The Importance Of The Empathic Ability Of Project Participants During The Preconstruction Phase To Construction Project Performance



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Master Thesis

THE IMPORTANCE OF THE EMPATHIC ABILITY OF PROJECT PARTICIPANTS DURING THE PRECONSTRUCTION PHASE TO CONSTRUCTION PROJECT PERFORMANCE

DESIGNING A FRAMEWORK TO IMPROVE PROJECT PERFORMANCE VIA EMPATHY

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Preface

In 2017 I got, without any experience in this field, a job at the Learning & Development (L&D) department of an offshore engineering firm in Delft. I had never heard of the term Learning & Development and being a student at a technical university I never realised the success of a company is determined by more than just technical skills. However, during the three years I worked at the L&D department I learned about the importance of people's competences for business success and I created a natural interest in this topic. I learned that next to technical skills, soft skills are also very important, maybe even more important. When I saw the advertisement for a thesis project about the competences of construction project teams and project success I immediately thought: 'this is something for me!'. It was the perfect combination of applying my knowledge learned during my masters and my experience of working at an L&D department where the word 'competences' came by almost on a daily basis. The same hour as I saw the advertisement I responded. Within a week I had the confirmation I got the thesis topic and I started my journey of graduation.

During the time span of my thesis, when I told people about my graduation topic they often responded with things like: 'oh really? But you're doing a technical study right?'. Apparently a lot of people still don't see the relevance of soft skills in technical projects, just like I did before. To me, this lack of familiarness only raised my enthusiasm to continue with my thesis even more. It is something different and relatively new in the sector which many people don't expect from a technical student. Nevertheless, at the same time I think this is also unfortunate and I hope in the future more people will change their view and understand the relevance of soft skills in technical projects.

In the student world graduation is always seen as a big and maybe even scary thing. However, personally I never experienced it this way. I think my graduation project went very smoothly and I enjoyed working on it the past months. I believe this is partly caused because I was very interested in the topic, but the guidance from my graduation committee was also an important factor contributing to the smooth process. I was lucky I could get a lot of guidance and a meeting with one of my supervisors whenever I wanted to. First I want to thank Prof. dr. Hans Bakker for being the chair of my graduation committee and giving such structured guidance during the meetings we had with the committee. Second I want to thank Dr. Erik-Jan Houwing who, when I asked him to guide my graduation on a Sunday afternoon, responded within five minutes with an enthusiastic reply that he would like to do that a lot. This also sums up his guidance: enthusiastic and fast help I could count on. Third, I want to thank Dr. ir. Froukje Sleeswijk Visser for her guidance during my thesis. I really appreciated that you shared your knowledge on the topic coming from a different faculty and having a different viewpoint. This helped me to sometimes look at my research from a different perspective. Next to this I want to thank Ir. Guus Keusters for the opportunity of doing my thesis within the topic of his PhD research and his dedicated guidance. I really enjoyed that my topic was in the field of your research as it allowed me to always have someone to share ideas and knowledge with. Finally I want to thank Dura Vermeer for the opportunity of executing my research in collaboration with their company which caused I had access to very interesting project data and I could speak to professionals from the industry.

To the readers: enjoy reading this report and I hope that it will open your eyes on the importance of other skills than just technical skills to project success.

Frédérique Batelaan

01 July 2021, Rotterdam

Management Summary

The aim of this research was to investigate if and how the project performance of integrated construction projects can be improved by focussing on empathy during the preconstruction phase. Big infrastructural construction projects often face a poor project performance which causes the sector is aimed at searching for strategies to deal with this. This results in a need for finding out what causes this underperformance and how it can be solved. Looking at what drives project success it is said the people involved and their competences are main factors of influence. These people need to integrate working processes and collaborate with each other to successfully deliver the project. Previous research and experiences from practice gave a strong impression especially the competence empathy could be of high importance to this. Empathy is defined as 'the ability to understand and share the feelings of another'. It would support the alignment and integration between the project team members. It is believed this is important during the preconstruction phase in specific as in that phase the most different people come together and the most important decisions for the project are made. The research focusses hereby on the preconstruction phase of integrated construction projects. Next to this it follows the Integral Project Management (IPM) structure to describe the structure of construction project teams which assumes project teams are structured by five different processes: Contract Management, Project Management, Stakeholder Management, Project Control and Technical Management. The research further adopts that there's a difference in internal and external empathy in a construction project. Internal empathy is interpreted as empathy within the project organization between team members or colleagues. External empathy is interpreted as empathy towards the client and stakeholders to understand their perspectives and/or context adoption of the project. Both internal and external empathy seem relevant to a construction project where on one hand the designed project must comply with the wishes of the client and/or end user and on the other hand many different people working together in multidisciplinary teams need to deliver and/or execute this design.

