alternative to other methods.

In addition, this project exhibits typical characteristics of an international project carried out in an environment where people with different nationalities, cultures and backgrounds have to work together encountering several problematic situations in the process. It is also the view of many project managers who have a lot of experience in similar projects that similar circumstances are encountered in the majority of projects. This rationale also aligns with results from surveys of the project excellence department of the company who have seen similar set of incidents on different projects. As a result choosing the particular project is justified from the aforementioned arguments.

2.4 Data collection

The methods used for collecting the required data are face to face interviews and questionnaires from the project participants. This holistic approach is selected as the investigated issue – relationships – isn't something that can be evaluated solely on the basis of hard – tangible data. In this way the participants can also raise topics and issues that might not be considered as critical to the investigation from the beginning and are allowed to "express their feelings and offer their perspectives in their own words" (Kuada, 2012). All the acquired information will be treated anonymously.

2.4.1 Semi – structured interviews

Face to face semi-structured interviews are conducted with several project managers in order to gain insight into the investigated topic. In this manner the researcher has the advantage of observing the expression on the face of the interviewee as well as similar body language, which may be of interest for a correct interpretation of the answer (Verschuren et al., 2010). Interview questions are formulated based on the input from the literature study and the derived theoretical framework. The questions discuss certain relevant topics for the project but they give the interviewee the opportunity to share their perspective and if necessary (for the interviewer) to pose some follow – up questions. Have a certain degree of predetermination is necessary as respondents are expected to share their feelings and as a result drifting away because they are emotionally upset for example is something that should be taken into consideration. The interview protocol can be found in Appendix A.

2.4.2 Questionnaires

The second method of data collection is handing out questionnaires. A number of project managers from the various project parties are asked to fill in the questionnaires that look into several aspects of a collaborative relationship. The questionnaire utilized in this research project is the RECAP (Relational Capability) tool developed by Suprapto (2016) with the goal of assessing the current state of the collaborative relationships between the different parties within a partnership regardless of the underlying formal arrangements. In doing so the project managers can evaluate the soft and relational aspects of the collaborative working. This form of assessment had been implemented in similar projects and received a positive feedback as a means of "building awareness facilitating constructive discussions for improving ongoing working relationships" (Suprapto, 2016). The questionnaire can be found in Appendix B.

2.4.3 Data analysis

The empirical data gathered from the previous stage of the research are analyzed and interpreted. The analysis will be based on the perspective of each party in the project – owner/client, contractor, subcontractor- as people from each party share a different view on the ongoing collaboration depending on their interests (both on personal and business level) on the project. Moreover the added value of this approach is to give the project managers of each party the chance to address issues within each team separately according to each team's structure and working mentality.

In addition the results will be compared to the results of the questionnaire which have been filled in for the same type of project for the same client in the Netherlands (Tarazona, 2019) in order to observe if there are similar patterns. This procedure also provides a certain degree of validation of the results because if similar results are obtained from the cases replication is possible to consider (Yin, 1994).

2.5 Synthesis

In the subsequent part and based on the analysis of the results of the previous one some methods and tools are proposed that would facilitate the project manager in implementing a collaboration model and practices with the ultimate aim of building awareness and creating a truly integrated team to achieve improved project performance. The end result will contain a guideline for the project managers that will enable them to incrementally create project teams that collaborate and not just cooperate. Ultimately in order to validate the results and draw conclusions regarding the applicability of the model an expert validation will be the last step of the procedure. This action also provides the opportunity to make recommendations about future adjustments or further developments.

2.6 Research Scope

This research places the emphasis on the soft side of project management which can be defined as the interpersonal relationships between the project members (Cardoso dos Santos Durão et al., 2017). The front end development phase is the focal point of attention as project managers have stressed "the importance of having an integrated project team" considered by both owners and contractors already in the front end development phase (Bosch-Rekveldt, 2011).

The project is looked into regardless of the contractual arrangements between different project parties and without accentuating the cultural differences given the thesis timeframe and limitations. Contractual arrangements are not taken into account as it has be stated that "contract types and contractual incentives per se are not the game changer but the parties" attitudes toward collaborative relationship and how they play out throughout the project into actual teamworking behavior" (Suprapto, Bakker, & Mooi, 2015). The cultural differences between the different project teams are nevertheless given attention as they have a considerable effect on the individual and team behavior of the various parties.

3. Literature Review

This chapter discusses the literature encompassing collaboration. In section 3.1 an introduction is done of the different topics addressed during the literature review. In section 3.2 definitions of partnership are compared and the difference between an alliance and a partnering agreement is elaborated. In section 3.3 the benefits of having a collaborative agreement are described and a number of success factors are compiled. In section 3.4 the most important elements favoring and hindering a collaboration are analyzed. Lastly in section 3.5 the theoretical framework used in the research is established.

3.1 Introduction

In this section an overview is provided of the relevant theoretical concepts stemming to a large extent from theory and practitioners' perspectives found in academic resources. In order to develop and cultivate a collaboration model for a partnership it is essential to decompose the terms 'partnering' and 'collaboration' in their constituting elements.

To accomplish this objective the theoretical concepts are elaborated according to Figure 4 . Firstly a definition of partnering is provided along with the different forms – both formal and informal – that can be attributed to the term. Subsequently a differentiation is attempted between the connotations of cooperation and collaboration and the results they entail when the transition is made from the first state (cooperation) to the second (collaboration) by linking them to success factors. Ultimately the most important components of a collaborative relationship are acknowledged together with the impediments that opting for such a way of project implementation can pose.

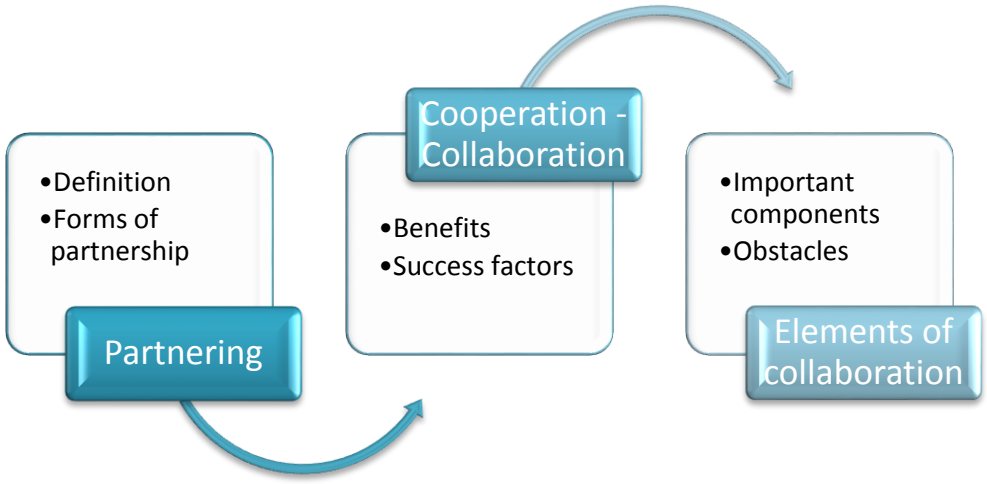


FIGURE 4 LITERATURE REVIEW BLOCKS

3.2 Partnering

Although construction projects have been carried out successfully for centuries they are rarely completed within the estimated budget and time frame set at the beginning of the project. Despite the vast advancements in technology and the professionalization of methods and tools used in project management the project performance hasn't improved in a proportionate way (Bakker et al., 2010). Partnering however is valued as the most significant development to date in terms of improving project performance (Wood et al., 2005).

A plethora of definitions has been attributed to the term partnership or partnering regarding the construction industry. According to the Construction Industry Institute (CII) in the USA partnering is defined as a best practice of the industry in which ''a long-term commitment between two or more organizations as in an alliance or it may be applied to a shorter period of time such as the duration of a project.'' In addition the ultimate goal of applying this practice is ''to achieve specific business objectives by maximizing the effectiveness of each participant's resources'' (CII, 1991).

A more generic interpretation is given by Chan et al. (2003b) who define partnership as a simple procedure of establishing good working relations among the different project parties. In a more extensive delineation of this working method Eriksson (2010) perceives partnering as a cooperative governance form based on cooperative procurement procedures which comprise core and optional components. The higher the degree of demanded cooperation the more elements of optional cooperative procurement procedures should be utilized. Bresnen et al. (2000b) advocate that "partnering is a rather loose term" to describe a rather multi-faceted practice. A similar approach is provided by Beach et al. (2005) who acknowledge that the word partnering is a generic term for a variety of formal and less formal arrangements which embrace a wide range of practices aiming at promoting greater collaboration between the different parties by involving differing time frames.

3.2.1 Project Partnering and alliancing

According to Suprapto et al. (2012) the term collaborative relationship comprises a range of practices and contractual arrangements such as project partnering, project alliancing, and supply chain management. Project partnering and project alliancing are two terms often used interchangeably but besides many shared features there is a number of differences.

Project alliancing is defined as a collaboration between the client, service providers and contractors where all parties share and manage the gains and risks of the project together, all parties either win together, or lose together (Young et al., 2016). Another definition states that by establishing an alliance an interorganizational cooperative arrangement is made in which "client and associated firms will join forces for a specific project, but will remain legally independent organizations" (Gerybadze, 1995).

Both concepts put the emphasis on relationship and people and aim at achieving results though relationships. A high level of collaboration is desired in both cases thus rendering them as one form of relationship contracting. A partnering agreement on the one hand is encountered alongside a traditional standard contract and has no contractual and legal force itself. There is no formal gain or pain sharing arrangement if goals are or aren't met according to the contract (Yeung et al., 2007).

An alliancing agreement on the other hand entails a formal alliance contract which is legally and contractually binding. This condition implies that there is a real gain or pain sharing mechanism according to which if one party in the alliance under-performs, then the rest of the partners are at risk of not only losing their rewards (profit and incentives) but also obliged to share losses and vice versa (Yeung et al., 2007) .

3.3 Cooperation – Collaboration

In the present time major construction projects are rarely carried out by only one company. Within the boundaries of a collaborative relationship the project team can be perceived as an organization which is based on two different albeit complementary structures. The first one is the formal structure which contains the normative relationships on the basis of contractual terms. The second one is the informal structure which describes relationships that evolve through the interaction of people. The former prescribes how people are supposed to relate and the latter how they actually do relate (Nicholas et al., 2017).

A similar interpretation which also puts the emphasis on the people within the collaboration framework has been given by Mankin et al. (2015) who deal with the concept of complex collaboration. According to the authors collaboration is composed of two different yet inextricably intertwined sets of elements; the 'soft side' i.e. the people, their relationships and how they work together and the 'structure side' i.e. the infrastructure of the collaboration, the team formation and processes. These two sides are inseparable and support each other; the structure side supports the soft side which respectively establishes relationships that produce structure.

Young et al. (2016) examine one form of relational contracting, project alliance and support that these kind of collaborative relations are characterized by two different sets of elements. The first one comprises the necessary hard (contractual) elements as in a formal contract and implementation of a real gain and pain-sharing arrangement. The second set includes the so-called essential soft (relationship-based) elements such as trust, long-term commitment, cooperation and communication in construction alliancing among others.

Regarding the contract type a lot of research has been conducted relating to the influence of the contract type on the owner – contractor relationship and overall project performance yet no conclusive answer has been reached. For the most part a partnering/alliance contract is anticipated to promote a more collaborative behavior than a lump-sum or reimbursable contract. However contract type and contractual incentives are not the determining factor. It is rather the project parties' attitudes towards collaborative relationship and the way they demonstrate their teamworking behavior that plays a more pivotal role in achieving true collaboration (Suprapto, Bakker, Mooi, et al., 2015).

Some of the positive outcomes that a collaboration can entail for the organizations involved is mutual rewards and an opportunity to develop and build trust, experience cultural change and achieve mutual learning (Beach et al., 2005). In the case of capital projects collaboration promotes a culture which cultivates technical and process innovation while simultaneously stimulating organizational learning within the team members (Barlow, 2000). Moreover a positive correlation has been observed between teamwork quality and project performance (Suprapto, Bakker, & Mooi, 2015) hence successful collaboration strongly enhances the success rate of projects. These factors can be perceived as important drivers for a collaborative approach.

3.3.1 *Differentiation cooperation – collaboration*

With respect to the two terms – cooperation and collaboration- a special reference should be made in order to clarify the different nuances in their meaning. Both terms denote a form of collective behavior and are arrangements that have an effect on the overall project performance (Polenske, 2004).

Consequently these two words are used interchangeably and frequently as synonyms to indicate people or groups of people from different companies that work together yet there is a subtle difference. In collaboration the relationship between the participants in the project is stronger and more intense. This is due to the fact that a common goal is pursued, and a jointly developed project culture is nurtured on the basis of trust and transparency. In a cooperation sharing information will be utilized by each party individually which is more common than trying to achieve something together (Schöttle, 2014).

3.3.2 *Success factors*

Despite all the research and advances during the last decades in the field of project management success rates are still disappointing and projects with cost and time overruns are the rule rather than the exception (Flyvbjerg, 2003). Identifying critical success factors isn't a new concept yet there are still a variety of views as to which factors influence mostly the outcome of the project (Alias et al., 2014; Cooke-Davis, 2002; Radujković et al., 2017).

In the success factor framework developed by (Bosch-Rekveldt et al., 2018) a clearly defined scope, top management support, collaboration between project parties, an integrated project team of client and contractor, clear goals and stakeholder engagement are some of the factors identified from a practice – based approach. According to Chan et al. (2006) mutual trust amongst project participants, early implementation of partnering process and commitment to a mutually beneficial (win-win) attitude are ranked as the most critical factors to partnering success.

Combining these two frameworks the factors shown at Figure 6 are used for the framework that combines drivers for collaboration, elements and success factors at Figure 10 at the end of this chapter. These factors need to have a strong presence in the project setting in order to realize the benefits of a partnership as described in the previous paragraph.

FIGURE 6 SUCCESS FACTORS FROM LITERATURE

3.4 Elements of collaboration

3.4.1 Elements enhancing collaboration

A collaborative relationship implies the existence of certain features which play a significant role in determining the successful outcome of the partnering agreement. According to Beach et al. (2005) some of these elements are shared vision and goal, good communication, conflict resolution processes, management commitment, shared risk, mutual rewards and benefits, innovation and long-term commitment, integrated team, learning culture and exchange of knowledge.

Another interpretation of collaborative relationships classifies characteristics into four different categories. These are owner and contractor capabilities (prior relationship experience, top/senior management commitment and support), relationship indicators (aligned goals and interests, open communication, mutual trust, no-blame culture), relational attitudes (knowledge sharing, integrated team working, joint risk management, risk-reward or gain-pain sharing scheme) and relational attitudes (long-term orientation, owner's commitment and support) (Suprapto et al., 2012). Using the Wittgenstein approach to define partnering Nyström (2005) recognized some overlapping features among projects within partnerships. Some of this partnering factors include trust, openness, activities that promote relationship building, continuous meetings, top management support and having continuous improvement as a goal.

With regard to the managerial implications that a partnership presents aiming at integrated teams comes across as the most important trait. Having integrated teams appears to contribute to project success by enhancing decision – making (Bosch-Rekveldt et al., 2011). Typical characteristics of such teams comprise focus on a common goal (project objectives) and sharing a common behavior (Suprapto, 2016).

Trust, commitment, joint vision, convergence of management styles, process alignment, top management support, information sharing and joint decision making are also recognized by Verdecho et al. (2012) as integral parts of collaboration. Teambuilding is also shown as a way of helping teams in aligning behind project goals and objectives (Bresnen et al., 2000a).

3.4.2 Integration

Team integration is a key factor in having a successful collaborative relationship. Research shows that integration management in collaborative relationships can have a considerable impact on project management performance and that the link between these two aspects is of considerable importance (Demirkesen et al., 2017). In addition implementing practices which meet the requirements of integration can either complement or even increase the prospect of meeting the key elements of effective teamwork (Bernard K. Baiden et al., 2011).

Working in integrated project teams can also contribute to less scope changes and to an increase in client satisfaction through a better understanding of the project environment (Bosch-Rekveldt et al., 2011). A team can be characterized as "fully integrated" when they work towards mutually beneficial results by ensuring that all the members support each other, and achievements are shared among the team members. In addition having a new identity and a colocation enhances efficient delivery of the project (B. K. Baiden et al., 2006).

3.4.3 Trust

The element of trust is the only characteristic that is mentioned without any exception in all relevant examined literature as the most important ingredient of a collaborative relationship. It is nevertheless a rather ambiguous component that has a binary nature owing to the fact that trust it on the one side is a critical factor for any partnership but on the other side is it also an outcome of the partnering process (Beach et al., 2005).

Trust formation and integration in early project phases is favored in cases of positive prior ties between team members and enhanced through early formation of integrative work practices, development of a common philosophy, open communication and early as well as explicit role expectations (Buvik et al., 2015).

Therefore these attributes should be aimed for by the project managers who seek to establish successful partnerships. Having the same working location and being transparent are also two elements linked to the development of trust and to a successful outcome; the first one through frequent and informal interactions and the second one by means of a shared administrative system in which all events are recorded (Laan et al., 2011). Some of the appropriate behaviors and attitudes for building a trustworthy collaborative relationship according to Whiteley et al. (1998) are sharing information with reliability, dealing with the issues that come up instead of avoiding them, exchanging ideas, putting emphasis on the relationship and carry out what is agreed upon.

3.4.4 Challenges in collaborative relationships

Engaging into a partnership doesn't occur without some undesirable side-effects that require a fair share of attention. Partnering isn't a panacea to solve all the problematic situations that might arise (Chan et al., 2006) and even if it is utilized in the right way but in a wrong situation the benefits will never materialize (Eriksson, 2010).

Establishing a collaborative relationship necessitates a degree of change management the scale of which is determined by the prevailing business cultures and organizational structures of each party. In this direction the horizontal and vertical differentiation within a company impose a complicating factor in developing the collaboration. The former (departmental specialization) because individual groups are usually driven by their own departmental or divisional interests (Bresnen et al., 2000b) and the latter (hierarchical stratification) owing to the fact that "embedding the agreed behavior protocol at senior level into effective working relationships at operational level" is a rather challenging procedure not always effortlessly effectuated (Suprapto, 2016).

Furthermore maintaining a long-term relationship isn't always an alluring situation. It could create a sense of undesirable dependency or be confronted with the hesitation of companies to share their technical know-how (proprietary knowledge) with the other contractual partners (Bresnen et al., 2000b). Some implications mentioned by project managers with regard to the relationship with the client are role ambiguities and conflicts, unexpected intervention form the owner's internal teams, reversion at times to more traditional structures and interfacing with owner's internal teams (Suprapto et al., 2012).

Moreover what is also often observed in projects at international level are not only challenges relating to the cultural diversity but also challenges of organizational diversity which may be less obvious but not less important (Mankin et al., 2015). People from different organizations involved in an inter-organizational

collaboration carry different agendas, goals, points of view, and even different cultures to the collaboration, making these collaborations far more complex and challenging than if they were from the same organization.

Combining the elements encountered in the majority of the literature studied, the most important components of a collaboration are shown in Figure 9.

FIGURE 9 ELEMENTS OF COLLABORATIVE RELATIONSHIP

3.5 Conclusion

The theoretical framework which will be used for formulating the interview questions is presented in Figure 10. The most relevant for the examined case – study elements, that is the aspects that are mainly seen either enhancing or hindering the partnership from reaching its full potential are selected. They are utilized as an input for the interviews that will be conducted as they are the elements that are looked into more closely. The success factors found in literature have a dual role. First they are the output of the interviews; the success factors from literature are linked to the findings of the case - study regarding project performance during front – end development. Secondly these success factors are the input to the collaboration model that will be proposed, and which will attempt to accomplish, to the extent that this is feasible, these factors during the front – end development phase of the project.

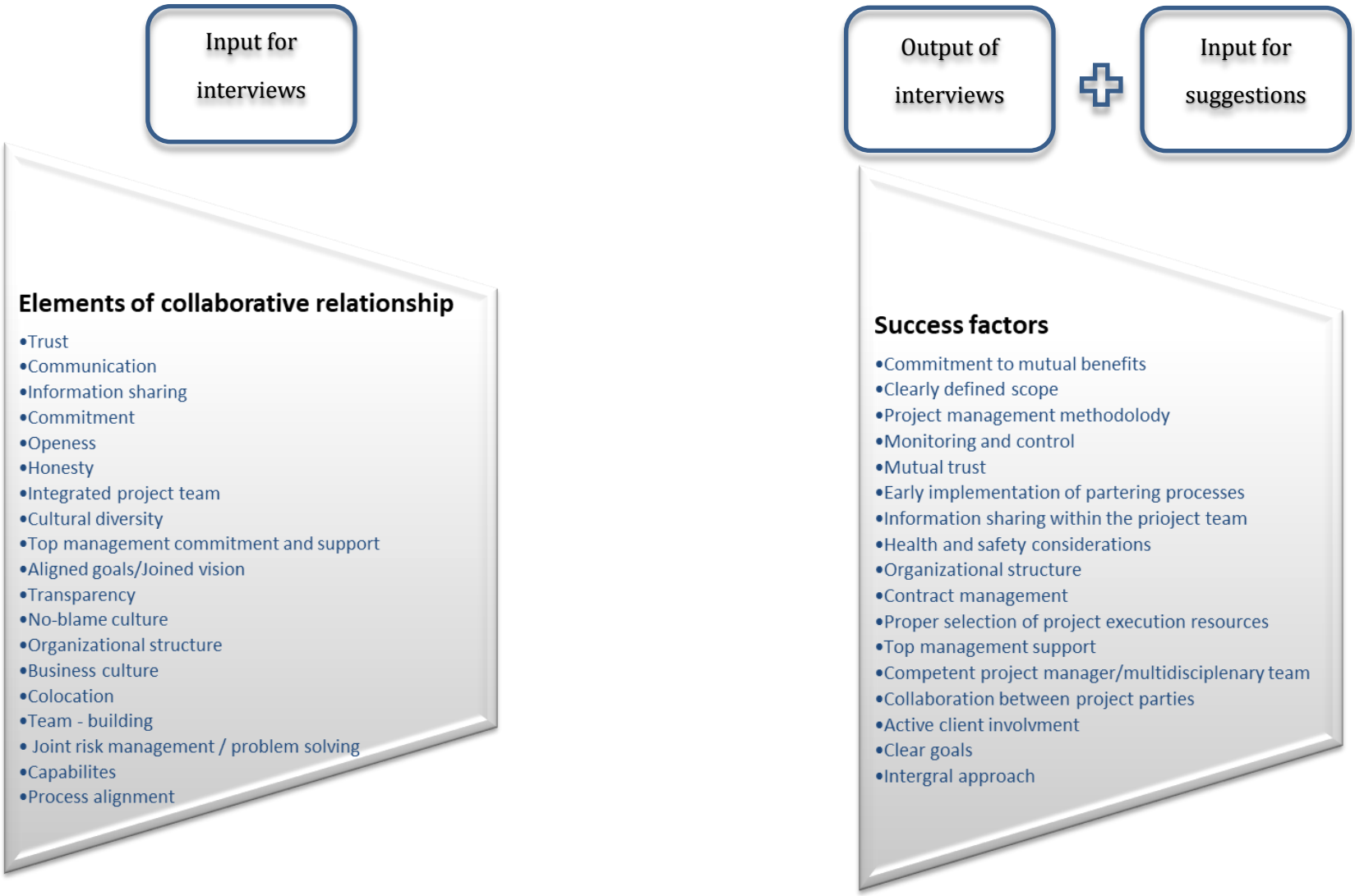


FIGURE 10 THEORETICAL FRAMEWORK

4. Case study set-up

In this chapter the general setting of the case study is introduced and described. In section 4.1 the case setting is described followed by a description of the project organization in section 4.2. In section 4.3 an overview of the research participants – interviewees and questionnaire respondents – is shown followed by the interview protocol in section 4.4. This chapter (in combination with the previous chapter) corresponds mainly to the first part of Kolb's cycle (Figure 3) comprising the main information with regard to the concrete experience (case-study) encountered and further interpreted.