The research has been executed by looking at empathy of involved project participants from both the contractor and client side. It was the question for which activities in the preconstruction phase it would be crucial for these involved people to be empathic for a good project outcome and how project performance can then be improved. The research tries to answer the following research question:

How to improve the project performance of integrated construction projects by focusing on empathy during the preconstruction phase?

To find an answer to this question, the research has been executed in four separate parts. In Part I a literature review and theoretical framework delivered input for the following parts of the research. Part II of the research consisted of conducting in-depth interviews with experts from the industry to investigate if the importance of empathy during the construction phase could be confirmed and to gain insight in where in the preconstruction phase it would then be important for project participants to be empathic with others. Part III consisted of a measurement of empathy within a project organization to gain insight in how the actual empathic ability of project participants is distributed. This has been done by spreading a questionnaire with a test to measure individual empathic ability. On the basis of the results of Part I, II and III a framework has been designed as a strategy for the construction sector on how to improve project performance via empathy. Part IV of the research validated this framework in an expert session. The final framework is presented as The Empathy Framework.

Looking at the results of the research it seems that construction professionals on average score low on empathic competence and that in certain situations it is important for project participants to be empathic for a good project outcome. This results in a gap in the construction sector between required empathy and actual empathic competence which demonstrates there's room for improvement in this area. The research results let us believe that it seems that the project performance of integrated construction projects can be improved by focussing on

stimulating more empathy between client and contractor and towards stakeholders during the preconstruction phase (= external empathy). Especially in the relationship between client and contractor there would be room for improvement as there's a gap in required empathy of the contractor. The reason that it is believed that the performance of construction projects can be improved via external empathy is that when looking at what mostly causes projects to perform badly, this seems often related to a bad collaboration between client and contractor and/or insufficient involvement of stakeholders. It is believed empathy between the client and contractor helps to improve the collaboration between them by supporting both parties in understanding each other's interests and to understand how to communicate with each other in an open way. It forms the basis for a good relationship and it is already of importance from the beginning of the tender phase. In case a conflict or other issue occurs it helps them to solve the situation in a collaborative way. It are the management teams of the client and contractor specifically who should be more empathic with each other in this case and people of the contractor in general that are in contact with the client who should be more empathic to their counterparts of the client. When it comes to stakeholders it is believed empathizing with them helps to understand how to involve them, how to keep them satisfied and how to communicate important information about the project to them. If stakeholders are not involved enough they could thwart the project which disturbs the construction process and planning. Eventually this could harm the project with delays or extra costs. It is mostly the responsibility of the stakeholder managers to be more empathic with stakeholders. Next to this it seems also technical design managers should be more empathic towards stakeholders to understand how to cope with their wishes and requirements in the design.

The research also resulted in the believe that it would be beneficial for the project to stimulate empathy internally in the project organization within teams and between people from different disciplines. However, this would have a lower effect on improving the performance of the project compared to stimulating external empathy. It is believed within teams managers should be empathic with their team members to understand how to activate these people and involve them in the project. Managers also scored relatively low on empathy which shows there's a gap here and room for improvement. Next to this it is believed empathy helps team members in general to understand what type of person the other is, how to communicate with this person and it creates trust and respect between them. This will support the relationship between them and their job satisfaction which benefits their productivity. Between people from different processes or disciplines empathy would also be helpful, especially between people from the design and execution team. Here also a gap in empathic ability has been found. It is said people from different disciplines are often very different types of people but the integration between them is of high importance to the project. It is therefore believed it is helpful if they empathize with each other to understand the other's personality, to understand how to communicate with the other and to understand how to think along for a good integration between them. This is mostly the responsibility of the managers of the different processes who should be more empathic with each other. They however scored relatively low on empathic ability.

The Empathy Framework as presented in Figure 1 is developed as a strategy for construction professionals on how to improve construction project performance via empathy. The framework presents an overview of interventions related to empathy of which it is believed they improve project performance. It is recommended for all integrated construction projects, regardless of their complexity, to follow the framework during the preconstruction phase to understand how to improve project performance via empathy. This should be done as early in the project as possible. The framework consists of two parts. Part A consists of the recommended interventions to be followed by the client and contractor of the construction project during the different phases of the preconstruction phase. The interventions are presented on the basis of their effectiveness to improve project performance. For each intervention it is indicated which people in the project organization need to be more empathic for this. Part B consists of recommendations on how more empathy can then be facilitated if recommended by an intervention from Part A. The framework shows this can be done in two ways: (i) by selecting people based on empathic competences, and (ii) by stimulating the empathic behaviour of people.



Select people based on empathic competences

- Select people in key positions based on their empathic competence
 - Measure the empathic ability of people to find out who scores high on empathic competence (e.g. with the test presented in this research)
- Select people with experience on the side of the people who they need to empathize with (e.g. select design managers with experience on the execution side)
- Create more gender diversity; involve more women as women in general have a higher empathic ability
- Select people based on empathic competence as early as possible in the project; later will be less effective

Stimulate the empathic behaviour of people

 Focus on stimulating people's empathic ability (e.g. via workshops, trainings, empathic design, etc.)

- Focus on improving people's willingness to be empathic:
 Stimulate good relations between people (e.g. via team building activities)
 - Stimulate people's personal well being
 - Stimulate engagement to the project
- Let people gain experience on the side of the person they need to empathize with (e.g. job rotation/walk along with a colleague for a day)
- Make sure the situation is conducive to being empathic.
 Facilitate interaction between people and create a work environment where people are able to find each other more easily (i.e. not only working remotely)

Figure 1: The Empathy Framework

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MASTER THESIS



1. Introduction

The construction industry shows a lot of big infrastructure projects underperform. Projects exceed the set budget, are delivered behind schedule or don't fit the initial scope. Dealing with this problem is a hot topic within the sector. A lot of tools and techniques have been developed that try to make the construction process more efficient and minimize project exceedances like risk management, time charts and Building Information Modelling (BIM). Although despite these developments construction projects still underperform. Some recent examples of projects underperforming in the Netherlands are the project Zuidasdok, the construction of the new sluice of Ijmuiden and the strengthening of the Afsluitdijk (Cobouw, 2020). These projects are at the moment of writing this report still in progress, but they already exceeded the set budget, planning or scope. This raises the question why these kinds of large construction projects perform so poorly?

Looking at what drives project success, it is argued the success is determined by the people involved (Bakker & Kleijn, 2014). However, these involved people often have different discipline backgrounds and/or different interests in the project (Baiden & Price, 2011). They need to cooperate and integrate working processes and information with each other on a high level to successfully deliver the project (Eriksson & Westerberg, 2011; Demirkesen & Ozorhon, 2017). It is said this integration is often not going well. This research has been executed in collaboration with a contractor from the Dutch construction industry. Listening to the experiences of this company, it seems the different disciplines needed for a project all function quite well on their own. The BIM engineers for example are well capable of making a detailed BIM model; they master the software. However, as they experience in practice, the problem lays in the alignment between the different people involved. The project team needs to deliver the project in a way that meets the requirements of all stakeholders. They need to integrate their disciplines and understand each other. It is about the BIM engineer being aware of and relating to what the other teams with different discipline backgrounds need in the BIM model for it to be suitable to use in practice. The company explained this is sometimes hard as these people are often of different origin; they are different types of people. They also explained that especially during the preconstruction phase they think a better alignment between project participants is of importance as in that phase the most different people come together and the most important decisions for the project are made. This seems no strange assumption as it is said decisions made in the early phases of a project can influence the project outcome the most (Oberlender, 1993).

Compared to other sectors, integration in the construction industry is more difficult to achieve considering its dynamic and complex nature in which different parties and processes need to be aligned (Demirkesen & Ozorhon, 2017). There's a need for better integration of processes and project participants in construction projects (Franz, Leicht, Molenaar, & Messner, 2016). This need also comes from the fact that recent experience from practice shows that tender bidders now almost always need to hand in a plan on how they will achieve a better collaboration between project participants. As a result construction companies are very interested in learning more about how collaboration can be improved. Unfortunately, just bringing people together does not automatically ensure they will work together in an efficient way and make optimal decisions (Baiden & Price, 2011). Project participants integrating and collaborating with each other means they need to understand and relate to each other. They need to be aware of other project team members' contributions to the project (Baiden & Price, 2011). Looking at the definition of *empathy*, it is expected someone's empathic ability is related to this. According to the Oxford dictionary, empathy is "the ability to understand and share the feelings of another" (Lexico Oxford Dictionary, 2021). This matches with the statements that project team members need to understand and relate to each other for a better integration in construction projects. Would this mean if project team members are more empathic towards each other, they align and integrate better which in turn improves construction project performance?