4.1 Case context

The project examined concerns the upgrading of refinery plant facilities in the highly industrialized Ruhrgebiet in Germany. The client is one of the leading companies in the oil and gas industry and the current owner is a wholly owned subsidiary of the mother company. The refinery was built in 1935 and until 2017 it was owned and run by a number of companies that were operating mostly as joint ventures. The current owner acquired the first shares on the refinery in 1999 and since 2017 it is the sole owner and hence responsible for the refinery operation and maintenance.

The main driver of this project is safety of people on site which has always been one of the most important core values within the oil and gas industry. During the last years a number of incidents on site in combination with the refinery's outdated and deteriorating infrastructure have rendered indispensable the need for upgrading existing infrastructure facilities. To this end a portfolio of projects has been put into place with the projects falling under two main categories; improved performance of the refinery plant and improved safety conditions for employees.

The client has core values applying to all the branches worldwide, two of which are safety and team integration, the latter known as the -one team- approach. Seeking the enhancement of these values in the refinery along with improved communication the client decided to bring in employees from different operational units into one common working location, the Central Control Room. RHDHV has been selected to lead the project management team responsible for the front – end development of this main building. The same project has been carried out successfully by RHDHV for the Dutch branch of the client in Rotterdam, something that played a role in being chosen to implement the same project in Germany. This is the first time that these two parties are working together on a project in Germany. This is a brownfield project as most of the new facilities will be built close to or on the place of existing infrastructure thus creating a lot of interfaces which require attention.

In order to ensure that every project within the client's refineries worldwide adheres to the company's standards regarding scope, quality as well as procedures, each project is carried out in five stages depicted in Figure 11. The examined project has been in development for more than two years and when this graduation research is carried out the project is situated in the select to define phase, meaning it is still in the front – end development phase. Something that should be pointed out is the dynamic environment in which the project is taking place.

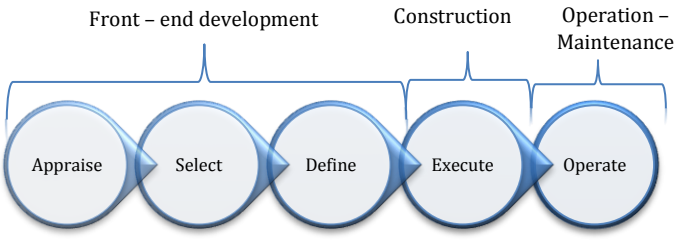


FIGURE 11 STAGES OF PROJECT EXECUTION

The responsible project manager of the client was replaced some months before the research when the project was already in the third phase (Define) and thus was one of several staff changes that occurred on the client's side. Moreover a lot of requirements, responsibilities or assignment changes are put into place leading to a high degree of uncertainty regarding the project execution.

The project can be characterized as a typical capital project where teams conduct the processes in order to realize products which are technically complex and highly customized, have a long lead time, include high risks and are implemented by a temporary organization (Suprapto, 2016). The success of the outcome is highly dependent on the successful collaboration between the different project parties hence the research into this topic is of major interest to both the client and the contractors.

4.2 Project Organization

As mentioned in the previous section the examined project is part of a bigger building program that takes place on the refinery site in a timespan of approximately ten years. Some of the other projects that share interfaces with the Central Control Room are the Distributed Control System -DCS project, an Infra project – Fiber optics and electrical and construction of operator shelters.

The project organization involves several parties most of which are German. The client as said in the beginning of the chapter is the German branch of one of the biggest companies in the oil and gas market, a multinational company with international presence. It should however be noticed that it was only a couple of years ago that the client acquired full ownership of the refinery which was until that point governed by German and Russian management teams. Adapting to the new owner's standards, business mentality, procedures and ways of working is still an ongoing process. For carrying out this building project which is totally different from the client's core business (operation and maintenance) the client has hired a lot of external consultants most of which have worked in the past for the client in a variety of projects.

Royal HaskoningDHV, a Dutch company with experience in international projects has been employed as the main consultant for the front – end development of the Central Control Room. In order to have a better understanding of the local context and regulations regarding the design process of the building RHDHV engaged a German architectural firm as a subcontractor. The latter shares a collaborative relationship with the client that extends more than a decade. The rest of the contractors are all German companies with limited international experience.

This research has as scope the collaboration between the client, the consultant (RHDHV – also referred as contractor) and the subcontractor. A scheme of the organization breakdown structure can be seen in Figure 12.

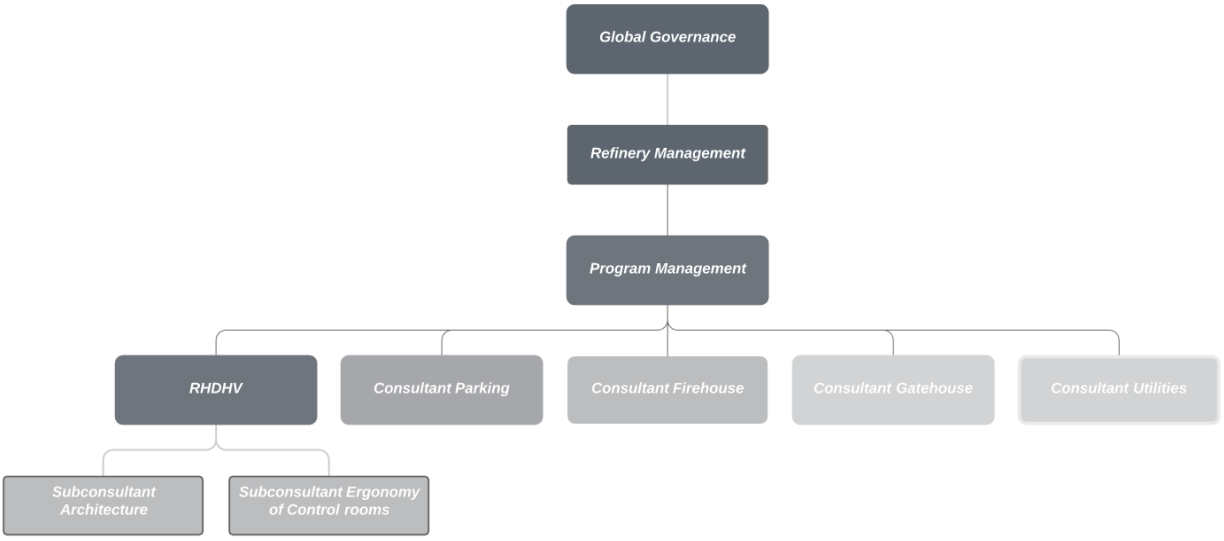


FIGURE 12 PROJECT ORGANIZATIONAL STRUCTURE

4.3 Research participants

The participants' selection was based on their degree of involvement in the project (not just observants) as well as their position in the project organization by ensuring they were involved to a large extent in the higher levels of project management. Taken into account is also the questionnaire requirement to have it filled in by project members that are on higher managerial positions (Suprapto, 2016). In addition is it strived to have a balanced representation of all three parties –client, consultant, subcontractor – so that the answers are not biased. Having a variety of perspectives enhances the credibility of the findings and bringing together these different point of views helps with providing the complete picture (Rubin et al., 2005).

There is a differentiation in the respondent's sample where people from various project teams and positions are included such as project director, contracting and procurement managers and managers from the design team. A complete profile overview of the respondents with their function and time of involvement in this particular project is provided in Appendix C. An outline of the respondents' distribution among the different parties is given in Figure 13.

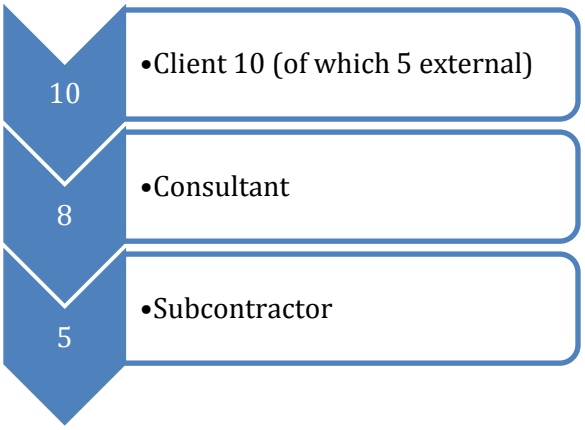


FIGURE 13 PARTICIPANTS DISTRIBUTION AMONG PARTIES

4.4 Interview protocol

The interviews are semi – structured or so-called focused interviews designed to last 20 to 30 minutes depending mainly on the attitude of the interviewees, whether they are willing to share their opinions and in general appear willing to talk. This timeframe is indicative as some of the interviewees showed real eagerness to share their point of view and explain their perspective something that really contributed to the research. This interview format assumes a conversational manner and is up to a certain degree open-ended albeit following a certain set of questions from the protocol (Yin, 1994).

The purpose of the interviews with the different parties aims at having the perspective of each one towards certain aspects of the collaboration along with corroborating certain conclusions drawn from the researcher's observations and involvement in the project (participation at meetings, informal conversations with other team members, review of relevant documentation).

The interview structure used for this research contains a combination of questions and follow – up questions. The former in order to ensure that the main aspects of the research topic are answered, and the latter support the researcher in achieving the right degree of depth, detail, vividness, richness and nuance that is required (Rubin et al., 2005).

The first part of the interview includes an introduction by the researcher to the purpose of the research, the topic investigated and some questions about the interviewee regarding the professional background and their role and degree of involvement in the project. This is done to gain the trust of the interviewee and make them feel comfortable enough to share sensitive information and feelings. To this end the interviewees are also informed that all the data are treated anonymously.

Subsequently the most relevant elements of the collaboration framework are identified and discussed during the interviews; these are communication, trust, information sharing, cultural awareness, integration and success definition. Regarding the question about trust it is not asked explicitly but rather implicitly by asking about elements of a trusting behavior and whether these can be found within the current project. The final part of the interview encourages the interviewee to contemplate whether there are aspects to be amended with regard the current project situation and, if the answer is positive, in what way this could be done. The complete interview protocol is given in Appendix A.

The answering of the RECAP questionnaire always follows the interview. The reason for choosing this sequence is because through the discussions the interviewees have to get in the process of thinking and becoming aware of issues they might otherwise not have spent much time contemplating. In addition the context and environment in which the project is carried out is taken into consideration. Unanswered emails have been an issue in the organization and therefore if a questionnaire would have been mailed without any prior introduction or mention, the probability of receiving no feedback would be very big. Eventually potential bias in the questionnaires (due to having the interviews first) hasn't been noticed and the answers of both methods are in alignment.

5. Data analysis and interpretation

This chapter contains the presentation and analysis of the collected data. In section 5.1 the way the results are going to be analyzed is explained. The analysis is carried out three times in order to analyze all the relationships between the investigated parties in pairs; client – contractor (section 5.2), client – subcontractor (section 5.3) and contractor – subcontractor (section 5.4). Section 0 comprises a summary of all the analyses and the suggestions proposed. In section 5.6 a comparison is made between the results of the questionnaire and the results of the questionnaire from the same type of project carried out for the same client in the Netherlands. This chapter corresponds mainly with the second part of Kolb's cycle (Figure 3) which is reflective observation, analyzing and assessing the obtained information.

5.1 Analysis mode

The findings are evaluated in three pairs; client – contractor (consultant), client – subcontractor, contractor – subcontractor. Firstly, the results from the interviews are examined and analyzed in the following categories (according to the interview protocol):

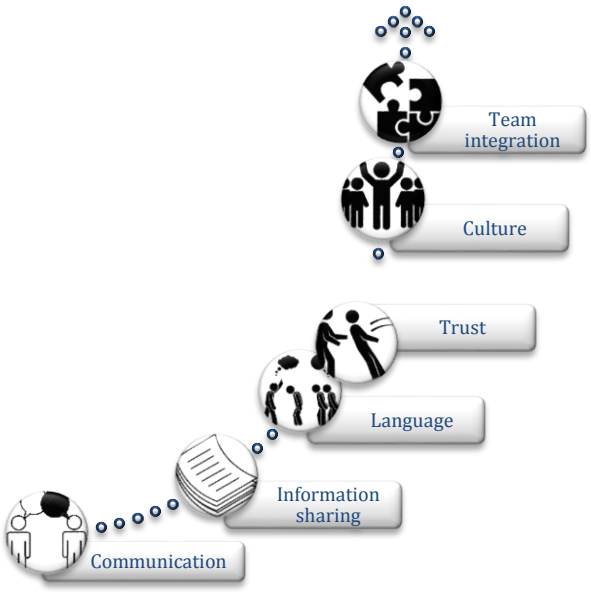


FIGURE 14 INTERVIEW ANALYSIS

Subsequently the results of questionnaires are summarized and analyzed. The convergence of the interviews and the questionnaires is also investigated. As it can be derived from Table 1 the higher a set of sub-criteria scores the better is the perception of the collaboration from the party that provides the corresponding scores.

However, as it is mentioned in the previous chapters what is examined in this research is the extent to which the different parties share the same perception over a certain situation. Therefore the score gaps of the sub-criteria are presented and discussed at each case. The difference in these scores displays potential relationship between dysfunctions and areas that designate significant room for tackling the issues and improving the current situation (Suprapto, 2016).

The assessment criteria are rated on a scale range 1 to 5 according to Table 1.

Score	Explanation
1	Very poor
2	Poor
3	Moderate
4	Good
5	Very good
NA/DK	Not applicable / Do not know

TABLE 1 ASSESSMENT CRITERIA RATING

The criteria are categorized according to Suprapto (2016) in four different clusters which contain a number of sub-criteria as depicted on Table 2.

	Sub-criteria	Factors
1	Front-end definition	**Front – end definition and collaborative practices**
2	Team integration	
3	Joint working processes	
4	Efficiency	**Project performance and relationship continuity**
5	Quality	
6	Satisfaction	
7	Relationship continuity	
8	Senior management commitment	**Relational attitudes**
9	Senior management trust	
10	Established relational norms	
11	Communication	**Inter – teamworking**
12	Coordination	
13	Balanced contribution	
14	Mutual support	
15	Aligned effort	
16	Cohesion	
17	Affective trust	

TABLE 2 ASSESSMENT CRITERIA CATEGORIES

One conclusion drawn from the observations of the researcher prior to conducting the interviews is the fact that every client employee considers the working groups of the contractor and the subcontractor as one team. Consequently the assessments of the client's respondents towards the contractor and subcontractor coincide with some minor differentiations pointed out only during the interviews.

The phrases shown in italic are direct quotes from the interviewees. It should be noticed that the terms consultant and contractor are used interchangeably and the same applies to subcontractor and subconsultant as the interviewees used them in this manner.

5.2 Client to contractor

5.2.1 Interview findings

Communication is assessed as unsatisfactory, hard and *"a challenge"* from the majority of the interviewees. In multiple occasions unanswered emails have been a source of frustration for many project members. Communication is in general unstructured and insufficient. A lot of respondents expressed their discontent over cancelation of meetings *"without any prior notice"* or in some cases having long meetings with no substantial value. Many interviewees emphasized the lack of feedback from the client on their work as a result of inadequate communication, something that when improved, it would ameliorate project performance and bring quicker results. In addition, an absence of *"clear reporting lines"* is perceived as a factor that aggravates the current situation. In general, all the interviewees stated that the communication has had significant progress since the beginning but still is an area *"with room for improvement"*, highlighted particularly by the client's viewpoint.

Likewise sharing of information is perceived as an aspect that needs to be addressed more in the project. Bad information sharing is considered by many as a consequence of insufficient communication. A lot of interviewees indicate that someone *"has to work your way around to get what you want"* and that information sharing is generally unstructured. For people working in small groups this aspect doesn't seem to be much of a problem. On a broader level there is not a proper and organized information management system and data are hard to find as most project members don't know where to look for what they need. Another issue underlined was the balance of verbal and written information. The practice of keeping minutes of meetings is not embedded in the client's business culture and a great deal of information is communicated orally or implied but is not put into written form. The documentation on the other hand of the consultant is sometimes perceived as bit excessive to the client. Every interviewee underlined the need for the set-up of a common information management system that would help in ensuring that *"everybody is on the same page"*. It was nevertheless acknowledged that no party withheld information intentionally, it was rather a mismatch of communication.

Regarding the question whether having English as the project language in a German project there was a dichotomy in the parties' perspectives. From the client's viewpoint on the one hand nearly every interviewee mentioned that are there a lot of misunderstandings and lack of fluency of some German

employees leaves often *"room for multiple interpretations of the same thing".* In addition, some employees *"hesitate to be open in communication"* and *"don't feel comfortable enough"* to share their opinions owing to this difficulty.

The consultant on the other hand has more experience in international projects and perceives the different languages as something that might obstruct some procedures or make some people *"feel lost in some meetings".* This kind of issues are encountered quite often in projects with international context and with some effort from both sides can be resolved.

This element is the most difficult to investigate and interviewees were asked to share their opinions on a number of relationship components that enhance or hinder the development of trustworthiness. Although all the respondents admitted the absence of blame culture, the entire group emphasized that whenever asking for something the reply is always *"I don't know, it's not my responsibility"*. Not assuming responsibility could be linked to unclarity of each person's role within the project team or misalignment between roles and responsibilities especially when it comes to larger working groups.

The consultant's and subcontractor's team members that work mostly in groups of two or three people don't encounter this issue to such an extended degree and this applies too to the client employees that work in these groups. These results are also linked to many changes in the project team, many team members weren't given the opportunity to get to know their partners' way of working or given time to have a smooth transition into the project. In addition, the client's organization hired a lot of external consultants that don't always feel supported by the rest of the client organization resulting mainly from lack of goal and responsibility clarity. On the whole front-end definition and decision making combined with goal setting from client top management is perceived as an aspect that has definitely a lot of room for improvement. Some recommendations are given at the end of this chapter.

Culture has been assessed as having a considerable degree of influence on the project outcome both positively and negatively. The interviewees were asked about their opinion on two levels, culture in business terms (ways of working) and culture in general (mainly German and Dutch).

The project carried out is a construction project which is entirely different from the core business of the client (refinery operation and maintenance). Many of the client's employees cited the difficulty of the organization of having to work in a completely different way than usual and to adapt to new circumstances and procedures. This isn't perceived in a negative manner and many appreciate the learning opportunities provided. However, combined with the pressure exerted on program level some more attention is needed in order to balance the different characteristics of each party. In addition, many people reported a mismatch between the Dutch and German management methodologies applied by the main consultant and client program managers respectively. The client feels the need to adjust the management methods to the project circumstances. Furthermore a remark regarding control was made with opposing views; either that the

client exerted frequently too much control over the work of some parties or that the client gave no feedback or had no interaction with the work of others.

Referring to culture on a broader perspective virtually every project member put the emphasis on the challenge of embedding a change mentality in the client's organization. This feature is also related to the difficulty of upper management to create a sense of urgency for this project, embracing the new conditions that have been formulated is a matter of business survival. The projects are necessary for the financial viability of the refinery facilities. A rather *"old-fashioned mindset"* and a *"stiff organizational structure"* need to be addressed. This is expressed to a great extent by the client's side and the employees who have embraced the need to change recognize that changing a long-embedded mentality in the refinery is a process that requires time.

Finally the hierarchical and stiff organizational client structure opposed to the more flexible and adaptive mentality of the consultant has had a significant impact on relationship management for this project organization. The different perception on hierarchy is an aspect highlighted particularly by the consultant. The German business culture has a more hierarchical mentality which isn't as strong in a Dutch environment. Both parties acknowledge that aspects of both cultures can be used to the advantage of this project if both teams are willing to adapt to the conditions of the project.

Having one true team is one of the client's more highly esteemed values. The interviewees were asked to demonstrate how the team integration has evolved in the course of their time in the project (see Appendix A). Some of project team members don't have sufficient knowledge on the matter as their role is more distant or doesn't require them to be part of a group. The consultant's and subcontractor's teams as mentioned before are perceived as an integrated team from the client. Regarding overall integration a recurring pattern occurred in the majority of the answers. There was a convergence on the fact that all parties have come closer over the last months and developed as an integrated team to a certain extent until a number of incidents one month prior to the interviews. These incidents are related to different perceptions about project management. In addition an observation made multiple times is that the external consultants employed by and working on the client's behalf haven't achieved the desired level of integration with the core organization. Nevertheless it should be highlighted that all the parties express their affirmance and desire that the relationship will continue, and that integration will be higher in the future.

5.2.2 Questionnaire findings

After completing the interviews a questionnaire is handed to the interviewees in which they are asked to rate their view on several aspects of their collaborative relationship in the current project. An overview of the categories is shown in Table 2 and the results of each party are compared graphically in Figure 15. It should be taken into account that this graph presents the client's view against the teams of the contractor and the subcontractor combined as they are seen as one working group by the client's employees.