Combining the experiences from practice and this definition of empathy, there's an expectation that empathy of the project participants is of importance to construction project performance. It would be related to the integration and collaboration between project participants. Especially during the preconstruction phase empathy would then be important to enhance project success. The goal of this research is therefore to examine if this is true by investigating if and how the project performance of construction projects can be improved by focussing on empathy during the preconstruction phase. This has been done by looking at empathy of involved project participants from both the contractor side and the client side. The preconstruction phase however is quite large and consists of many different processes, activities and involved people. It is the question for which activities it would be crucial for the involved people to be empathic for a good project outcome. For some activities it is maybe less important to be empathic. It should be noted that in different procurement models the responsibilities of the preconstruction phase are distributed in different ways across the project participants. As a result one procurement model has been chosen of which the preconstruction phase will be used to describe the processes taking place; the preconstruction phase of integrated construction projects. Traditionally a lot of the responsibilities of the preconstruction phase were the responsibility of the client. However, the last years this changed to more integrated procurement methods in which most design responsibilities are now transferred to the contractor (Makkinga, de Graaf, & Voordijk, 2018). Considering the current situation in which projects are at the moment mostly procured with integrated procurement models, the research will focus on the preconstruction phase of integrated construction projects. To map what the preconstruction phase looks like and which people are exactly involved in this phase the Integral Project Management (IPM) structure for construction project teams has been followed as explained by Wermer (2018). This structure has been chosen because the construction company in collaboration with which this research has been executed and the case project used in this research both follow this IPM structure.

The research was of an exploratory nature to investigate if relations between empathy and certain steps in the preconstruction phase can be found that are essential for the performance of the project. The total research tests if the theory that empathy is an underlying factor affecting project performance can be confirmed. The end goal was to design a framework that can be used by the construction industry as a strategy to improve project performance via empathy during the preconstruction phase. This framework will be presented as *The Empathy Framework*. It is believed that for the activities where it is vital the involved people are empathic towards each other, attention should be paid to this empathic component in future projects. This would then support project success. Next to this, construction companies can use this information when drawing up their plans on how to achieve a better collaboration between project participants when they need to deliver this in the tender phase.

The research consists of four separate parts. Part I consists of an extensive literature review, the theoretical framework and the research design to solve what is still unknown. The next chapter, chapter 2, will first present the results of the literature review. After this, conclusions will be drawn about what has been found in literature in the theoretical framework in chapter 3 The chapter ends with a problem statement to clarify what is still to be solved. Following, chapter 4 will show the research design that has been drawn up to solve this problem. Next in chapters 5, 6 and 7 in consecutive order the research results of Part II, Part III and Part IV will be presented. After this the found research results will be interpreted in the discussion in chapter 8. Finally, chapter 9 will then consist of the conclusion of the research.

2. Literature Review

First it is important to gain an understanding of what is already known about the topic based on previous research. This chapter therefore consists of a literature review that investigates what is already known and unknown about the topic and key concepts relevant to this research.

2.1 Construction project performance

Many articles can be found in which the statement is made that construction projects are often underperforming (e.g. Takim & Akintoye, 2002; Jha & Lyer, 2007; Bosch-Rekveldt, Jongkind, Mooi, Bakker, & Verbraeck, 2011; Jalali Sohi, Hertogh, Bosch-Rekveldt, & Blom, 2016). It is said the industry calls for a change in behaviour, attitudes and procedures in order to increase project success (Dubois & Gadde, 2002). Despite the many attempts to find explanations and solutions for the problem of underperforming projects, the underperformance is still present. This first raises the question what is meant with construction project (under)performance.

Searching for a definition of project performance in literature, no common definition could be found. Different researchers define project performance in different ways (e.g. de Wit, 1988; DeCotiis & Dyer, 1979; Cheung, Suen, & Cheung, 2004). However, what all studies have in common is that they define project performance as how a project scores on its key performance indicators (KPI's) or success criteria. The difference in their definition of project performance is their choice of KPI's or criteria. Cheung, Suen, & Cheung (2004) explain project performance is dependent on the objectives of the project. This means for one project it could be very important the project is delivered before a certain deadline. If this project is finished after the scheduled delivery date, the project can be labelled as an underperforming project. However, for another project it could be far more important that the project will be delivered with minimal nuisance for the environment, even if this would mean the project will be delivered behind schedule. As long as nuisance is minimised the project would be considered successful.