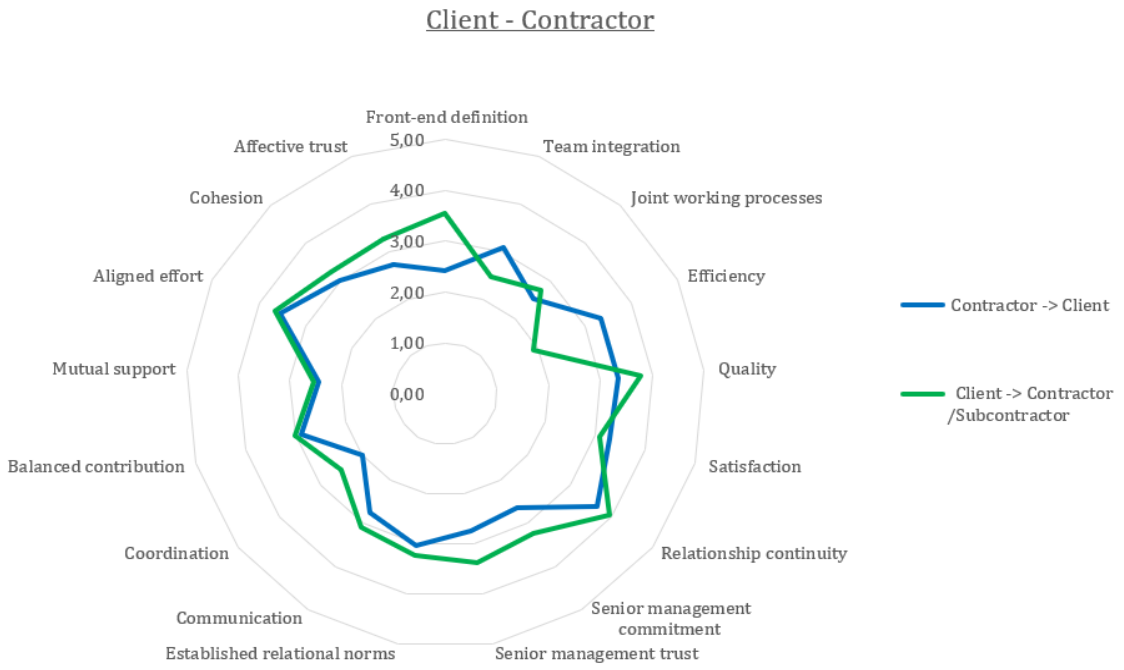


FIGURE 15 SCORE LEVELS CLIENT / CONTRACTOR

The analytical data for each sub-criterion are included in Appendix D. What is of particular interest in this analysis is not only the absolute numerical values per se but the score differences in the perceptions of the client and the contractor against each other. These are depicted in Figure 16. Positive correlation (green) indicates that assessed sub-criterion is perceived better by the client and consequently the client is more satisfied than the contractor or subcontractor about that aspect of their relationship. Vice versa a negative correlation (red) shows that an aspect is viewed less satisfactory by the client compared to the contractor's or subcontractor's opinion. A score value over 3 is considered satisfactory.

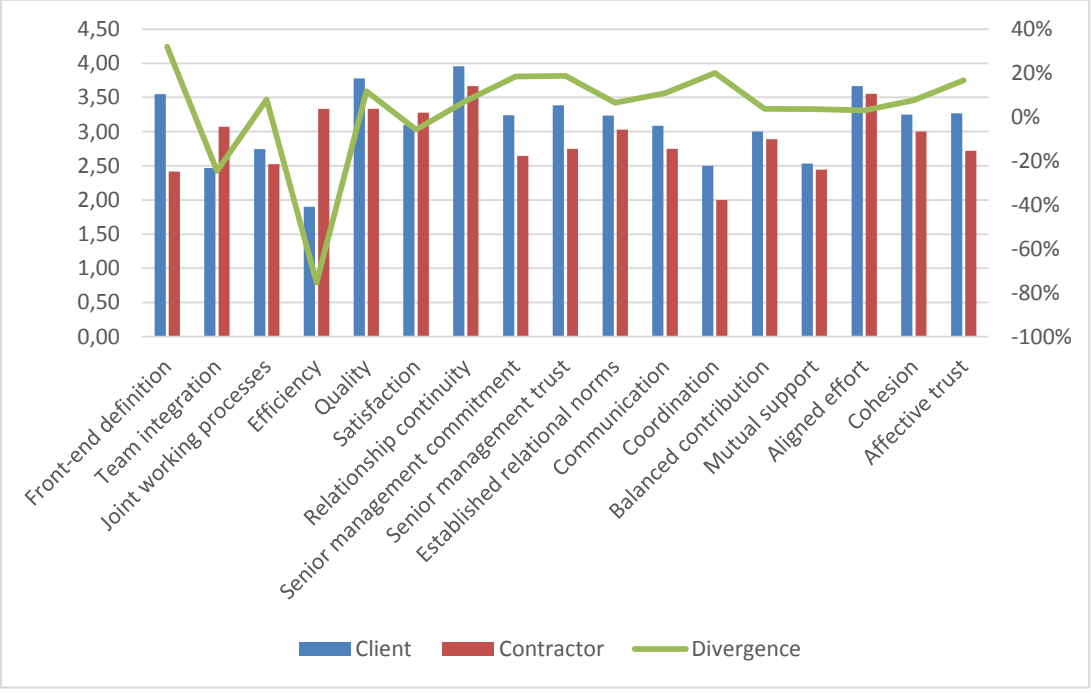


FIGURE 16 SCORE GAPS CLIENT - CONTRACTOR

The answers from the questionnaires align to a large extent with the interview responses. In general, the client has more positive perception of most aspects towards the collaboration than the consultant but the deviations aren't very large. The index with the highest divergence is efficiency but this can be easily explained by the fact that the consultant (and the subcontractor) are performing very well and delivering their projects on time and within budget. The whole portfolio of projects managed by the client on the contrary is not performing very well hence on a higher level the client isn't satisfied but this is attributed as a feedback towards all the projects that the consultant has interfaces with.

The front-end definition has lower scores from the contractor's point of view and especially the criterion regarding *"clear roles and responsibilities assigned to both teams"* scores really low from both parties. One paradox is the score of *"goal setting and alignment meetings with sub-contractors and suppliers"* which is relatively high. This leads to the assumption that on the short-term there are concrete goals but what would improve project performance is a vision on a broader level. Joint working processes also score low for both with the criteria of *"robust mechanisms to resolve conflicts/disputes"* and *"formal procedures for joint decision making"* receiving low scores. The really low scores of overall coordination are in line with many interviews expressing the lack of problem awareness and the results thereof. The overall low team integration can be seen as a reason for these scores. Information quality is also perceived as not sufficient.

Mutual support isn't highly valued by both parties with the criterion *"Every critical decision is made together by both teams"* scoring only 2 out of 5 indicating the need for more joined procedures. However it should be pointed out that both parties appreciate the effort put into the project by each other (aligned effort criterion).

The criterion of affective trust which comprises *"being comfortable to depend on each other"* and *"keeping promises"* is perceived low by both parties showing the need to improve the overall atmosphere of the project. In the category of senior management commitment there is a large gap in the scores concerning *"Senior management shows consistent and passionate leadership".* The client's leadership receives a lower score than the contractor's, a fact that also aligns with the findings from the interviews of all stakeholders. Finally the relationship continuity criterion has a high score expressing the strong desire of both parties to maintain their professional relationship. Satisfaction and quality are elevated from both sides and on the whole the project is performing well.

5.3 Client to Subcontractor

5.3.1 Interview findings

The analysis of the results for the pair of the client and the subcontractor is going to be integrated for the different aspects examined as the members of these two teams didn't have a lot of direct contact. The reason is that the German subcontractor has only a contractual relationship with the consultant (RHDHV) and not with the client. The majority of the subcontractor's employees has been working in smaller teams so their knowledge regarding the collaboration on a broader level is rather limited. In addition as mentioned in the beginning of the chapter the client perceives the consultant and the subcontractor as one team hence the feedback provided for the consultant from client perspective is the same for the subcontractor. However the client and the subcontractor have had a collaborative relationship that has been in place for almost two decades hence there are some areas where the results are somehow differentiated.

Although both sides speak the same language communication isn't as smooth as it would be expected. There are still a lot of misunderstandings that are mainly the result of lack of goal clarity. Absence of feedback is also a concern for the subcontractor though not to the same extent as the consultant. The fact that the two parties have worked together for years and speak the same language makes information management a relatively smooth process. Avoiding assuming responsibility has been reported as one of the project's biggest bottlenecks but as described in the case of the previous pair this is attributed mostly to many changes within the client organization and absence of clear tasks.

Integration with the client is, like in the consultant case, not up to the desired level but this aspect should be examined with precaution as the subcontractor team members work in smaller subgroups. For most respondents, integration with their counterparts from all three parties is satisfactory. Finally the two teams do share the same cultural background but there are differences when it comes to business culture. The subcontractor has shown its willingness to adapt to the consultant's way of working, learn from each other and adhere to different procedures than usual. That is in contrast with the client where having a change mentality is harder to find with the exception of some people within the client organization. Despite the aspects described above which can be improved, both parties are rather satisfied with the quality of work that has been produced so far and see the collaborative relationship expanding for more years

5.3.2 Questionnaire findings

As aforementioned the client and the subcontractor have a collaborative relationship for more than two decades but for this project they aren't contractually related and the client's view towards them is integrated with their view towards the consultant. Hence the analysis presented at the previous part (5.1.2 Questionnaire findings, client to contractor) is also valid for this relationship. Figure 17 shows the graphic presentation of the results and it is noticeable that there is a similar trend as in the client – consultant assessment.

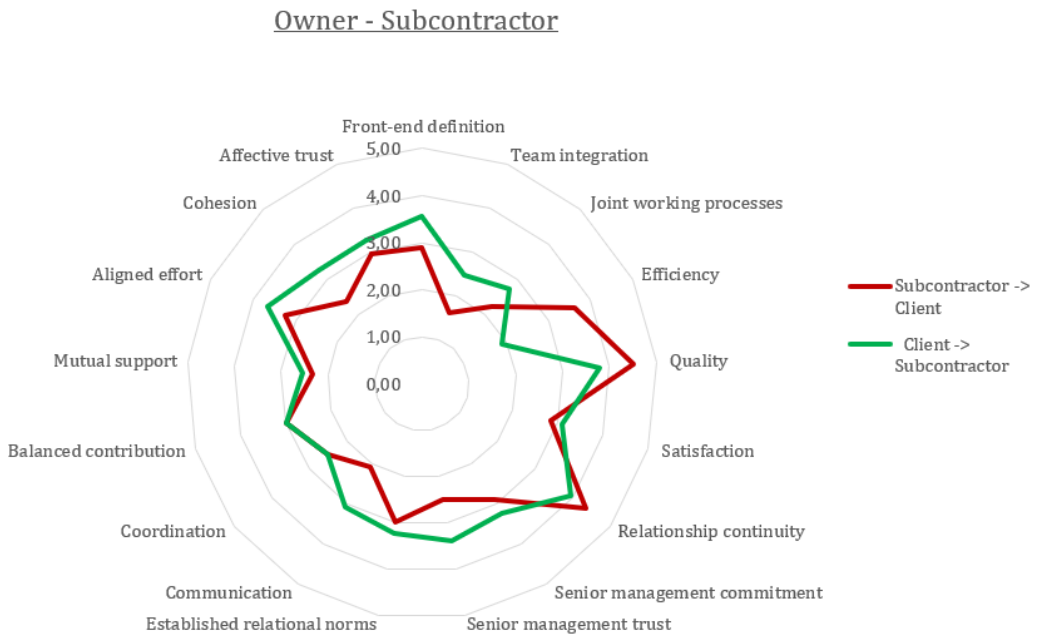


FIGURE 17 SCORE LEVELS CLIENT / SUBCONTRACTOR

In Figure 18 the deviations in the scores between the two parties are analyzed. Efficiency is again the criterion with the biggest gap but as described before this can be attributed to the different interpretation of project performance. Team integration, communication and cohesion present the largest gaps but due to the nature of the parties' relationship the weight they carry shouldn't be considered very big.

Regarding the criteria related to problem solving, they score very low from the subcontractor's perspective as in the case of the contractor (*"robust mechanisms to resolve conflicts/disputes", "formal procedures for joint decision making", "Whenever a problem is detected, it is immediately and honestly communicated to the other team"*). The relationship continuity factor is perceived very well from both sides and aligns with the interview findings along with the fact that parties are content with the quality of the work so far.

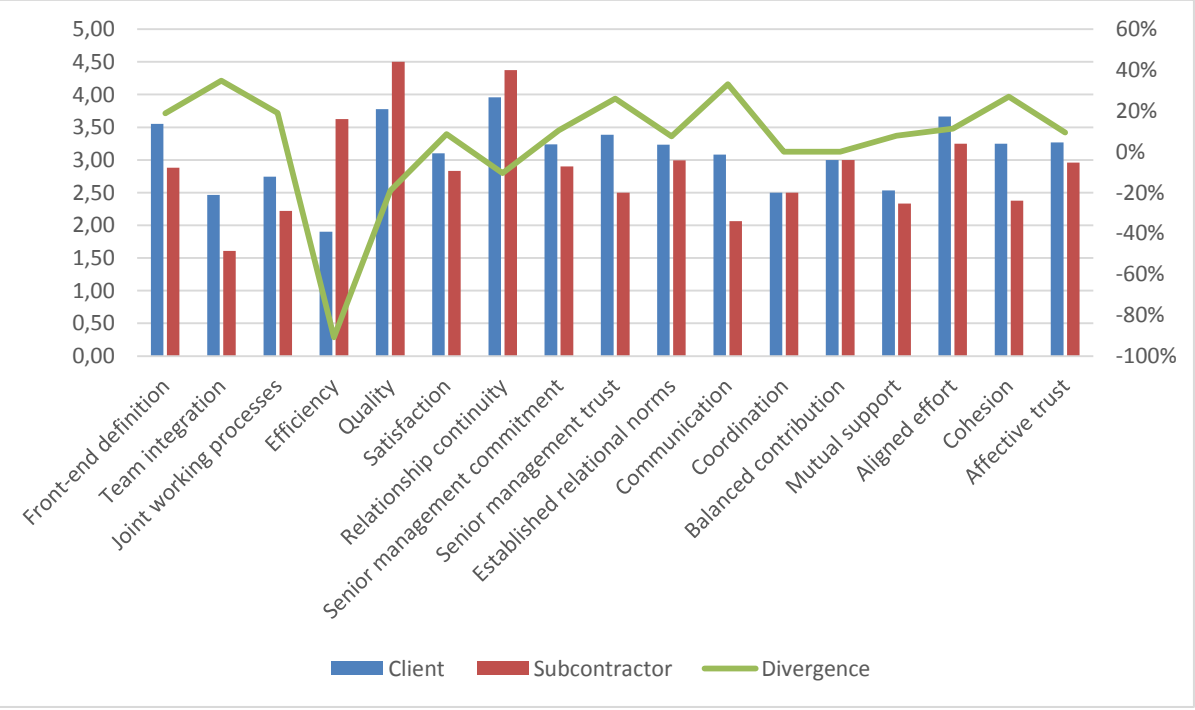


FIGURE 18 SCORE GAPS CLIENT – SUBCONTRACTOR

5.4 Contractor to Subcontractor

5.4.1 Interview findings

Communication between the two parties has been since the beginning very open, honest and transparent. The interviewees have never encountered any difficulties and meetings are always taking place without unexpected cancellations. As mentioned the people from these parties mostly work in pairs or teams of three so it is reasonable to expect less communication issues.

Information sharing like communication is a process that runs smoothly most of the times. The only difference that was highlighted by the interviewees was with regard to documentation. The amount of documentation produced by the consultant is not a method that the subcontractor is familiar with. The same observation was also made by the client organization and is probably related to the importance of oral communication and discussion for the German team members. This is not in any case a major issue and finding an equilibrium is a rather easy task.

The majority of the subcontractor's team stated that it was the first time that they worked in English. However, this has not posed any hindrance on the workflow and whenever there are difficulties both sides show good will to overcome it. From a consultant perspective most team members have some basic understanding of German hence no language issues were reported. Both sides saw this project as a learning opportunity to improve their respective language skills.

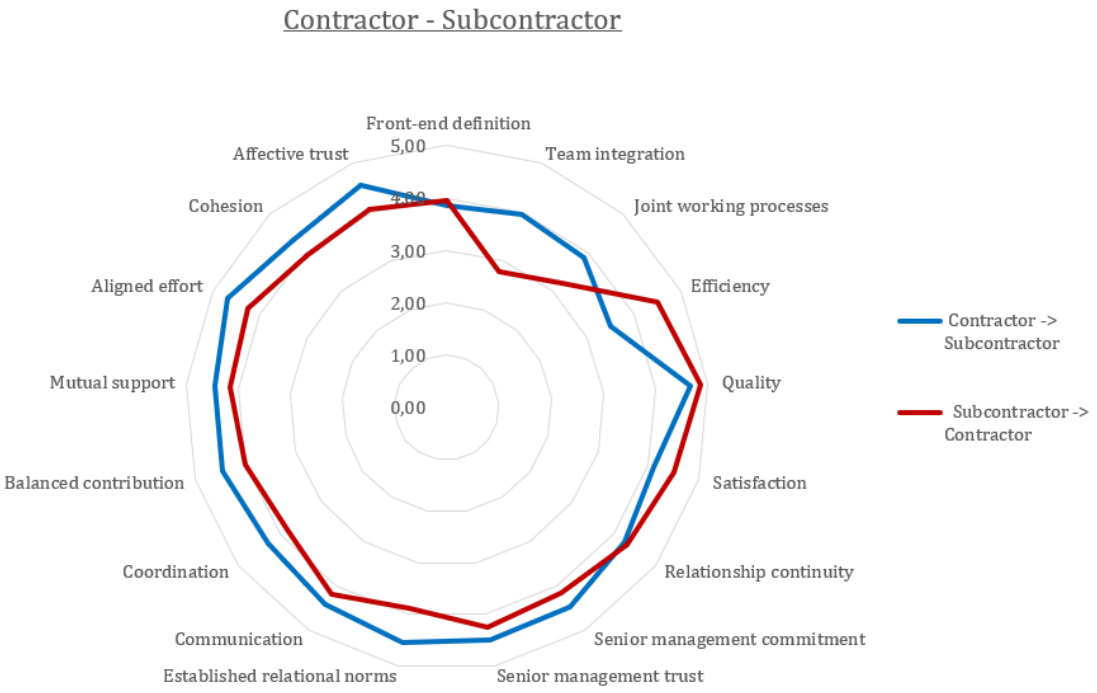
All the interviewees have a really positive attitude regarding the atmosphere between the two parties. Team members from both sides expressed their ability to rely on each other and seek support when it is necessary. The management is also encouraging and supporting the work groups within this cluster and has been very successful in creating an environment of honesty and transparency.

Although the two parties started this endeavor from a different cultural viewpoint they have both learnt to take advantage of the opportunities that such a collaboration has to offer. Especially the subcontractor's team members have embraced the different ways of working that the consultant is implementing and whenever there was a mismatch it was always possible to find a compromising solution.

This aspect has been perceived as the most positive feature of this collaborative relationship from all the parties involved in the project. The two teams work in a completely integrated way and this is confirmed too by the client who don't differentiate between the two (consultant and subcontractor) when sharing their opinion on them.

5.4.2 Questionnaire findings

The graph in Figure 19 confirms the interview findings for this pair of parties and it is not hard to recognize



the difference of these scores when compared with the evaluations towards the client. All categories are scored very high (more than four out of five). The team integration is the only factor that doesn't score very high from a subcontractor perspective, but this can be attributed to the very low scores of two indexes that should have been marked as not applicable instead of being given a low score (inter-team building workshops, recognition and reward programs). With the exception of these all the other factors of team integration score very high.

In Figure 20 the score gaps have been estimated and the divergences calculated are negligible (less than 10% for most categories). Satisfaction and relationship continuity are very high from both parties' perspectives as is the case for mutual support which is in contrast when compared to the support received by the client's teams and management. It should be highlighted that the criteria concerning senior management trust and commitment present particularly high ratings. This aspect was mentioned from several interviewees and it is considered that the effort put by the managers of these two subgroups is reflected entirely in the truly integrated team that has come out of this process. The client's perception of this pair as one team also confirms the findings from this questionnaire.

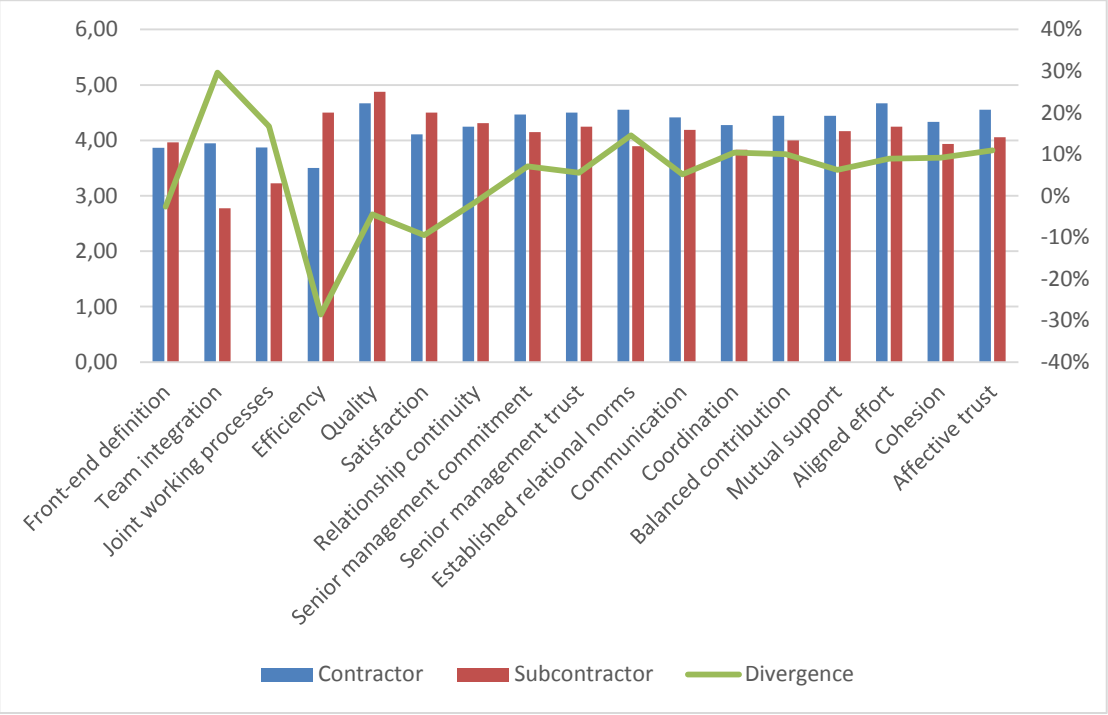


FIGURE 20 SCORE GAPS CONTRACTOR - SUBCONTRACTOR

5.5 Conclusion of findings and suggestions

In this part of the chapter some more general observations of all parties are described along with the suggestions made from all respondents that would help in creating better circumstances for carrying out the project. There are some recurring patterns in the suggestions and a convergence in the answers provided.

Firstly almost all the interviewees admitted that this project has offered them a lot of learning opportunities. The most mentioned was improving language skills, mostly English for the German teams. Having an international working environment also allowed the acquaintance with some new cultures and mentalities.

On a professional level the fact that the project nature was different from the core business of the refinery has offered many employees the chance to grow professionally, work with a variety of disciplines and expand their professional portfolio.

It should be highlighted that the performance of the projects which the contractor and the subcontractor are carrying out is very good and this is also verified by the desire of all parties to continue their collaboration. The examined aspects are the ones that if addressed they would allow the parties to fully take advantage of each party's capabilities and overal partnership potential. The interviews put more emphasis on the areas that have room for improvement in order to verify whether all the parties recognize the source of the project's bottlenecks. Culture and the need for a mentality change have been acknowledged as the main impediements in this procedure.

Regarding suggestions one phrase was mentioned by every single interviewee and that was to have *"less changes and a clear vision"* which require in turn a better understanding of the scope so that people are motivated to perform. A prerequisite to achieve this aim is to have a management organization on top that is more supportive to the project members not by exerting control but by showing them the need to change and the benefits that come with embracing the new status quo. When people are ready to accept change it is also easier to become more adaptive to new procedures.

An improved project governance was also a recurring pattern in the answers of the client's external consultants and of the consultant (RHDHV) as it would enable every team member to know what responsibilities are assigned to them and which people they can respond too. Ameliorating communication and information sharing are also indicated by many of the respondents as critical for the project continuation. An earlier problem awareness would also help in maintaining a better workflow as pointed out by the client. Finally a better integration is desired by all three project parties as continuing the collaborative relationship that has been developed is in the interest of all the involved stakeholders.

In Figure 21 the overall scores of client assessing the consultant/subcontractor and vice versa are shown and a conclusion that can be drawn is that the patterns in the answers of the three parties align to a great extent with the exception of team integration and efficiency. The quality criterion isn't very relevant for this research because like efficiency it is referring to different projects depending which party assesses it and has thus a room for different interpretations. The team integration scores can also be explained by the fact that many of the respondents worked on teams of two or three people hence having a more holistic view on overall team integration can be biased. It is safer to extract information about this aspect either by the interviews or by looking at specific sub-criteria of this category that are more objective.

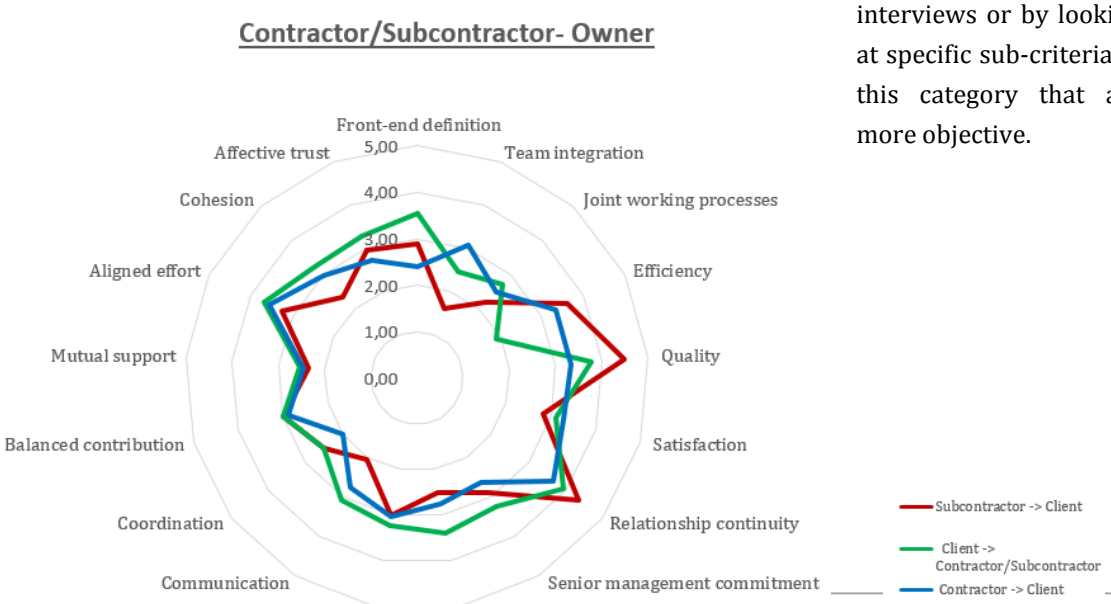


FIGURE 21 OVERALL SCORES

Altogether combining the insights from the interviews and the responses of the questionnaires the conclusion can be drawn that the different cultures represented by the project teams have played a pivotal role in the relationship development. The perception of the client and the consultant as to what really constitutes a proper organizational structure and what kind of project management and people are suitable for the different levels of the organization pyramid are the root of many issues that hindered a fully successful collaboration. This mismatch was not considered to the appropriate degree and lead to a series of incidents as mentioned a month before the research.

The lack of change mentality in the client which stems from the overall business culture of the core organization has had a considerable influence on the outcome. However the maintenance of the relationship is favored by all parties. In order to achieve this there is a need for goal alignment and joint decision making by all the involved stakeholders. The client's organization has to stimulate its employees to realize the benefits that the project can bring in their organization's operation and contribute in making the company future – proof in the long term.

The suggestions can be roughly categorized in two levels of management.

1. Strategic: The higher level refers to the strategy that should be formulated mainly by the client organization in order to effectuate an improved team performance.

2. Operational: The second level tackles issues that would contribute to an improvement of aspects which facilitate daily operations. Without the approach on strategic level, addressing the second part of the suggestions wouldn't take the major bottlenecks away from the project.

The suggestions are illustrated in Figure 22.

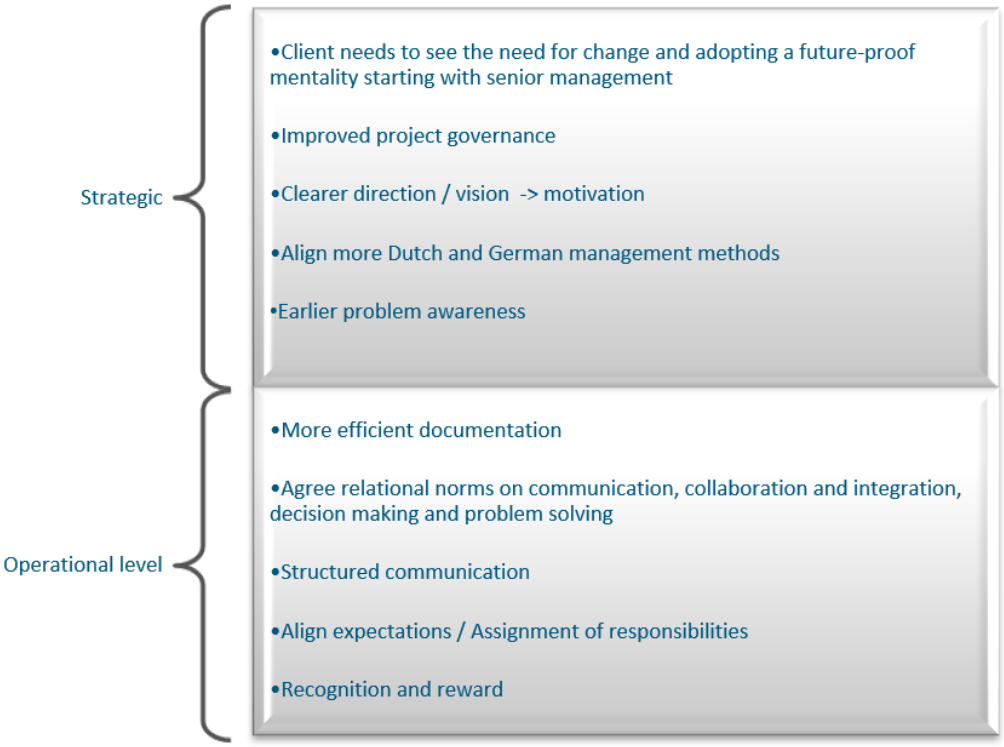


FIGURE 22 SUGGESTIONS PROPOSED FROM RESPONDENTS

5.6 Comparison with similar project in the Netherlands

As mentioned in the beginning a similar project (design and construction of a Central Control Room of the refinery) has also taken place in the client's facilities in the city of Rotterdam in the Netherlands. In this project the consultant (RHDHV) is leading the design and supporting the execution of the actual construction of the building with its installations. In the premises of an internship a student looked into the usefulness and applicability of the RECAP questionnaire with the goal of improving the relations between the client and the various contractors of the project (Tarazona, 2019). The results are illustrated in Figure 23. One main difference in comparison to the German project is the fact that in the Dutch branch of the client the contractor and the client organization share a long-term working relationship.

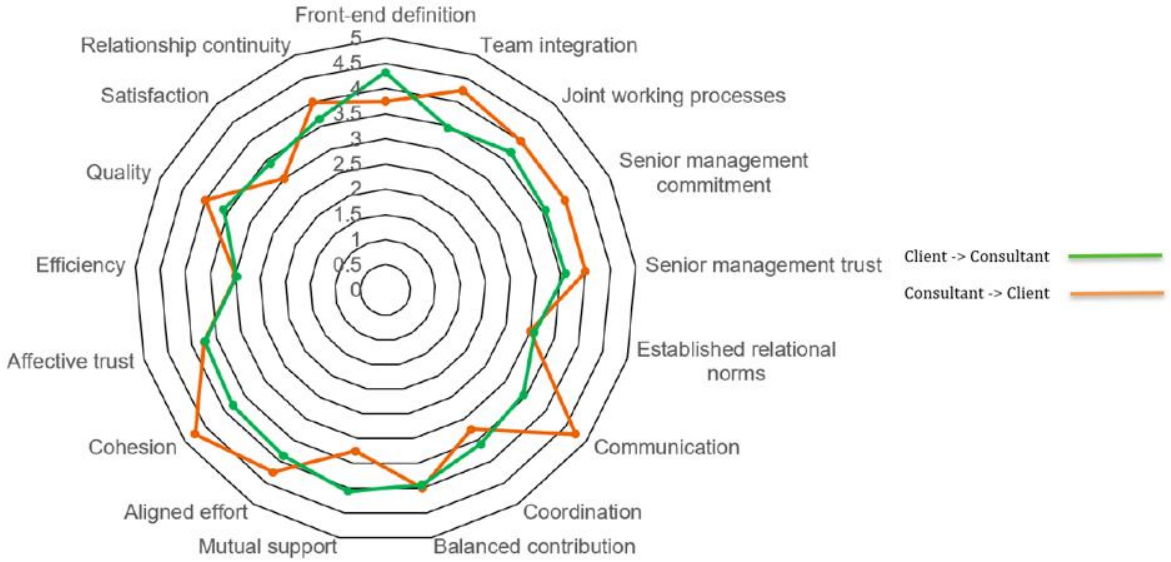


FIGURE 23 CLIENT - CONTRACTOR SCORES IN DUTCH PROJECT

One striking contrast with the results of the German project is the much higher team integration and cohesion scores proving the different team atmosphere between the two projects. Efficiency is also a factor that performs differently as in the Netherlands the respondent's view on this aspect are in complete alignment whereas in Germany it was the category with the highest divergence. Furthermore the senior management trust and commitment are two components that are appraised better in the Dutch project as do joint working processes. The scores on the criteria of senior management are remarkably high (more than 4) not only in the case of the consultant (RHDHV) but also for the rest of the contractors and consultants that participated in the project.

Although no interviews were conducted to provide more insight into the results of the Dutch project there were discussions done with employees of RHDHV who took part in both projects. They mentioned the commitment from top management and a clear vision as a critical success factor for the Dutch project. Moreover the culture in Germany has had an important impact on certain areas, this aspect was especially highlighted by people working on both projects. It is vital for the future implementation of the project plans that the German team becomes more open to new ways of working and demonstrate willingness to implement these new processes.

On the whole, the consultant's perception of the Dutch project is more positive than the client's perception, the reverse of what was observed in Germany and almost all the criteria score higher in the project in the Netherlands than in Germany. The client organization uses the same procedures for every project carried out around the world hence some lessons can be drawn from the Dutch project that could be utilized in the German project. Nevertheless each project is a unique endeavor and has some features inherent to it that cannot be found in similar situations.

In this case it is the mentality of the core organization and not discussing how to align the different cultures that played a significant role on the project outcome. A successful collaboration between two parties in one country doesn't automatically imply a successful outcome when the same parties are working in a different

country and consequently cultural environment. Putting more effort into team building during the front -end development could significantly enhance the project performance in the later stages.

6. Synthesis

In this chapter the findings of the case study analysis are linked to the success factors from the theoretical framework and translated into a collaboration model that can be included in the EPCM (Engineering, Procurement and Construction Management) manual of Royal HaskoningDHV. In section 6.1 the success factors from the theoretical framework that are most relevant to the results from the interviews and questionnaires as well as the suggestions proposed are identified and discussed. In section 6.2 some steps are proposed that could be included in the project start – up process of RHDHV. In section 6.3 the feasibility and appropriateness of the proposed steps are validated through experts. This chapter corresponds to the

third part of Kolb's cycle (Figure 3) which comprises the conceptualization phase, creating new concepts based on learnings from experience.

6.1 Relevant success factors

The findings of the case study are linked to the success factors for project performance from the literature review. In the third chapter a theoretical framework is proposed in which critical success factors for project performance are identified mainly according to Bosch-Rekveldt et al. (2018) and Chan et al. (2006). The most relevant factors for the case study are selected and analyzed in order to investigate how they can be reached through the proposed collaboration model.

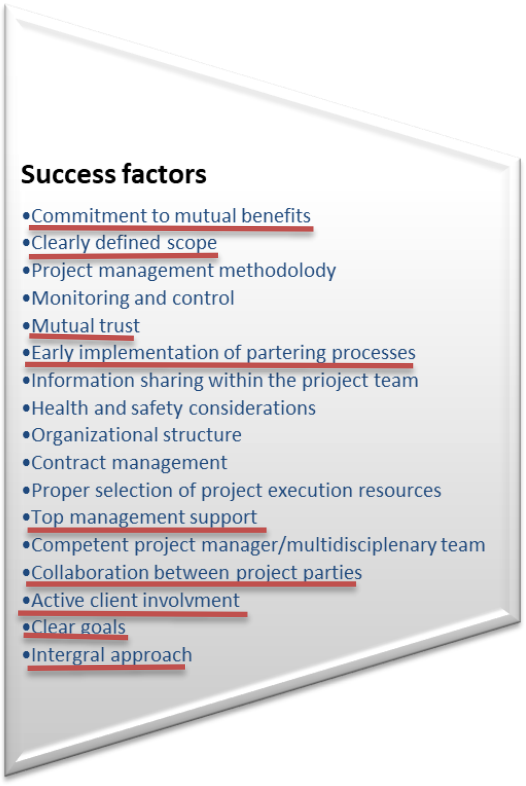


FIGURE 24 RELEVANT SUCCESS FACTORS FROM THEORETICAL FRAMEWORK

Combining the findings from paragraphs 0 and 5.6 there are some patterns derived from the results and suggestions that can be linked to certain success factors for project performance. The factors are shown in Figure 25. The influence that can be exerted on these success factors during the front – end development phase is investigated in the following paragraphs. These factors are further analyzed so that the model that will be proposed will put the focus on those factors.

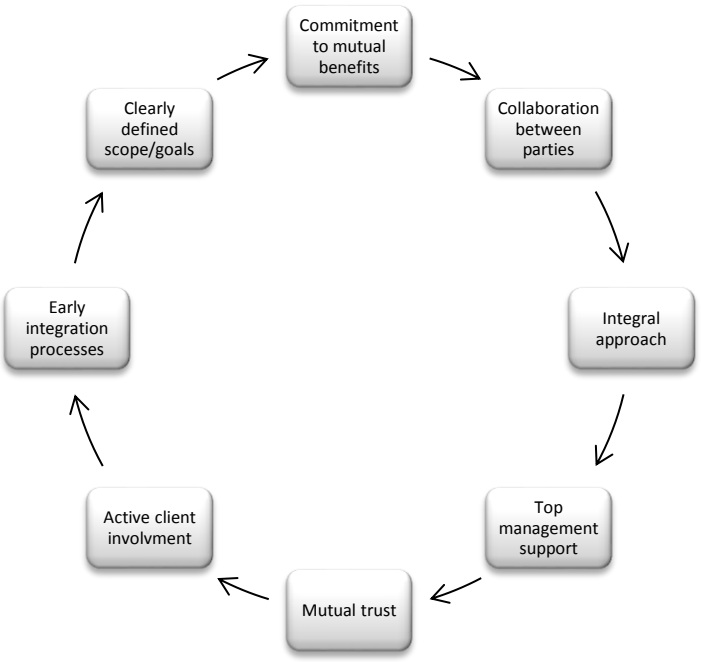


FIGURE 25 SUCCESS FACTORS FOR TEAM COLLABORATION

The majority of the project participants put the emphasis on having a clear vision and goal alignment something that can also help the project team members to be more motivated in taking their responsibilities. A strong top management support would also enhance the commitment of the different project participants by helping their team members in grasping the benefits that a partnership agreement can bring and thus embracing some new ways of working if required. Having more feedback and involvement from the client was also accentuated by many interviewees as a significant aspect missing from the project. All the partners in the project perceived team integration as a key characteristic of such capital projects hence applying partnering processes during the front – end development phase could mitigate some conflicts originating from different cultural or business mentalities and favor the development of a trusting atmosphere. The low scores of established relational norms from the questionnaires also suggest the need to establish some agreements as to how the collaborative relationship can work for the parties at each project.

In the subsequent part of this paragraph the relevant success factors from the third part of the theoretical framework (Figure 24) are discussed and compared to the theoretical conditions. This analysis will determine the input for the collaboration model proposed in the next paragraph by proposing steps that can positively influence these factors in the project start – up phase.

6.1.1 Analysis of success factors

Commitment to mutual benefits

Many interviewees mentioned the reduced motivation of some project members from the client organization to commit to the project. They lacked eagerness to "step out of their comfort zone" and work

together with new partners in a project that would create a new working environment. The advantages of working with parties that have experience in similar projects weren't always taken into consideration by the client organization. Encountering uneven commitment levels amongst the project participants is a common challenge in partnering endeavors and can lead to reduced motivation (Chan et al., 2006). Adopting a win - win attitude by establishing together common goals and ways of working could enhance the focus on mutual earnings. According to Chan et al. (2003a) in building commitment during a project, parties should also establish some ground rules for the project process that would facilitate this part of the project.

Clearly defined scope/ Clear goals

Having a clearly defined scope and goals is a prevalent feature of a partnering agreement (Verdecho et al., 2012) that is often mentioned as missing from the project. This aspect is not so much related to milestones and short- or mid- term goal setting but rather to the question what the vision of this project in a broader perspective is. A misalignment of personal goals with project goals is not a rare phenomenon (Chan et al., 2006), therefore the teams should strive for establishing together some common grounds on this aspect. Having a single team focus on goals and objectives is considered as one of the most important indicators for team integration (Che Ibrahim et al., 2015). The definition itself of an integrated team according to Suprapto (2016) entails the existence of one team that places the focus on a common goal (on strategic level) and common project objectives (on operational level). Adopting a joint vision is classified by Verdecho et al. (2012) as one of the most critical success factors relating to the strategic aspects of a collaborative relationship and is suggested by every interviewee as the most necessary requirement for the project.

Mutual trust

Trust can be demonstrated in various ways in a relationship and when developed by all parties it can significantly contribute to joint learning from collaborative problem-solving activities (Davis et al., 2011). Combining an early formation of integrative work practices, open communication and early and clear role expectations contributes to development of trust during the front – end development phase of projects (Buvik et al., 2015). Absence of clear roles in the examined project combined with unwillingness to take responsibilities influenced negatively the development of trust within the team. Although no blame culture was adopted many participants felt uncomfortable relying on their partners for help. Many interviewees mentioned also the importance of working together at common offices and frequent interaction as an important aspect which nevertheless wasn't itself sufficient for the development of trust when not accompanied by the willingness of project participants to ''unlearn'' behaviors and learn to work within a partnering agreement (Laan et al., 2011).

Early implementation of integration processes

As highlighted by many interviewees if some effort would have been put earlier in the project to enhance integration earlier in the project, project performance might be similar but the relationships and workflow in general could have run smoother (with regard to communication and information exchange for example). One obstacle in this process was undoubtedly having a lot of changes in the project team. These changes resulted in having to go through the group development phases multiple times in the project according to Tuckman's model (Tuckman, 1965). Allocating resources for team integration during the first stages of a project for implementation of partnering processes is one of the most critical success factors according to Chan et al. (2006). Furthermore, involving the operations people early on in the project increases efficiency in decision making (Bosch-Rekveldt et al., 2011).

Top management support

This aspect was one of the two main areas (together with clear vision) mentioned by interviewees as an integral part of successful collaboration that could be improved. The commitment of senior management is of vital importance in the process of coordination and empowerment in integrated project teams. Especially when the project (as in the examined case) necessitates embracing changes and adapting new ways of working top management' s support and enthusiasm are vital in generating and sustaining those changes (Moore et al., 2001). Otherwise programs that involve cultural change are prone to failure since managers often presume "that the need for change and the direction it should take, once articulated and specified, simply will be taken as given" (Bresnen et al., 2000b).

Active client involvement

Receiving more feedback from the client was emphasized as a key aspect of the relationship that had room for improvement. Client commitment is considered as a significant exogenous factor and the willingness of clients to accept that it is best value and not cost minimization that constitute a more effective and efficient way of achieving project goals is paramount (Beach et al., 2005). In addition the client's top management has an important role, as mentioned in the previous paragraph, in embedding the need for change in their organizations.

Collaboration between project parties

Successfully managing parties with different backgrounds, incentives and mentalities is not just a matter of putting the teams on the same working site. As pointed out by project participants contractors are used to working with multiple parties on different projects but the same condition doesn't always apply for the client. Interfacing with client's internal teams (Suprapto, 2016) was one of the biggest challenges therefore more involvement and integration from the client early on in the project could allow for maximum partnership performance. Attention should be given to the use of tools such as incentives and team-building activities that facilitate development of trust while at the same shedding light on behavioral and cultural aspects of relationship (Bygballe et al., 2010).

Integral approach

Having a more integral approach and looking at the project from a broader perspective is essential. A lot of interviewees mentioned focus on the short – term goals and difficulties on the project thereby missing the opportunities that the project will bring in the long - term. Therefore looking at the bigger picture is needed and including informal aspects of relationship development strongly complement the use of formal tools in keeping the team focused at the same goal (Bygballe et al., 2010). Developing the appropriate culture and adopting the appropriate behaviors isn't independent of systems and process that are put in place to support and reinforce the partnership (Izam Ibrahim et al., 2013).

Looking at the different success factors for project performance it is apparent that most of them relate to the so – called soft side of project management. According to Unterhitzenberger et al. (2019) human-related factors followed by management actions have a primary role in project performance.

6.1.2 Stages of group development

When a group of people is assembled and put together to work as a team there are certain stages with regard to the behavior of the team members as the development process evolves. According to Tuckman (1965) going through these stages is essential and inevitable so that the team grows and becomes efficient in delivering results. These stages are forming, storming, norming and performing and are illustrated in Figure 26.

In the subsequent paragraph some steps will be proposed that can be incorporated in the project start – up phase to enhance the accomplishment of the success factors analyzed. These steps put the emphasis on the forming and storming phases of group development. However team building is a continuous process hence frequently assessing the way the team develops and focusing on continuous improvement is necessary for a successful implementation of partnering (Cowan et al., 1992). These evaluations of the project team's effectiveness can be either formal or informal and aim at increasing team performance and thus the likelihood of meeting project objectives (Project Management Institute, 2017).

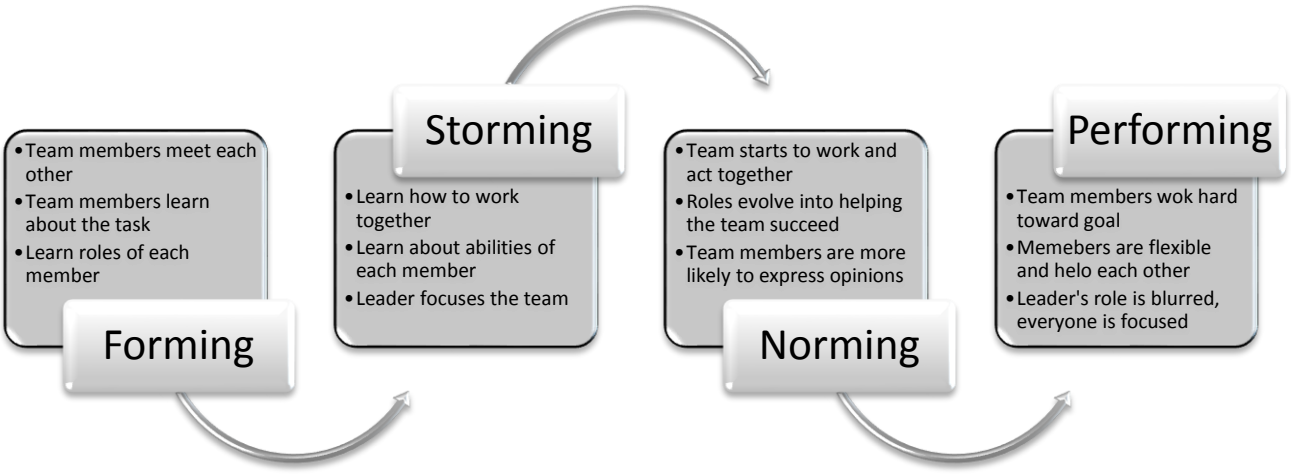


FIGURE 26 STAGES OF GROUP DEVELOPMENT (TUCKMAN, 1965)

6.2 Collaboration model

Royal HaskoningDHV has a manual for project managers that aims at providing a guideline and a framework for setting up and carrying out a project effectively and efficiently. This manual is called the EPMC (Engineering, Procurement and Construction management) manual and comprises a practical toolkit that could be used as a reference by all project managers within Royal HaskoningDHV. The first step contains the acquisition stage, submitting a proposal and winning the contract for a project. After obtaining the contract for a project the subsequent step is to appoint a project manager that will establish a project team, determine a time schedule and define how the project will be executed. In order to facilitate efficient and effective project execution the project manager prepares and finalizes a project execution plan that is shared with rest of the project parties. The procedure includes a number of steps that are illustrated in Figure 27.

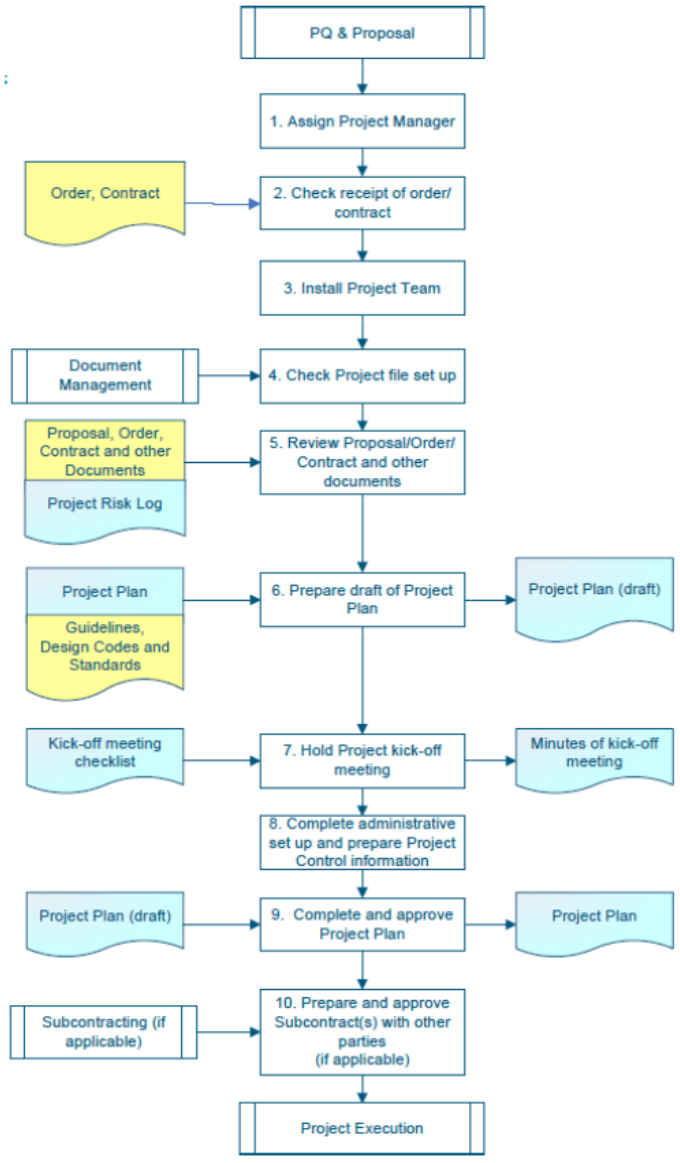


FIGURE 27 PROJECT START - UP FLOWCHART (RHDHV)

6.2.1 Partnering and team – building

Enhancing and promoting team – building in the early stages of project development entails multiple benefits for project performance (Bresnen et al., 2000b). The project execution plan provides the means for consistent alignment of internal and external stakeholders, but it places the emphasis on the rather tangible results such as milestones but not on the intangible aspects such as relational norms. The client is usually asked to provide an input for the plan but team members from the client side aren't always present in the process. The same applies for most project team members as it is often one team member that drafts the plan asking from the rest of the project participants an input for the part they are responsible for. What is needed in the EPCM manual is the means to making a true team and building a team that is capable of working towards a common goal ensuring at the same time that they have the necessary information to take action without constant direction from supervisors or people in managerial positions (Nicholas et al., 2017).

It is suggested to include one more step in the process before the official kick – off meeting where the project team focuses on what is the vision that is to be reached with this project and how the team members can work together in order to realize this vision. This can be implemented by means of a partnering working session which will take place before the official kick – off meeting or be the first part thereof as shown in Figure 29.

In this session the attendees should come (to the degree that this is feasible) from all parties that work together on the partnership and especially from the client. As aforementioned early client involvement holds an important role for project success. The outcome of this process should be a partnering charter, one single page that describes the kind of commitment to be achieved and establishes team values, agreements and operating guidelines (Project Management Institute, 2017).

This charter has no legal significance but a rather symbolic function; it represents a commitment to the principles of partnering by reinforcing individual commitment, providing a superordinate goal for all the parties and thereby enhancing project ownership (Cowan et al., 1992). Similar processes are proposed by Bresnen et al. (2000a) where the agreement of charters or mission statements are suggested as a significant outcome of a teambuilding workshop. A more detailed description of what should be contained on the charter as well as a template can be found in Appendix E.

The objective of this step is to form a cohesive, cooperative project management team with a single set of objectives that develops a joint commitment for timely identification, discussion, and resolution of issues involved in completing the project (Cowan et al., 1992). Nevertheless, having new people entering the team is a rather common phenomenon. Thus, the charter may need to be updated to reflect changes to agreed – upon team operating guidelines as a result of team development. Team building is undoubtedly essential during the initial stages of a project, it should however be perceived as a continuous process. Changes in projects' environment are inevitable and to manage them effectively a continuous team – building effort shall be applied. (Project Management Institute, 2017).

6.2.2 Influence on success factors

Adding this step in the front - end development phase can have an influence on the project performance success factors that were analysed in the previous section. Firstly, incorporating this process in the project front - end (start-up) development phase before or in parallel with the official kick – off meeting constitutes an implementation of partnering processes early on in the project that encourages respectively early onset of team integration. Moreover, if it is the project manager that leads the procedure, support and commitment from senior management can have a significant role. Translating partnering agreements on

senior level into effective working relationships can be a hard task. Having the managers leading the working session this task can be a facilitator in this process.

Discussing about the goals of each party, aligning their ambitions and expectations has multiple impacts on the project. The different project parties have the chance to collectively formulate a vision for the project that harmonizes the goals of all the stakeholders. This aspect can be supplemented by having the attendees design a project logo that illustrates their vision. In this manner the commitment of the project members can start to build up from the front – end development phase. Team members jointly discuss about their objectives and in what way these can be aligned so that each fraction has an input on the vision statement as well as the logo. It is therefore very likely that people be will more inclined to commit to a vision that they have taken part in putting together.

Involving the client in this process is essential as it would help achieving a better interface with the client's team. In addition, formulating the vision together with the client will help in realizing that delivering on cost and time are often as important as delivering a product with the best value. The best value of the project is expressed through the mission statement.

Agreeing on norms (or ground rules) as to how the project can be carried out as well as ways to resolve issues has a substantial influence on the overall team collaboration development between the various project parties. Establishing rules with regard to communication, collaboration, decision – making and problem solving enables the team members to start developing a relationship and makes them aware of relationship aspects that might come up and how to solve them. In case there are people from different cultures discussing upfront the view of each party in relation to a certain aspect might help an easier transition into a common working team (for example when a decision has to be made, is it done individually or collectively).

This step, in combination with selecting the core values that represent the project participants, promotes the development of a trusting atmosphere within the project team. Because even without having started with the actual work, relationships have started to develop, and people have already discussed about how to handle issues once they arise.

Ultimately by incorporating this step in the project start – up phase the company has a more integral approach on the whole project as it puts the focus not only on the so – called hard (tangible) aspects of project management (budget, resources) but also on the soft (relational) aspects of management.

6.2.3 Intervision

Project managers should continually monitor the team functionality and performance to determine if any additional actions are needed to prevent or correct various team problems (Project Management Institute, 2017). In order to accomplish this it is recommended to add the use of the RECAP tool or a similar evaluation procedure in the projects as the project transitions from one stage (phase) to the next one. Having intervision sessions in which the team members communicate the problems they are aware of and try to communicate them with the rest of the team in a rational way could be implemented (Groeben et al., 2000). Applying this tool provides a useful overview to the project manager with regard to the extent that the agreements made in the beginning are kept as the project progresses in the next phases. Moreover reflecting on the problematic elements of the project motivates within a group people to come up with possible solutions (Groeben et al., 2000)

Setting the stage for successful project implementation is critical. Applying mechanisms such as joint evaluation and continuous improvement (Cowan et al., 1992) have the same degree of importance in

ensuring that the problems regarding relationship development are timely recognized and if possible dealt with. Moreover formal or informal assessment of the project team's effectiveness can positively influence team performance and increase the likelihood of meeting project objectives (Project Management Institute, 2017).

6.3 Model Validation

In order to check the feasibility and appropriateness of incorporating these steps in the processes of Royal HaskoningDHV interviews were conducted with three experts from the company. The validation protocol can be found in Appendix F.

Altogether all the experts were positive with the idea of putting more emphasis on team – building during the first stages of a project. Using a kind of assessment that enables the project manager to get an insight into the perspective of each party is also well perceived.

As far as the need for incorporating these additional steps is concerned, everyone unanimously stated that focusing on jointly planning the journey of each project with all the involved parties is crucial for project performance. Especially in the case where teams involve members from multiple disciplines who have different perceptions on how to do things, drawing attention to the process during the initial stages can enhance team collaboration. In addition, agreeing on a joint vision and common ground rules how to reach to the final destination gives team members the feeling that "they own the process". In doing so people can commit earlier in the project and feel motivated to put their best efforts in achieving results. Moreover the importance of assuming a role within a project and living up to the requirements that this role entails is considered of vital importance. One of the experts suggested this process as an intermediate step in adopting an overall lean approach in projects. Teams should be empowered and have the ability to perform without the need of constant guidance or seek for approval from the project managers.

Two of the experts highlighted the importance of the client is business case when formulating a vision or stating the ultimate project goal. Goals on personal (team members) and professional (company) level are important but eventually it is the client's requirements, desires and satisfaction that should be given precedence in the vision statement. This is underlined as the clients are often not present during the front – end development phase of projects (they get more involved usually in the execution phase).

With regard to who should be responsible for facilitating the team – building processes all the experts agreed that it is the project manager's responsibly in implementing the steps proposed. In this way the project managers also get into the process of thinking why team – building should be enhanced and get the opportunity to internalize the process. It is suggested in case of large projects to have an external person that will facilitate a workshop, especially in projects that will be extending over a longer period of time (for example two years). Providing coaching for professionals who don't have the necessary experience or familiarity with team – building within projects is also recommended.

Concerning the usefulness of the RECAP tool in the process, it is appreciated as a practical way of monitoring the partnership progress, as a means of gaining "a collaborative insight". The length of the questionnaire is criticized by some respondents who propose that adjusting the format would make its utilization feasible. One of the experts suggested making a summary that describes each of the seventeen sub- criteria and have the team members rate them and discuss the results during a meeting. Another expert suggested including a

shorter assessment more frequently in the process and not just when the project transitions from one stage to the next one (on a monthly basis for example). Keeping the evaluation simple and short is accentuated by all experts as it would make more people inclined to add these steps in their project management routines.

In Figure 28 the process of incorporating the team assessment through the project development is illustrated.

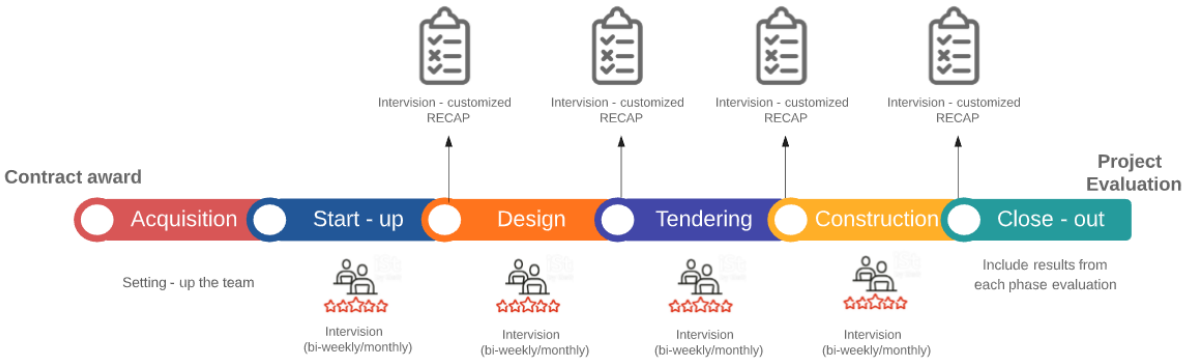
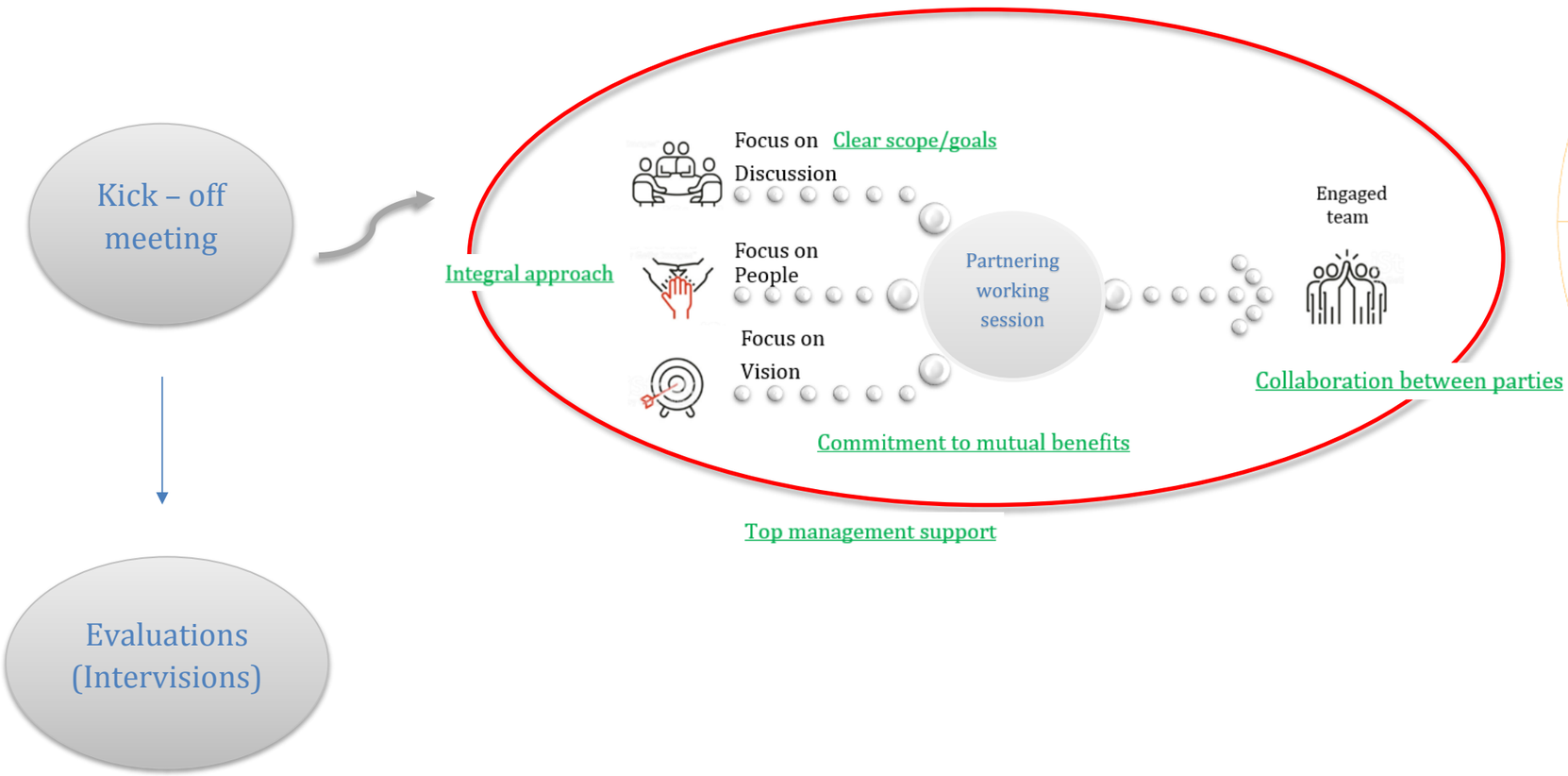


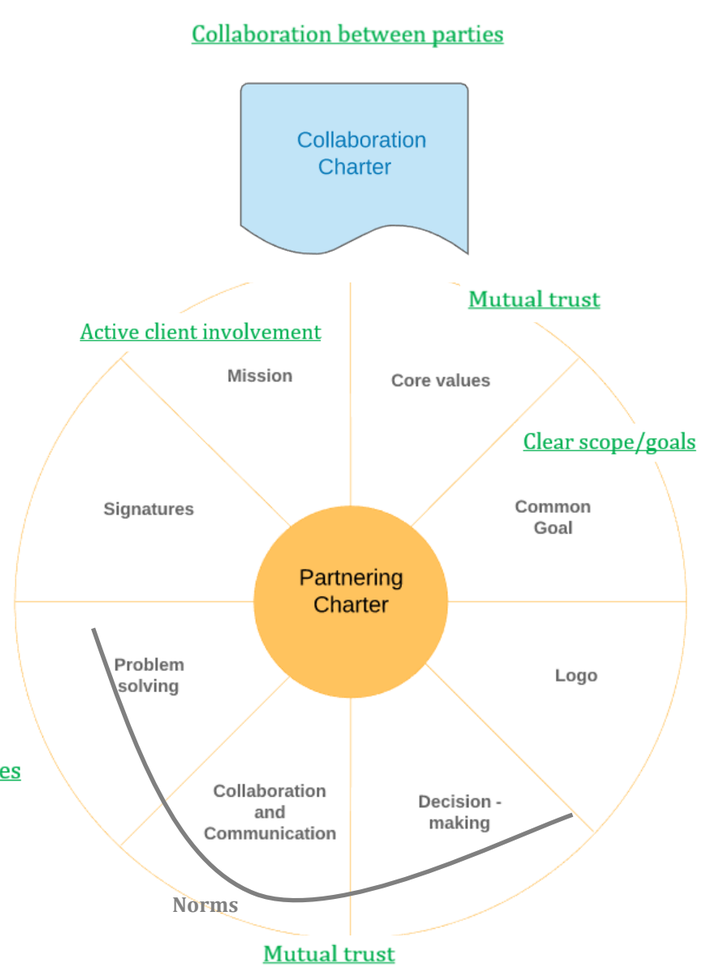
FIGURE 28 PROJECT COLLABORATION ASSESSMENT (OWN ILLUSTRATION)

In Figure 29 a visualization is provided of how all the steps recommended can be incorporated in the processes followed by Royal HaskoningDHV. The success factors are shown (in green color) in the part of the process that are mostly influenced.

FIGURE 29 COLLABORATION MODEL (OWN ILLUSTRATION)

Planning the Journey **Together**





7. Conclusion and discussion

In this chapter the answers to the main research question and sub-questions are described in section 7.1. A discussion of the managerial implications is provided in section 7.2, followed by the limitations presented during the research in section 7.3. Recommendations for future research and practice are discussed in section 7.4. This chapter is the fourth part of Kolb's cycle, recommendations are made so that the model is tested, and its effectiveness is proved.

7.1 Answering the research questions

In the beginning of the research three sub-questions were formulated that incrementally build – up to answering the main research question which is how it is possible to enhance team collaboration and integration within a construction project carried out in the framework of a partnership.

Sub-question 1: Which elements constitute a collaborative relationship?

The first sub-question investigates the elements that constitute a collaborative relationship from a theoretical perspective. These elements are present and necessary for an effective collaboration regardless of the type of partnering relationship that the project parties share. Whether there is a partnering or an alliancing relationship is not of significant importance as both practices aim at promoting collaboration between different project parties for achieving mutual goals. Contractual terms have more impact on the factors of the hard side of project management and less on the factors of soft side (where these necessary elements are mostly encountered).

With regard to the essential elements that should be found in a collaborative relationship there is a number of components that are encountered in the majority of the academic literature. The most important component is by far trust as it usually ranks on the top of the list of the most important ingredients of collaborative relationship. Having an integrated team is also a frequently encountered component usually accompanied by team – building, communication and information sharing. In addition having aligned goals and a joined vision is a critical aspect in partnering agreements along with support and commitment from top management. Some additional elements found in the theoretical conditions are transparency, no – blame culture, colocation of teams, openness, joint risk management and problem-solving processes. Support and commitment from the top management, having that is a strong leadership in the project team is also key in a partnership.

Sub-question 2: Which success factors are recognized as having the most influence on building a collaborative relationship from a practitioner's perspective?

The second sub-question aims at identifying which success factors, from the theoretical conditions, are recognized as influencing significantly the process of building a collaborative relationship from a practitioner's perspective. The selection of the success factors was based the analysis of a case – study and the findings thereof. These factors are commitment to mutual benefits, a clearly defined scope and goals, development of mutual trust, an early implementation of integration processes, top management support, an active client involvement, the overall collaboration between project parties and an integral project approach.

The majority of these factors is related to the management of the relationship development within the project and put the emphasis on the human aspect of the collaboration. What should be especially

highlighted is the role of the team leader and overall management in general. Even when all the other success factors, such as a clearly defined scope or commitment to mutual benefits are present, without a proper project leadership, people are not willing sometimes to overcome their personal goals and agendas and put more effort in achieving the project goals. Striving for high project results should not be imposed or dictated to the project team but encouraged and inspired to the team by the project leader(s).

Sub-question 3: What can project managers do in order to achieve earlier team integration during the front-end development phase of a project?

The third sub-question answers what can project managers do in order to achieve earlier team integration during the front-end development phase of a project. The answer of this question contains some steps that could be included in the start – up phase of a project as well as in later stages for evaluation. The main procedure that is proposed is a partnering working session with all project parties which aims at team building. This step can either be a separate session before the official project kick- off meeting or preferably integrated in the kick – off meeting. In this step of the process the project participants jointly formulate the vision for the project by aligning the goals of all stakeholders and decide on the core values that the relationship is based on. In addition some norms – ground rules – are established with regard to how the collaborative relationship is going to work in the course of the project.

As a complementary step to this process it is suggested to include some evaluation moments in the project that assess the status of the relationship aspect within the project team. These moments can have the form of intervisions – meetings that have a more informal façade and encourage people to reflect on the existing problems and look for ways to overcome them. These assessment moments are proposed at two levels of project development. The first level consists of short collaboration checks on a bi- weekly or monthly basis where brief discussions concerning potential conflicts or problems and solutions takes place. The next level pertains to the assessment of the relationship side of the project on a broader level which could take place as the project transitions from one phase to the next one. The use of a customized Relational Capability Assessment (RECAP) tool is highly advocated by the project managers as it provides a very effective way to have a concrete image on how the collaboration is perceived by the different project parties.

Main research question: How can team collaboration and integration be enhanced within a construction project carried out in the framework of a partnership?'

In order to reach this goal project parties should dedicate some time, energy and resources into getting to know each other and start building the relationship before embarking on the more tangible aspects of project management. Putting more focus on the relationship development doesn't alone guarantee a successful project outcome but it could help teams in overcoming easier problems that occur in the majority of projects.

The role of a competent project leadership is of vital importance and inextricably intertwined with a respectively competent team. These two parties have to synchronize their mentalities. If one party doesn't live up to the expectations then all the methods and tools that are in place do not materialize their benefits. The tools are only beneficial when there is an appropriate end – user hence all the partnering tools provided by the project leadership respectively require appropriate team members that will understand their value and apply them.

In addition, implementing some partnering processes earlier in the project can help becoming aware of issues that will come up later in relation to collaboration aspects. Monitoring the soft – side of a partnership

and looking at how it evolves during the course of the project enables project managers to have an insight on the relationship status. Gathering relevant information through discussions alone can prove a hard task therefore quantifying some relationship aspects offers the project manager the opportunity to put effort in improving those aspects that don't perform according to the desired standards. Through this process a culture of continuous improvement is promoted as time is devoted to looking at what presents room for improvement by taking into account the perspectives of the involved stakeholders.

7.2 Managerial Implications

Relationships in the construction industry haven't had the best record so far despite the fact that working with multiple parties to carry out a project is frequently encountered in modern day construction industry. Partnering arrangements are perceived as an efficient way of undertaking projects of size with a high degree of complexity however they are no panacea in curing the problems that are inherent in the process. (Laan et al., 2011).

Especially in the construction industry where many project managers have an engineering background a lot of attention is given to the aspects encompassing project execution and processes, usually with a high level of detail, and team – building is often expected as a natural outcome of the process. Although a lot of success factors involve processes and others involve people, it is ultimately the ''people'' side of the success factors that determines project performance (Cooke-Davis, 2002). Human relationships should be seen as crucial, as they have a direct influence on the relationship development between project teams (Che Ibrahim et al., 2015).

Senior management commitment and support are of central importance to integration, as construction projects involve complex organizational and technically challenging operations (Che Ibrahim et al., 2015). Developing a team culture and fostering the right attitudes has to be given considerable attention. It is a key ingredient in implementing necessary cultural changes often needed translating agreement reached at senior levels into practice (Bresnen et al., 2000a).

Therefore enhancing team building through the formative early stages of a project promotes a sense of group identity and ownership in the project. These features can be significantly enhanced as shown by effective team – building (Bresnen et al., 2000a). Having the team members have some discussions before the project kick – off about the project vision and how to reach it sets a good basis for building an efficient team. Established and cultivated routines and habits are often an obstacle in efficiently managing contradictions, disturbances and conflicts that often manifest in projects (Hartmann et al., 2011). Challenging situations in projects are inevitable hence putting effort in advance with regard to how they will be managed could prove valuable in the later stages.

Nevertheless engaging in a partnership requires an ongoing effort (Cooke-Davis, 2002) and in spite of the numerous benefits, the successful implementation requires hard work (Chan et al., 2003a). Continuous and frequent assessment of the relational characteristics of the collaboration is important. It enables the project manager to get an insight into behavioral aspects of the relationship that are hard to be assessed as they are not as tangible as the numbers of a cost estimation for example. In addition it also provides team members the opportunity to ensure that the agreements made by the team continue to be kept and each team member fulfills the role that was assigned.

7.3 Limitations

In this section some of the limitations that presented during the research and that might have had an influence on the outcomes of the research.

The first limitation is related to the findings from the case study. The project took place in a very dynamic environment where changes in conditions, project members, goals and attitudes were quite frequent. A couple of weeks prior to the interviews there were some incidents that had a negative influence on the project atmosphere. As a result the outcome of the interviews and the questionnaires might have been different if the research was conducted some weeks prior to these incidents. The interviewees admitted that these incidents had an influence on team integration and communication but their view on most of the other aspects remained the same.

A second limitation was the number of answered questionnaires. Although the interviewees were really cooperative and positive in having an interview, they weren't so keen on filling out the questionnaire. This is not uncommon (Eaker et al., 1998) and it has been often an issue in a lot of researches. The fact that most answers from people belonging to the same project party converged enables the extraction of relatively safe results. The interviews' findings also aligned with the questionnaires.

Another limitation is the generalizability of the results. This is a single case study and the research was carried out at a certain stage of the project at which events that occurred affected substantially the project conditions. Drawing conclusions from this project in order to propose a model that could be applied to other projects should be done with precaution. In order to increase the generalizability of the model, a validation process ensued.

Lastly, the steps proposed need to be tested by being implemented as a pilot on some projects in order to investigate whether it can actually have an influence in effective team building during the front – end development. A guideline to the partnering working session, a corresponding template for the charter might keep the process simple and might encourage project managers to make an effort in applying it.

7.4 Recommendations

In this final part of the chapter some recommendations are made in order to gain more insight on the research topic from a theoretical as well as from a practical perspective.

7.4.1 For Future research

One recommendation is to investigate which success factors are the ones that have a substantial influence on the soft aspects of project management. If the project is divided in different phases (front – end development, execution, operation) looking into which factors affect most each stage could contribute in categorizing the factors per project phase.

Moreover the role of culture in collaborative relationships has always been a vibrant field of research. Taking into account the fact that cultural differences are inherent in international projects, looking into ways of preparing the teams in advance of the project initiation could be a future research topic.

Monitoring the soft – side of project management isn't given the same attention as is attributed to monitoring of the so – called hard side aspects (such as budget and planning). Although there are a lot of

tools and processes that incorporate effective team – building during the project start – up phase, processes for evaluating the implementation and progress of the relational aspects are not as widespread.

Thus looking into methods that assess and quantify relational aspects in a way that would help the project manager realize if there is an aspect in a collaborative relationship that requires attention would prove useful. Adapting the RECAP tool, which forms a good basis for measuring collaboration health, could be the topic of a future research. Making the RECAP tool more concise and reducing the questions without nevertheless reducing its usefulness can be the focus of further research. In the same direction formulating the RECAP tool so that it can be utilized for inter-team assessment (instead of intra-team as it is applied currently) can be a useful tool in the process.

7.4.2 For Royal HaskoningDHV

Royal HaskoningDHV shall put more emphasis on the human side of project management. A lot of project managers have their own ways of building the team and motivating efficient team collaboration. However many of the managers have an engineering background hence their attention to the relationship development aspect of a project is not always as high as their attention to the non – relational aspects of the collaboration. The role of leadership in successfully guiding a team is essential and should be given more attention. Assembling a group of competent people will not alone guarantee success but provided with the appropriate leader the chances of reaching the targets set are much higher.

The importance of building an effective team should be highlighted and the means to get to this kind of team should be an integral part of the project management. Incorporating processes of (inter- and intra-) group assessment of relational aspects could prove useful if it is adopted and internalized by project managers. Proposing a standardized evaluation form that is simple and convenient could make project managers more inclined to see this step as an integral component of project management and not as an additional step that only adds up to the workload.

On a practical level providing training sessions for employees in senior managerial positions is another recommendation. This can help them to take the role of a facilitator in a partnering working sessions encouraging project managers to use this opportunity for team – building during the front – end development phase of a project. Realizing the importance of building a true team and putting the emphasis on the non – tangible aspects should be the focus of the training.

8. Reflection

This research has been an exciting journey that has taken me to the end of my studies. My background is heavily influenced by civil engineering, both on personal level, coming from a family of engineers, and on a professional level, having completed five years of civil engineering before doing the Master in Construction Management and Engineering. Investigating the aspects of a project development that deal with the people involved in a project is a new field for me to which I had little connection before the graduation project.

Since the beginning of this process it was clear to me that I didn't want a topic that would have to do with aspects such as cost estimations, planning or in general the tangible sides. I have practical experience on these aspects of project management and looking into them from a theoretical perspective didn't adhere to my interests. Choosing a subject that looks into the development of the team in a project and how to enhance team integration is an area that I had little familiarity with besides some courses during the first year of the master. When looking at the theoretical concepts from the lessons explaining or being applied on actual situations made a lot of things that seemed "pointless or too theoretical" suddenly started to make sense.

The graduation project was carried out in a consultancy environment and ensuring that it maintained a scientific approach was hard at times. The guidance from the committee proved very valuable in giving the appropriate structure in the research design. In addition the timing of my research, with regard to the case – study, was very interesting. The period I started conducting the interviews for the research was a turning point for the project team development as a number of incidents aggravated certain relationships within the team. Learnings from this part of the graduation process were numerous. Firstly, the relationships between the people have an enormous influence on project performance and handling them is not something that anyone can do just because the title of project manager is next to their name. Secondly, people often avoid discussing issues that relate to the soft side of project management. Many of these issues could have been detected and handled earlier if they weren't ignored with the result of exhibiting the weaknesses when repair was hard to do. Thirdly, gaining the trust of people and showing genuine interest in listening to what they have to say is very helpful in getting them to share their feelings and attitudes. Overall even the best tools and processes for project execution are useless if there is not a properly integrated team in place to use them efficiently. More attention needs to be paid to the relational aspects of project team and assessing them the same way the budget or the plan is assessed for example.

The fact that this research was done in parallel with myself volunteering to manage a project for a professional association relating to project management was an enlightening experience for me. Researching into how important integration can be for the team development helped me a lot in building my team and truly engaging all the members to commit to the best result. It also affirmed my choice to shift from pure engineering to project management. I found out that although engineering really suits my profile and is something I genuinely like, project management is really fulfilling as it requires much more attention to the people and that is something that suits my personality too.

References

Alias, Z., Zawawi, E. M. A., Yusof, K., & Aris, N. M. (2014). Determining Critical Success Factors of Project Management Practice: A Conceptual Framework. *Procedia - Social and Behavioral Sciences, 153*, 61-69. doi:https://doi.org/10.1016/j.sbspro.2014.10.041

Baiden, B. K., & Price, A. D. F. (2011). The effect of integration on project delivery team effectiveness. *International Journal of Project Management, 29*(2), 129-136. doi:https://doi.org/10.1016/j.ijproman.2010.01.016

Baiden, B. K., Price, A. D. F., & Dainty, A. R. J. (2006). The extent of team integration within construction projects. *International Journal of Project Management, 24*(1), 13-23. doi:https://doi.org/10.1016/j.ijproman.2005.05.001

Bakker, H. L. M., Arkesteijn, R., Bosch-Rekveldt, M. G. C., & Mooi, H. G. (2010). *Project success from the perspective of owners and contractors in the process industry*. Paper presented at the 24th IPMA World Congress, Istanbul.

Barlow, J. (2000). Innovation and learning in complex offshore construction projects. *Research Policy, 29*(7), 973-989. doi:https://doi.org/10.1016/S0048-7333(00)00115-3

Beach, R., Webster, M., & Campbell, K. M. (2005). An evaluation of partnership development in the construction industry. *International Journal of Project Management, 23*(8), 611-621.

Bosch-Rekveldt, M. G. C. (2011). *Managing project complexity: A study into adapting early project phases to improve project performance in large engineering projects.* (Doctoral Thesis), Delft Centre for Project Management, Retrieved from http://resolver.tudelft.nl/uuid:a783e581-bc7a-4efa-adcb-7e9201840367

Bosch-Rekveldt, M. G. C., Molaei, M., & Bakker, H. (2018). *Investigating practitioners' perspectives on project success factors How performing a Q-study could help professionals*. Paper presented at the EURAM 2018, Reykjavik, Iceland.

Bosch-Rekveldt, M. G. C., Smith, J., Mooi, H. G., Bakker, H. L. M., & Verbraeck, A. (2011). *The application of Value Improving Practices: Team integration pays off!* Paper presented at the EURAM 11th conference, Estonia. http://resolver.tudelft.nl/uuid:efbaec68-59de-4294-864f-748901e97f8c

Bresnen, M., & Marshall, N. (2000a). Building partnerships: case studies of clientcontractor collaboration in the UK construction industry. *Construction Management and Economics, 18*(7), 819-832. doi:10.1080/014461900433104

Bresnen, M., & Marshall, N. (2000b). Partnering in construction: A critical review of issues, problems and dilemmas. *Construction Management and Economics, 18*(2), 229-237.

Buvik, M. P., & Rolfsen, M. (2015). Prior ties and trust development in project teams – A case study from the construction industry. *International Journal of Project Management, 33*(7), 1484-1494. doi:https://doi.org/10.1016/j.ijproman.2015.06.002

Bygballe, L. E., Jahre, M., & Swärd, A. (2010). Partnering relationships in construction: A literature review. *Journal of Purchasing and Supply Management, 16*(4), 239-253. doi:https://doi.org/10.1016/j.pursup.2010.08.002

Cardoso dos Santos Durão, L. F., Vinicius Di Favari Grotti, M., Rafael Minetto Maceta, P., de Senzi Zancul, E., Tobal Berssaneti, F., & Monteiro Carvalho, M. (2017). A Review of the Soft Side in Project

Management: concept, trends, and challenges. *Revista Gestão da Produção Operações e Sistemas, 12*(2), 157-176. doi:10.15675/gepros.v12i2.1644

Chan, A. P. C., Chan, D. W. M., Fan, L. C. N., Lam, P. T. I., & Yeung, J. F. Y. (2006). Partnering for construction excellence—A reality or myth? *Building and Environment, 41*(12), 1924-1933. doi:https://doi.org/10.1016/j.buildenv.2005.06.026

Chan, A. P. C., Chan, D. W. M., & Ho, K. S. K. (2003a). An empirical study of the benefits of construction partnering in Hong Kong. *Construction Management and Economics, 21*(5), 523-533. doi:10.1080/0144619032000056162

Chan, A. P. C., Chan, D. W. M., & Ho, K. S. K. (2003b). Partnering in Construction: Critical Study of Problems for Implementation. *Journal of Management in Engineering, 19*(3), 126-135.

Che Ibrahim, C. K. I., Costello, S. B., & Wilkinson, S. (2015). Key indicators influencing the management of team integration in construction projects. *International Journal of Managing Projects in Business, 8*(2), 300-323. doi:10.1108/IJMPB-04-2014-0028

Chinowsky, P. S., & Songer, A. D. (2011). *Organization management in construction*. Milton Park: Spon.

CII. (1991). In search of partnering excellence. In. Austin, TX, USA: Construction Industry Institute.

Cooke-Davis, T. (2002). The real success factors on projects. *International Journal of Project Management, 20*(3), 185-190.

Costello, S. B., & Wilkinson, S. (2015). Key indicators influencing the management of team integration in construction projects. *International Journal of Managing Projects in Business, 8*(2), 300-323. doi:10.1108/IJMPB-04-2014-0028

Cowan, C., Gray, C. F., & Larson, E. W. (1992). Project partnering. *Project Management Journal, 23*(4), 5-11.

Davis, P., & Love, P. (2011). Alliance contracting: adding value through relationship development. *Engineering, Construction and Architectural Management, 18*(5), 444-461. doi:10.1108/09699981111165167

Demirkesen, S., & Ozorhon, B. (2017). Impact of integration management on construction project management performance. *International Journal of Project Management, 35*(8), 1639-1654. doi:https://doi.org/10.1016/j.ijproman.2017.09.008

Eaker, S., Bergström, R., Bergström, A., Adami, H. O., & Nyren, O. (1998). Response rate to mailed epidemiologic questionnaires: a population-based randomized trial of variations in design and mailing routines. *American journal of epidemiology, 147*(1), 74-82.

Eriksson, P. E. (2010). Partnering: what is it, when should it be used, and how should it be implemented? *Construction Management and Economics, 28*(9), 905-917. doi:10.1080/01446190903536422

Flyvbjerg. (2003). *Megaprojects and Risk: An Anatomy of Ambition*. In.

Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry, 12*(2), 219-245.

Gerybadze, A. (1995). *Strategic alliances and process redesign : effective management and restructuring of cooperative projects and networks*. Berlin ;: W. de Gruyter.

Groeben, N., & Scheele, B. (2000). Dialogue-hermeneutic Method and the "Research Program Subjective Theories. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research, 1*(2). doi:http://dx.doi.org/10.17169/fqs-1.2.1079

Hartmann, A., & Bresnen, M. (2011). The emergence of partnering in construction practice: an activity theory perspective. *Engineering Project Organization Journal, 1*(1), 41-52. doi:10.1080/21573727.2010.549609

Izam Ibrahim, K., Costello, S. B., & Wilkinson, S. (2013). Key practice indicators of team integration in construction projects: a review. *Team Performance Management: An International Journal, 19*(3-4), 132-152. doi:10.1108/TPM-10-2012-0033

Kuada, J. (2012). *Research Methodology : A Project Guide for University Students*. Frederiksberg, DENMARK: Samfundslitteratur Press.

Laan, A., Noorderhaven, N., Voordijk, H., & Dewulf, G. (2011). Building trust in construction partnering projects: An exploratory case-study. *Journal of Purchasing and Supply Management, 17*, 98-108.

Mankin, D., Cohen, S., & Fitzgerald, S. P. (2015). Developing complex collaboration: Basic principles to guide design and implementation. In *Complex Collaboration: Building the Capabilities for Working Across Boundaries* (pp. 1-26).

Manu, E., Ankrah, N., Chinyio, E., & Proverbs, D. (2015). Trust influencing factors in main contractor and subcontractor relationships during projects. *International Journal of Project Management, 33*(7), 1495-1508. doi:https://doi.org/10.1016/j.ijproman.2015.06.006

Moore, D. R., & Dainty, A. R. J. (2001). Intra-team boundaries as inhibitors of performance improvement in UK design and build projects: A call for change. *Construction Management and Economics, 19*(6), 559-562.

Nicholas, J. M., & Steyn, H. (2017). *Project management for engineering, business and technology* (Routledge Ed.).

Nyström, J. (2005). The definition of partnering as a Wittgenstein family-resemblance concept. *Construction Management and Economics, 23*(5), 473-481. doi:10.1080/01446190500040026

Polenske, K. (2004). Competition, Collaboration and Cooperation: An Uneasy Triangle in Networks of Firms and Regions. *Regional Studies, 38*(9), 1029-1043. doi:10.1080/0034340042000292629

Pollack, J., & Adler, D. (2015). Emergent trends and passing fads in project management research: A scientometric analysis of changes in the field. *International Journal of Project Management, 33*(1), 236-248. doi:https://doi.org/10.1016/j.ijproman.2014.04.011

Project Management Institute, P. (2017). *A guide to the project management body of knowledge (PMBOK guide) - 6th edition*. Newtown Square, Pa: Project Management Institute.

Radujković, M., & Sjekavica, M. (2017). Project Management Success Factors. *Procedia Engineering, 196*, 607-615. doi:https://doi.org/10.1016/j.proeng.2017.08.048

Rubin, H. J., & Rubin, I. S. (2005). *Qualitative interviewing : the art of hearing data* (2nd ed. ed.). Thousand Oaks, Calif.: SAGE.

Schoenmaker, R., Verlaan, J.G., Van den Boomen, M. . (2018). *CME1200 Collaborative Design and Engineering - Study guide and Reader*. Delft University of Technology.

Schöttle, A., Haghsheno, S. and Gehbauer, F. (2014). *Defining Cooperation and Collaboration in the Context of Lean Construction.* Paper presented at the Proc. 22nd Ann. Conf. of the Int'l Group for Lean Construction, Oslo, Norway.

Seymour, D. T., & Hussein, S. (2014). *The History Of Project Management* (Vol. 18).

Smits, K. (2017). United fates : collaboration isn't optional; project teams must navigate a maze of differences to bring the team together. *PM network., 31*(11), 24.

Suprapto, M. (2016). *Collaborative Contracting in Projects.* (Doctoral Thesis), Technische Universiteit Delft, Retrieved from http://resolver.tudelft.nl/uuid:8081fd15-7e16-4a05-bd6a-152c8fee2f94 WorldCat.org database.

Suprapto, M., Bakker, H. L. M., & Mooi, H. G. (2015). Relational factors in owner–contractor collaboration: The mediating role of teamworking. *International Journal of Project Management, 33*(6), 1347-1363. doi:https://doi.org/10.1016/j.ijproman.2015.03.015

Suprapto, M., Bakker, H. L. M., Mooi, H. G., & Hertogh, M. J. C. M. (2015). How do contract types and incentives matter to project performance? *International Journal of Project Management, 34*(6), 1071-1087. doi:https://doi.org/10.1016/j.ijproman.2015.08.003

Suprapto, M., Mooi, H. G., & Bakker, H. L. M. (2012). *How far can you go? Exploring long-term contractual relationship in engineering project*. Paper presented at the EURAM 2012 Conference, Rotterdam.

Tarazona, F. R. (2019). *Internship Project Report* Retrieved from Rotterdam

Tuckman, B. W. (1965). Developmental Sequence in Small Groups. *Psychological Bulletin, 63*(6), 384-399. doi:doi:10.1037/h0022100

Unterhitzenberger, C., & Bryde, D. (2019). Organizational Justice, Project Performance, and the Mediating Effects of Key Success Factors. *Project Management Journal, 50*(1), 57-70. doi:10.1177/8756972818808984

Verdecho, M.-J., Alfaro-Saiz, J.-J., Rodriguez-Rodriguez, R., & Ortiz-Bas, A. (2012). A multi-criteria approach for managing inter-enterprise collaborative relationships. *Omega, 40*(3), 249-263. doi:https://doi.org/10.1016/j.omega.2011.07.004

Verschuren, P. J. M., Doorewaard, H., Poper, R., & Mellion, M. J. (2010). *Designing a research project* (2nd ed. / ed.). The Hague: Eleven International Publishing.

Vince, R. (1998). Behind and Beyond Kolb's Learning Cycle. *Journal of Management Education, 22*(3), 304-319. doi:10.1177/105256299802200304

Whiteley, A., McCabe, M., & Savery, L. (1998). Trust and communication development needs: an Australian waterfront study. *JOURNAL OF MANAGEMENT DEVELOPMENT, 17*(5/6), 432-446.

Wood, G., & Ellis, R. (2005). Main contractor experiences of partnering relationships on UK construction projects. *Construction Management and Economics, 23*(3), 317-325. doi:10.1080/0144619042000287714

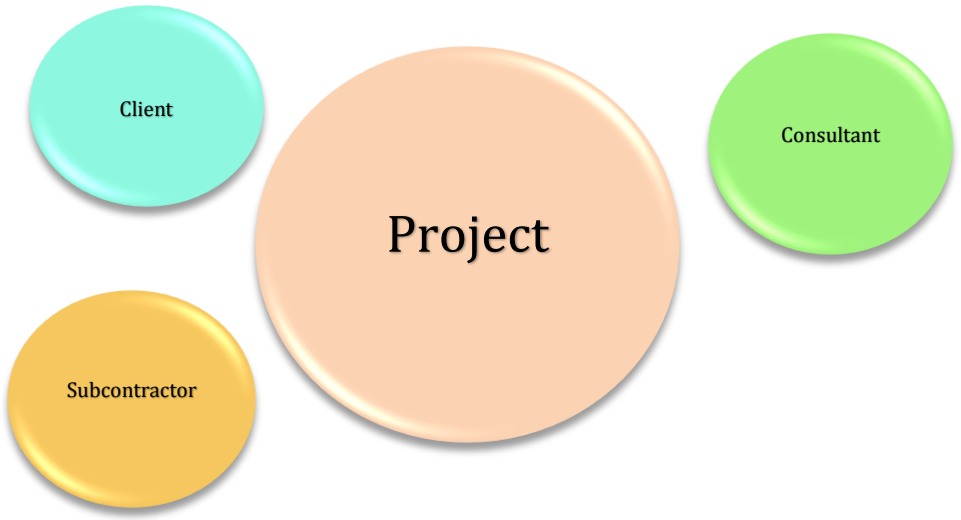
Yeung, J. F. Y., Chan, A. P. C., & Chan, D. W. M. (2007). The definition of alliancing in construction as a Wittgenstein family-resemblance concept. *International Journal of Project Management, 25*(3), 219-231. doi:https://doi.org/10.1016/j.ijproman.2006.10.003

Yin, R. K.-z. (1994). *Case study research : design and methods* (2nd [rev.] ed. ed.). Thousand Oaks, CA: Sage.

Young, B., Hosseini, A., & Lædre, O. (2016). The Characteristics of Australian Infrastructure Alliance Projects. *Energy Procedia, 96*, 833-844. doi:https://doi.org/10.1016/j.egypro.2016.09.145

Appendix A
Interview Protocol

1) Background, Role within the project and for which company are you working (permanent employee/freelance)
2) How long have you been involved in this project?
3) Have you had experience in similar projects (with same client/project type)?
4) What is your opinion about the communication between the different project teams?
5) How is information shared from team to team and company to company (from client/contractor/subcontractor)?
6) (Question about trust) Do you feel that the different parties support each other/ you can rely on each other – on the top management for dealing with problems?
7) Do you find the different languages within the project have had an influence on the project?
8) Have you experienced any cultural differences in personal level as well as in business cultures and ways of working?
9) How would you define success (project-wise and on personal level)?
10) Do you have the feeling that you are learning and gaining experience from working with other companies?
11) How much do you feel the One – Team approach (one of client's core values) within your working team of the project?
12) If you have been in this project from the beginning have you seen any evolution in the relationships between the different project members? Please think how the position of each party has shifted around the circle for the time you have been involved on the project.



13) Would you make any suggestions that would help in improving project performance with regard to the current situation? Suggestions can relate to any project aspect.

Appendix B

RECAP Questionnaire

A. Front-end definition and collaborative practices

This section examines the extent of how well the *front-end definition* is actually understood/ comprehended by the project teams and how well *collaborative practices* are actually being implemented in the current project. Collaborative practices are additional practices used to enhance the collaboration between parties (owner and contractor) and their project teams.

The words "**both teams**" and "**we**" refer to the owner and the contractor teams. Please mark "X" on the associated rating column, where: **1** = Very Poor, **2** = Poor, **3** = Moderate, **4** = Good, **5** = Very

Sub Criteria / Indicators	1	2	3	4	5	NA	DK
1. Front-end definition							
a. The project goals, objectives, and scope are understood by the contractor team.							
b. The project goals, objectives, and scope are understood by the owner team.							
c. All functional/ high level technical requirements (*basic design*) are reviewed together by both teams.							
d. The *project execution plan* is reviewed together by both teams and adjusted accordingly if needed.							
e. There are clear *roles and responsibilities* assigned to both teams.							
2. Team integration							
f. We form an *integrated project team* (IPT) where the owner and the contractor teams are structured and integrated as a single team with no apparent boundaries.							
g. We perform *goal setting and alignment meetings* with sub-contractors and suppliers.							
h. We perform *goal setting and alignment meetings* with the owner's business and operation representatives.							
i. We exercise *inter-team building* workshops to encourage collaboration via fun and excitement.							
j. We have *recognition and rewards program* to stimulate individual and team levels collaborative behavior.							
3. Joint working processes							
k. We jointly conduct *planning*.							
l. We jointly perform *monitoring, controlling*, and *reporting*.							
m. We jointly conduct *issue management*.							
n. We jointly *define* and *monitor* the achievement of key *performance* areas.							
o. We jointly *identify and monitor risks* and formulate a necessary *mitigation plan*.							
p. We have robust *mechanisms to resolve conflicts/disputes*.							
q. We have formal *procedures for joint decision making*.							

B. Project performance and Relationship continuity

This section is concerned with the perceived current achievement of the collaboration output, the project performance. The assessment aspects include measures of efficiency, quality of output, and satisfaction, and potential continuity of the relationship in future.

Please rate the following statements reflecting the current achievement or progress of the project so far. Please mark "X" on the associated rating column, where: **1** = Very Poor, **2** = Poor, **3** = Moderate, **4** = Good, **5** = Very Good, **NA** = not applicable, **DK** = Do not know.

Sub Criteria / Indicators	1	2	3	4	5	NA	DK
4. Efficiency							
a. The project is progressing in accordance with the estimated cost so far.							
b. The project is progressing in accordance with the planned schedule so far.							
5. Quality							
c. So far, there are no significant reworks due to major defects regarding the project deliverables.							
d. So far, all project activities are performed or completed safely with no accidents causing severe injury.							
e. So far, the facility or product constructed is taken into operation reliably without major problems.							
f. So far, the facility or product constructed is functioning according to the specified capacity.							
6. Satisfaction							
g. Both owner and contractor are satisfied with the project results and outcomes so far.							
h. So far, this project will make a positive impact on the owner's business.							
i. So far, this project will be a (commercial) success to the contractor.							

Please mark "X" on the associated rating column, where: **1** = Unlikely, **2** = Slightly likely, **3** = Moderately likely, **4** = Highly likely, **5** = Completely likely, **NA** = not applicable, **DK** = Do not know.

Sub Criteria / Indicators	1	2	3	4	5	NA	DK
7. Relationship continuity							
j. Beyond this project, we will likely work with each other in future with the same partners.							
k. The relationship experience we gain so far will be useful in future project(s) even with different partners.							
l. Because of collaboration in this project, we gain benefits that enable us to compete more competitively.							
m. This collaborative relationship makes our companies' able to develop unique capabilities (truly innovative products/solutions).							

C. Relational attitudes

This section is concerned with how well the senior management of both parties (the owner and the contractor) commits to support the collaboration, taking into account the degree of trust and interactional norms to bring together the necessary resources into a project.

The words "**senior management**" refers to high level managers or executives representing a company with the authority to make a final decision about a project. Please mark "X" on the associated rating column, where: **1** = Very Poor, **2** = Poor, **3** = Moderate, **4** = Good, **5** = Very Good, **NA** = not

Sub Criteria /Indicators	1	2	3	4	5	NA	DK
8. Senior management commitment							
a. Senior management of the owner commits to provide necessary resources and support to the project teams.							
b. Senior management of the contractor commits to provide necessary resources and support to the project teams.							
c. Senior management of the owner shows consistent and passionate leadership.							
d. Senior management of the contractor shows consistent and passionate leadership.							
e. Senior management of both parties actively work together to resolve potential conflicts when needed.							
9. Senior management trust							
f. There is an atmosphere of mutual trust between senior management of both parties.							
g. There is a mutual enthusiasm from senior management of both parties in achieving the project goals.							
h. Senior management of both parties has confidence in each other to do what is right.							
i. Senior management of both parties keeps their promises truthfully.							
10. Established relational norms							
j. The owner intentionally adopts 'no blame culture' when problems arise.							
k. The contractor intentionally adopts 'no blame culture' when problems arise.							
l. The owner is intentionally open and honest in any interactions with no hidden agendas.							
m. The contractor is intentionally open and honest in any interactions with no hidden agendas.							
n. The owner strives for business outcomes whereby both parties either win or both parties lose.							
o. The contractor strives for business outcomes whereby both parties either win or both parties lose.							
p. Both parties agree to have an equal say in any critical decisions that matter to both parties.							

D. Inter-teamworking

This section is intended to assess how the owner's team and the contractor's team work together in a project across their company's boundaries. Inter-teamworking reflects how two collaborating teams communicate with each other effectively, achieve synergies in coordinating interdependent activities, equally contribute their specific knowledge and expertise, align their effort, help each other in achieving project goals, behave as one team, and personally trust each other. The words "**both teams**" and "**the teams**" refer to the owner's core team and the contractor's core team. Either team can be represented by at least one person (team leader or manager or representative). Imagine the interaction between these two teams when you rate the following statements.

Please mark "X" on the associated rating column, where: **1** = Very Poor, **2** = Poor, **3** = Moderate, **4** = Good, **5** = Very Good, **NA** = not applicable, **DK** = Do not know.

Sub Criteria / Indicators	1	2	3	4	5	NA	DK
11. Communication							
a. Both teams communicate directly with each other.							
b. Project-relevant information is shared openly by both teams.							
c. Whenever a problem is detected, it is immediately and honestly communicated to the other team.							
d. Both teams are satisfied with the usefulness of the information shared by other team.							
12. Coordination							
e. The work done in the teams is closely synchronized between the teams.							
f. There is a clear linkage between the teams for their interdependent tasks.							
g. There is no redundancy regarding the work done between both teams.							
13. Balanced contribution							
h. Both teams recognize the specific strengths and weaknesses of each team's competences.							
j. Both teams are contributing their knowledge/ expertise in accordance with their full potential.							
j. There is a balanced contribution of ideas between the teams.							
14. Mutual support							
k. Both teams help each other as well as they could.							
l. Whenever problems occurred, they are resolved constructively.							
m. Every critical decision is made together by both teams.							
15. Aligned effort							
n. Both teams give this project the priority it needs.							
o. Both teams put their best effort into this project.							
p. There is no conflict regarding the effort that each team put into this project.							

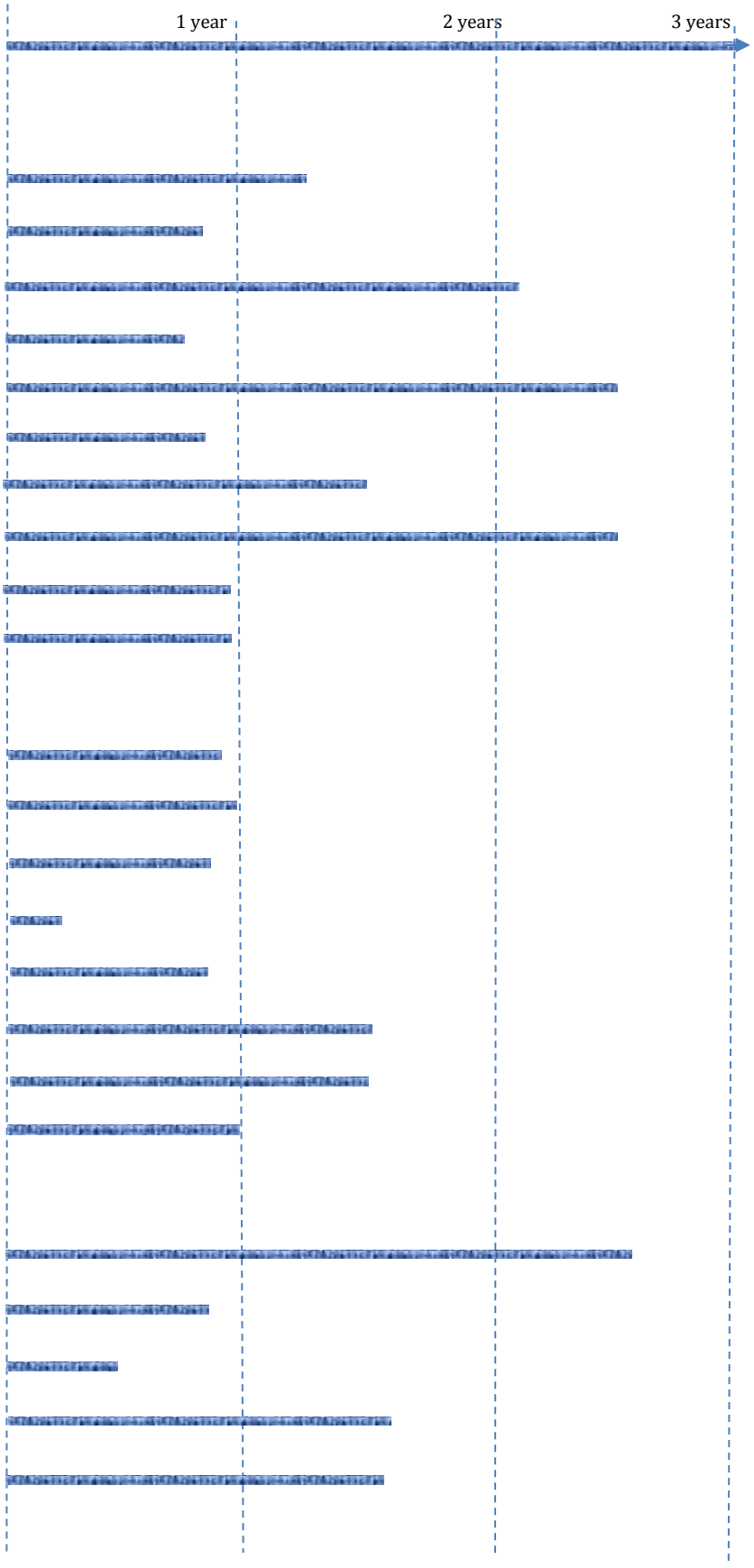
Sub Criteria / Indicators	1	2	3	4	5	NA	DK
16. Cohesion							
q. Members of both teams are personally engaged to this project.							
r. Members of both teams are integrated as one team.							
s. Members of both teams feel proud to be part of the project team.							
t. Members of both teams feel responsible for maintaining the relationships within the project team.							
17. Affective trust							
u. Both teams are comfortable being dependent on each other.							
v. Both teams keep their promises.							
w. Both teams work with high levels of integrity.							
x. Both teams are fair to each other.							
y. Both teams look out for the interests of both companies.							
z. Both teams can rely on each other for not taking advantage of the other team's weaknesses.							

This is the end of the assessment, thank you for the cooperation.

Appendix C
Respondents overview

Time of involvement in project

Client	Core organization / External
Engineering manager	Core
Application and permission manager	External
Procurement lead for program	Core
Project manager of gate east	External
Civil structure architect program development	External
Resource manager	External
General manager for civil projects	Core
Senior contract manager	External
Scope manager	External
Project sponsor	Core
Consultant	
Project manager gate east	
Contracting and procurement manager	
Project manager CCR	
Assistant project director	
Project manager demolition, assistant project director	
MEP design and coordination	
Architect and engineering lead	
Architect – BIM team	
Subcontractor	
Assistant project director east	
Interior design	
Permitting	
Architect casino demolition	
Architect	



Appendix D
Analytical questionnaire results

Client towards Contractor /Subcontractor

Perspective	Client to contractor/subcontractor	Contractor to client
1. Front-end definition	**3,55**	**2,42**
a. The project goals, objectives, and scope are understood by the contractor team.	3,50	3
b. The project goals, objectives, and scope are understood by the owner team.	3,83	3,67
c. All functional/ high level technical requirements (basic design) are reviewed together by both teams.	3,60	2,33
d. The project execution plan is reviewed together by both teams and adjusted accordingly if needed.	3,80	1,50
e. There are clear roles and responsibilities assigned to both teams.	2,40	1,67
2. Team integration	**2,47**	**3,07**
f. We form an integrated project team (IPT) where the owner and the contractor teams are structured and	2,20	2,33
g. We perform goal setting and alignment meetings with sub-contractors and suppliers.	2,40	3,00
h. We perform goal setting and alignment meetings with the owner's business and operation	3,20	3,67
i. We exercise inter-team building workshops to encourage collaboration via fun and excitement.	2,00	3,33
j. We have recognition and rewards program to stimulate individual and team levels collaborative	1,50	2,00
3. Joint working processes	**2,74**	**2,52**
k. We jointly conduct planning.	3,40	3,00
l. We jointly perform monitoring, controlling, and reporting.	2,60	2,67
m. We jointly conduct issue management.	2,80	3,00
n. We jointly define and monitor the achievement of key performance areas	2,60	3,00
o. We jointly identify and monitor risks and formulate a necessary mitigation plan.	2,80	2,33
p. We have robust mechanisms to resolve conflicts/disputes.	2,60	2,00
q. We have formal procedures for joint decision making.	2,40	1,67
4. Efficiency	**1,90**	**3,33**
a. The project is progressing in accordance with the estimated cost so far.	2,00	5,00
b. The project is progressing in accordance with the planned schedule so far.	1,80	3,33
5. Quality	**3,78**	**3,33**
c. So far, there are no significant reworks due to major defects regarding the project deliverables.	2,80	3,33
d. So far, all project activities are performed or completed safely with no accidents causing severe	4,50	5,00
e. So far, the facility or product constructed is taken into operation reliably without major problems.	2,00	5,00
f. So far, the facility or product constructed is functioning according to the specified capacity.	0,00	0,00

6. Satisfaction	**3,10**	**3,28**
g. Both owner and contractor are satisfied with the project results and outcomes so far.	3,00	3,00
h. So far, this project will make a positive impact on the owner's business.	3,00	4,50
i. So far, this project will be a (commercial) success to the contractor.	2,67	3,33
7. Relationship continuity	**3,96**	**3,67**
j. Beyond this project, we will likely work with each other in future with the same partners.	4,17	3,67
k. The relationship experience we gain so far will be useful in future project(s) even with different partners.	4,00	4,33
l. Because of collaboration in this project, we gain benefits that enable us to compete more competitively.	3,80	4,33
m. This collaborative relationship makes our companies' able to develop unique capabilities (truly	3,75	2,33
8. Senior management commitment	**3,24**	**2,64**
a. Senior management of the owner commits to provide necessary resources and support to the	3,33	2,00
b. Senior management of the contractor commits to provide necessary resources and support to the	3,80	4,50
c. Senior management of the owner shows consistent and passionate leadership.	2,83	1,67
d. Senior management of the contractor shows consistent and passionate leadership.	3,25	4,00
e. Senior management of both parties actively work together to resolve potential conflicts when needed.	3,00	2,33
9. Senior management trust	**3,38**	**2,75**
f. There is an atmosphere of mutual trust between senior management of both parties.	2,67	3,00
g. There is a mutual enthusiasm from senior management of both parties in achieving the project	3,25	3,00
h. Senior management of both parties has confidence in each other to do what is right.	3,25	2,50
i. Senior management of both parties keeps their promises truthfully.	3,50	3,00
10. Established relational norms	**3,24**	**3,03**
j. The owner intentionally adopts 'no blame culture' when problems arise.	3,40	2,67
k. The contractor intentionally adopts 'no blame culture' when problems arise.	3,60	3,50
l. The owner is intentionally open and honest in any interactions with no hidden agendas.	3,00	2,67
m. The contractor is intentionally open and honest in any interactions with no hidden agendas.	3,40	4,00
n. The owner strives for business outcomes whereby both parties either win or both parties lose.	3,00	3,00
o. The contractor strives for business outcomes whereby both parties either win or both parties lose.	3,33	4,00
p. Both parties agree to have an equal say in any critical decisions that matter to both parties.	3,00	2,00
11. Communication	**3,08**	**2,75**
a. Both teams communicate directly with each other.	3,67	3,00
b. Project-relevant information is shared openly by both teams.	3,17	3,00
c. Whenever a problem is detected, it is immediately and honestly communicated to the other team.	2,80	3,00
d. Both teams are satisfied with the usefulness of the information shared by other team.	2,20	2,00

12. Coordination	**2,50**	**2,00**
e. The work done in the teams is closely synchronized between the teams.	2,40	1,67
f. There is a clear linkage between the teams for their interdependent tasks.	2,80	2,33
g. There is no redundancy regarding the work done between both teams.	2,00	2,50
13. Balanced contribution	**3,00**	**2,89**
h. Both teams recognize the specific strengths and weaknesses of each team's competences.	3,00	3,00
i. Both teams are contributing their knowledge/ expertise in accordance with their full potential.	3,00	3,00
j. There is a balanced contribution of ideas between the teams.	3,00	2,67
14. Mutual support	**2,53**	**2,44**
k. Both teams help each other as well as they could.	3,00	2,67
l. Whenever problems occurred, they are resolved constructively.	2,60	2,67
m. Every critical decision is made together by both teams.	2,00	2,00
15. Aligned effort	**3,67**	**3,56**
n. Both teams give this project the priority it needs.	3,80	3,67
o. Both teams put their best effort into this project.	4,00	3,67
p. There is no conflict regarding the effort that each team put into this project.	3,20	3,33
16. Cohesion	**3,25**	**3,00**
q. Members of both teams are personally engaged to this project.	4,00	3,67
r. Members of both teams are integrated as one team.	2,60	2,00
s. Members of both teams feel proud to be part of the project team.	3,20	3,00
t. Members of both teams feel responsible for maintaining the relationships within the project team.	3,20	3,33
17. Affective trust	**3,27**	**2,72**
u. Both teams are comfortable being dependent on each other.	2,80	2,33
v. Both teams keep their promises.	2,80	2,50
w. Both teams work with high levels of integrity.	3,60	3,00
x. Both teams are fair to each other.	3,40	3,00
y. Both teams look out for the interests of both companies.	3,40	3,00
z. Both teams can rely on each other for not taking advantage of the other team's weaknesses.	3,60	3,00

Client towards Subcontractor

Perspective	Client to contractor/subcontractor	Subcontractor to client
1. Front-end definition	**3,55**	**2,88**
a. The project goals, objectives, and scope are understood by the contractor team.	3,50	4,00
b. The project goals, objectives, and scope are understood by the owner team.	3,83	3,25
c. All functional/ high level technical requirements (basic design) are reviewed together by both teams.	3,60	2,00
d. The project execution plan is reviewed together by both teams and adjusted accordingly if needed.	3,80	1,67
e. There are clear roles and responsibilities assigned to both teams.	2,40	3,25
2. Team integration	**2,47**	**1,61**
f. We form an integrated project team (IPT) where the owner and the contractor teams are structured and	2,20	2,25
g. We perform goal setting and alignment meetings with sub-contractors and suppliers.	2,40	2,00
h. We perform goal setting and alignment meetings with the owner's business and operation	3,20	2,00
i. We exercise inter-team building workshops to encourage collaboration via fun and excitement.	2,00	1,25
j. We have recognition and rewards program to stimulate individual and team levels collaborative	1,50	1,00
3. Joint working processes	**2,74**	**2,22**
k. We jointly conduct planning.	3,40	2,25
l. We jointly perform monitoring, controlling, and reporting.	2,60	1,67
m. We jointly conduct issue management.	2,80	2,33
n. We jointly define and monitor the achievement of key performance areas	2,60	2,67
o. We jointly identify and monitor risks and formulate a necessary mitigation plan.	2,80	2,33
p. We have robust mechanisms to resolve conflicts/disputes.	2,60	2,67
q. We have formal procedures for joint decision making.	2,40	2,25
4. Efficiency	**1,90**	**3,63**
a. The project is progressing in accordance with the estimated cost so far.	2,00	4,50
b. The project is progressing in accordance with the planned schedule so far.	1,80	3,75
5. Quality	**3,78**	**4,50**
c. So far, there are no significant reworks due to major defects regarding the project deliverables.	2,80	4,50
d. So far, all project activities are performed or completed safely with no accidents causing severe	4,50	4,50
e. So far, the facility or product constructed is taken into operation reliably without major problems.	2,00	4,00
f. So far, the facility or product constructed is functioning according to the specified capacity.	0,00	0,00
6. Satisfaction	**3,10**	**2,83**

g. Both owner and contractor are satisfied with the project results and outcomes so far.	3,00	3,50
h. So far, this project will make a positive impact on the owner's business.	3,00	1,00
i. So far, this project will be a (commercial) success to the contractor.	2,67	5,00
7. Relationship continuity	**3,96**	**4,38**
j. Beyond this project, we will likely work with each other in future with the same partners.	4,17	3,33
k. The relationship experience we gain so far will be useful in future project(s) even with different partners.	4,00	4,67
l. Because of collaboration in this project, we gain benefits that enable us to compete more competitively.	3,80	4,00
m. This collaborative relationship makes our companies' able to develop unique capabilities (truly	3,75	3,33
8. Senior management commitment	**3,24**	**2,90**
a. Senior management of the owner commits to provide necessary resources and support to the	3,33	1,75
b. Senior management of the contractor commits to provide necessary resources and support to the	3,80	3,50
c. Senior management of the owner shows consistent and passionate leadership.	2,83	2,50
d. Senior management of the contractor shows consistent and passionate leadership.	3,25	3,75
e. Senior management of both parties actively work together to resolve potential conflicts when needed.	3,00	3,00
9. Senior management trust	**3,38**	**2,50**
f. There is an atmosphere of mutual trust between senior management of both parties.	2,67	3,00
g. There is a mutual enthusiasm from senior management of both parties in achieving the project	3,25	3,00
h. Senior management of both parties has confidence in each other to do what is right.	3,25	2,50
i. Senior management of both parties keeps their promises truthfully.	3,50	3,25
10. Established relational norms	**3,24**	**2,99**
j. The owner intentionally adopts 'no blame culture' when problems arise.	3,40	3,00
k. The contractor intentionally adopts 'no blame culture' when problems arise.	3,60	3,50
l. The owner is intentionally open and honest in any interactions with no hidden agendas.	3,00	3,00
m. The contractor is intentionally open and honest in any interactions with no hidden agendas.	3,40	3,75
n. The owner strives for business outcomes whereby both parties either win or both parties lose.	3,00	2,67
o. The contractor strives for business outcomes whereby both parties either win or both parties lose.	3,33	3,33
p. Both parties agree to have an equal say in any critical decisions that matter to both parties.	3,00	2,00
11. Communication	**3,08**	**2,06**
a. Both teams communicate directly with each other.	3,67	2,50
b. Project-relevant information is shared openly by both teams.	3,17	2,00
c. Whenever a problem is detected, it is immediately and honestly communicated to the other team.	2,80	1,75
d. Both teams are satisfied with the usefulness of the information shared by other team.	2,20	2,00
12. Coordination	**2,50**	**2,50**

e. The work done in the teams is closely synchronized between the teams.	2,40	2,25
f. There is a clear linkage between the teams for their interdependent tasks.	2,80	2,75
g. There is no redundancy regarding the work done between both teams.	2,00	2,67
13. Balanced contribution	**3,00**	**3,00**
h. Both teams recognize the specific strengths and weaknesses of each team's competences.	3,00	3,25
i. Both teams are contributing their knowledge/ expertise in accordance with their full potential.	3,00	3,00
j. There is a balanced contribution of ideas between the teams.	3,00	2,75
14. Mutual support	**2,53**	**2,33**
k. Both teams help each other as well as they could.	3,00	2,50
l. Whenever problems occurred, they are resolved constructively.	2,60	2,75
m. Every critical decision is made together by both teams.	2,00	1,75
15. Aligned effort	**3,67**	**3,25**
n. Both teams give this project the priority it needs.	3,80	3,25
o. Both teams put their best effort into this project.	4,00	3,67
p. There is no conflict regarding the effort that each team put into this project.	3,20	3,00
16. Cohesion	**3,25**	**2,38**
q. Members of both teams are personally engaged to this project.	4,00	3,33
r. Members of both teams are integrated as one team.	2,60	2,00
s. Members of both teams feel proud to be part of the project team.	3,20	2,33
t. Members of both teams feel responsible for maintaining the relationships within the project team.	3,20	2,33
17. Affective trust	**3,27**	**2,96**
u. Both teams are comfortable being dependent on each other.	2,80	2,67
v. Both teams keep their promises.	2,80	3,00
w. Both teams work with high levels of integrity.	3,60	3,25
x. Both teams are fair to each other.	3,40	3,50
y. Both teams look out for the interests of both companies.	3,40	2,33
z. Both teams can rely on each other for not taking advantage of the other team's weaknesses.	3,60	3,33

Contractor towards Subcontractor

Perspective	Client to contractor/subcontractor	Subcontractor to client
1. Front-end definition	**3,87**	**3,97**
a. The project goals, objectives, and scope are understood by the contractor team.	4,00	4
b. The project goals, objectives, and scope are understood by the owner team.	4,33	3,50
c. All functional/ high level technical requirements (basic design) are reviewed together by both teams.	3,67	4,67
d. The project execution plan is reviewed together by both teams and adjusted accordingly if needed.	3,50	4,00
e. There are clear roles and responsibilities assigned to both teams.	3,67	4,25
2. Team integration	**3,94**	**2,78**
f. We form an integrated project team (IPT) where the owner and the contractor teams are structured and	4,67	3,50
g. We perform goal setting and alignment meetings with sub-contractors and suppliers.	4,00	3,50
h. We perform goal setting and alignment meetings with the owner's business and operation	4,00	3,67
i. We exercise inter-team building workshops to encourage collaboration via fun and excitement.	2,50	1,75
j. We have recognition and rewards program to stimulate individual and team levels collaborative	2,00	1,75
3. Joint working processes	**3,87**	**3,23**
k. We jointly conduct planning.	4,67	4,00
l. We jointly perform monitoring, controlling, and reporting.	4,33	2,75
m. We jointly conduct issue management.	4,00	3,50
n. We jointly define and monitor the achievement of key performance areas	4,00	3,33
o. We jointly identify and monitor risks and formulate a necessary mitigation plan.	4,33	3,75
p. We have robust mechanisms to resolve conflicts/disputes.	3,50	2,75
q. We have formal procedures for joint decision making.	2,00	2,50
4. Efficiency	**3,50**	**4,50**
a. The project is progressing in accordance with the estimated cost so far.	3,67	4,25
b. The project is progressing in accordance with the planned schedule so far.	3,33	4,75
5. Quality	**4,67**	**4,88**
c. So far, there are no significant reworks due to major defects regarding the project deliverables.	4,67	4,75
d. So far, all project activities are performed or completed safely with no accidents causing severe	4,67	5,00
e. So far, the facility or product constructed is taken into operation reliably without major problems.	0	0,00
f. So far, the facility or product constructed is functioning according to the specified capacity.	0	0,00
6. Satisfaction	**4,11**	**4,50**

g. Both owner and contractor are satisfied with the project results and outcomes so far.	4,33	4,25
h. So far, this project will make a positive impact on the owner's business.	3,67	0,00
i. So far, this project will be a (commercial) success to the contractor.	4,33	4,75
7. Relationship continuity	**4,25**	**4,31**
j. Beyond this project, we will likely work with each other in future with the same partners.	4,67	4,50
k. The relationship experience we gain so far will be useful in future project(s) even with different partners.	4,33	4,75
l. Because of collaboration in this project, we gain benefits that enable us to compete more competitively.	4,67	4,00
m. This collaborative relationship makes our companies' able to develop unique capabilities (truly	3,33	4,00
8. Senior management commitment	**4,47**	**4,15**
a. Senior management of the owner commits to provide necessary resources and support to the	4,50	4,00
b. Senior management of the contractor commits to provide necessary resources and support to the	4,67	4,00
c. Senior management of the owner shows consistent and passionate leadership.	4,00	4,25
d. Senior management of the contractor shows consistent and passionate leadership.	4,33	4,00
e. Senior management of both parties actively work together to resolve potential conflicts when needed.	4,33	4,50
9. Senior management trust	**4,50**	**4,25**
f. There is an atmosphere of mutual trust between senior management of both parties.	4,67	4,25
g. There is a mutual enthusiasm from senior management of both parties in achieving the project	4,67	4,25
h. Senior management of both parties has confidence in each other to do what is right.	4,67	4,25
i. Senior management of both parties keeps their promises truthfully.	4,50	4,25
10. Established relational norms	**4,56**	**3,89**
j. The owner intentionally adopts 'no blame culture' when problems arise.	4,00	4,00
k. The contractor intentionally adopts 'no blame culture' when problems arise.	4,50	3,75
l. The owner is intentionally open and honest in any interactions with no hidden agendas.	4,50	4,25
m. The contractor is intentionally open and honest in any interactions with no hidden agendas.	4,67	4,25
n. The owner strives for business outcomes whereby both parties either win or both parties lose.	4,00	3,75
o. The contractor strives for business outcomes whereby both parties either win or both parties lose.	4,50	3,75
p. Both parties agree to have an equal say in any critical decisions that matter to both parties.	4,33	3,50
11. Communication	**4,42**	**4,19**
a. Both teams communicate directly with each other.	4,33	4,00
b. Project-relevant information is shared openly by both teams.	4,33	4,25
c. Whenever a problem is detected, it is immediately and honestly communicated to the other team.	4,67	4,00
d. Both teams are satisfied with the usefulness of the information shared by other team.	4,33	4,50
12. Coordination	**4,28**	**3,83**

e. The work done in the teams is closely synchronized between the teams.	4,00	3,75
f. There is a clear linkage between the teams for their interdependent tasks.	4,67	4,33
g. There is no redundancy regarding the work done between both teams.	4,00	3,75
13. Balanced contribution	**4,44**	**4,00**
h. Both teams recognize the specific strengths and weaknesses of each team's competences.	4,33	3,75
i. Both teams are contributing their knowledge/ expertise in accordance with their full potential.	4,33	4,25
j. There is a balanced contribution of ideas between the teams.	4,67	4,00
14. Mutual support	**4,44**	**4,17**
k. Both teams help each other as well as they could.	4,33	4,50
l. Whenever problems occurred, they are resolved constructively.	4,67	4,50
m. Every critical decision is made together by both teams.	4,33	3,50
15. Aligned effort	**4,67**	**4,25**
n. Both teams give this project the priority it needs.	4,67	4,00
o. Both teams put their best effort into this project.	4,67	4,50
p. There is no conflict regarding the effort that each team put into this project.	4,67	4,25
16. Cohesion	**4,33**	**3,94**
q. Members of both teams are personally engaged to this project.	4,33	4,25
r. Members of both teams are integrated as one team.	4,33	4,00
s. Members of both teams feel proud to be part of the project team.	4,33	3,50
t. Members of both teams feel responsible for maintaining the relationships within the project team.	4,33	4,00
17. Affective trust	**4,56**	**4,06**
u. Both teams are comfortable being dependent on each other.	4,33	3,50
v. Both teams keep their promises.	4,67	4,25
w. Both teams work with high levels of integrity.	4,33	4,50
x. Both teams are fair to each other.	4,67	4,50
y. Both teams look out for the interests of both companies.	4,50	3,50
z. Both teams can rely on each other for not taking advantage of the other team's weaknesses.	4,50	4,33

Appendix E
Partnering charter

A partnering charter or partnering statement describes the commitment to be achieved between the different teams that collaborate in a project. The ultimate goal is to identify shared goals, objectives, norms and values within the team and aligning these aspects on an individual as well as on a group level (Schoenmaker, 2018).

Components

It is usually composed of the following:

- **Ambitions and goals**

Firstly it is stated what the team's expectations are with regard to the final result and the quality of the final product. Afterwards a team mission statement is formulated with the goal of inspiring and motivating all team members to commit to the project. A clear view of the goal of the team is also given at this part. Finally one of the most important components of the charter is the core values that are embraced by the team members.

- **Key areas**

The key areas also summarized as 'norms' describe the kind of commitment that is to be achieved by agreeing on the parameters of these key areas. They can be regarded as the design and process parameters of the collaboration. These are:

a) Communication
b) Collaboration and integration
c) Decision-making and problem solving.

- **Potential Problems or Risks**

In this section a statement is made with regard to the way that problems will be managed and what factor might have a negative impact on the project.

This format is not binding and it is adjusted to fit the project context. A partnering charter does not in any way guarantee a solution to every problem that will arise. Nevertheless, it forms a good basis and starting point for communication, team integration, decision-making and problem solving all of which are crucial throughout the project execution.

Background information

Partnering and similar forms of collaboration is an industry concept that emerged in the beginning of the 1990s as a way of dealing with the fragmentation and lack of integration that occur owing to the nature of the projects and result in low performance. It is a notion that developed within the Anglo-Saxon culture hence most of the literature promoting partnering has focused entirely on experiences in the UK, the USA and Australia (Bresnen et al., 2000b).

It has also been utilized by Rijkswaterstaat in various partnering collaborations with the intention of collaborating and continuous learning (Hartmann et al., 2011).

According to Project Management Institute (2017) team charter establishes team values, agreements and operating guidelines and it may include team values, communication guidelines, decision – making criteria and process, conflict resolution process, meeting guidelines as well as other team agreements. The goal is to establish clear expectations regarding acceptable behaviour by project team members. By discussing areas such as codes of conduct, communication, decision – making and meeting etiquette allows team members to discover values that are important to one another. The team charter has more chances of being utilized successfully the team develops it or at least has an opportunity to contribute to it. A template is provided in Figure 30.

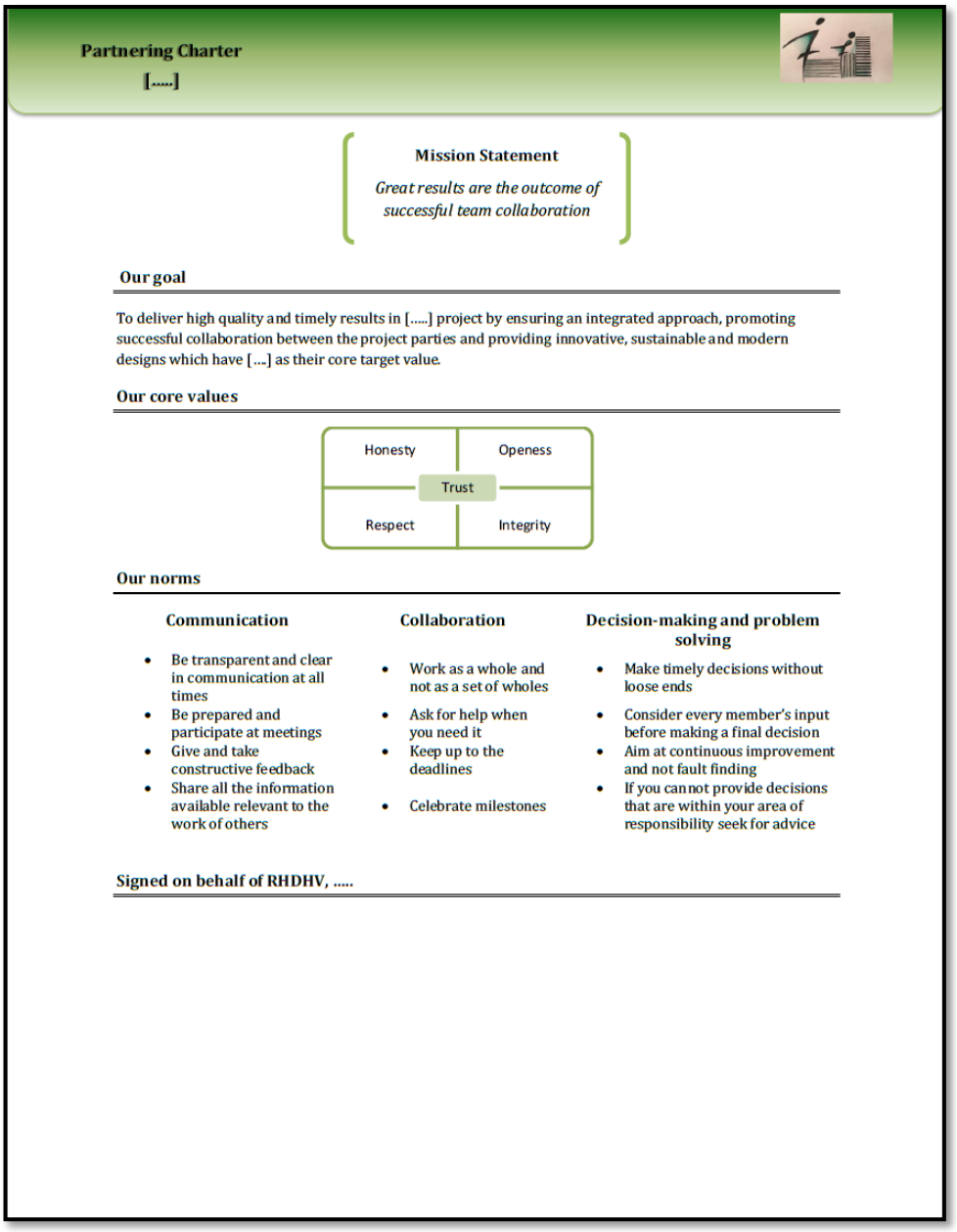


FIGURE 30 PARTNERING CHARTER TEMPLATE (OWN ILLUSTRATION)

Appendix F
Validation Protocol

In order to check the feasibility and appropriateness of incorporating this model in the processes of Royal HaskoningDHV interviews were conducted with three experts from the company. The managerial implications and usefulness of adding this step in the project start – up phase are the main points of discussion.

The experts are three project managers from the department of industry and buildings of RHDHV and they have all experience in leading teams on large Dutch and international projects. All three experts hold senior managerial roles and they are chosen not only because of their experience but also due to the fact they have explicitly expressed their interest in improving the management of the soft – side aspects of projects.

The interviews are semi – structured and expand for a timeframe of an hour.

Interview Structure

- Short introduction to research topic, background, findings from case – study, presentation of model and goal of incorporating the model in the.

Questions:

- Do you see the need for such a step in the project start – up phase?
- Is there room in the project start – up phase for including this step in the process?
- Do you think that it is the project manager that should lead the workshop, or would a facilitator be more appropriate?
- Which relational norms would you include for discussion in the charter?
- How can project managers be convinced to adopt this procedure (for example by providing templates)?
- What is your opinion of the RECAP (questionnaires) tool? Do you believe it could be included and used by project managers for getting an overview of the collaboration between the different stages of projects (the so – called gates)?