Herrera, Mourgues, Alarcón, & Pellicer (2020) write that: "poor performance results from activities that do not add value and are considered project losses, such as reworks and waiting times, among others". A general explanation of underperformance in the construction industry is that the project is not achieving the requirements set for one or more of the basic components of a project: scope, budget and schedule (Oberlender, 1993; Nicholas & Steyn, 2017; Eriksson & Westerberg, 2011). Scope (or 'quality'), budget (or 'cost') and schedule (or 'time') are referred to as the iron triangle of project management (Jha & Lyer, 2007; Nicholas & Steyn, 2017; Atkinson, 1999). It are the most commonly used criteria to measure project performance. However, there are also proponents of measuring project performance with more indicators than just scope, budget or schedule (e.g. Chan & Chan, 2004; Takim & Akintoye, 2002; Eriksson & Westerberg, 2011). A reasoning behind measuring project performance with more indicators is given by Takim & Akintoye (2002) who explain that it is hard to measure project performance in a standard way because it is a wider concept related to the expectations of stakeholders and the way the stakeholders contributed to the project. This is confirmed by Chan & Chan (2004) who conclude different stakeholders can have different views and expectations of a project and find different things important. This means that a project can be experienced as successful by one stakeholder and unsuccessful by another (Takim & Akintoye, 2002).

Looking at the connection between improving the integration and cooperation between project participants and project performance, also a downside is mentioned by researchers. Eriksson & Westerberg (2011) explain that the increased focus on collaboration could cause that collaboration becomes rather the objective of a project than a means for successful project delivery. They therefore propose to not measure project performance in terms of collaboration.

2.2 Competences of people and project performance

From practice it seems integration between project participants is important for project success. Nonetheless it is also important to investigate what is said about how project success can be achieved in literature. It is first of all said decisions and actions made in early project phases can influence the project outcome the most (Kuprenas, 2007; Young, 1997; Herrera, Mourgues, Alarcón, & Pellicer, 2020; Oberlender, 1993). Cheung, Suen, & Cheung (2004) write: "the success of a construction project depends on a number of factors, such as project complexity, contractual arrangements, relationships between project participants, the competency of project managers, and the abilities of key project members". Nicholas & Steyn (2017) and Oberlender (1993) argue that good project management is needed to make sure construction projects perform better. De Wit (1988) explains it should be made clear there is a difference between project success and successful project management: "good project management can contribute to project success, but it is not able to prevent project failure". Especially in the early stages of a project successful project management would be important because then the ability to influence the factors of the iron triangle is the highest (Oberlender, 1993). Different researchers conclude competences of people are an important factor affecting the outcome of project management, which matches with the statement about project success from Cheung, Suen, & Cheung (2004). Toor & Ofori (2008), Nicholas & Steyn (2017) and Jha & Lyer (2007) conclude that the project manager's competences are of main influence on good project management. Others argue that not only the competences of the project manager are of importance for the success of a project, but also the competences of the project team members (Sidwell, 2006; Love, Holt, Shen, Li, & Irani, 2002). Sidwell (2006) explains this as follows:

It is the project manager's task to understand and align people working in the project organization. But this is not a one-way road; there's a mutual dependency between the project manager and the project team. The team also needs to have the competences to work according to and understand the guidelines and instructions of the project manager. The project manager is dependent on this for successful implementation of his or her management. On the other side the team members are dependent on high-level guidance of the project manager.

The fact that good project management is determined by competences of people in general (of project managers and project team members) is supported by the research of Bakker & Kleijn (2014) who state that people are key in making big projects a success. Yet looking at the different perspectives towards the influence on project performance of competences of the project manager versus competences of the project team no consensus could be found on who's competences are more important.

2.3 Leadership competences

Diving a step further into which competences of people are then important for the success of a project, leadership is often mentioned as an important or even the most important competence (e.g. Toor & Ofori, 2008; Giritli & Topcu Oraz, 2004; Simmons, McCall, & Clegorne, 2020; Pinto & Trailer, 1998). Toor & Ogunlana (2006) state: *"it is one of the most important subjects in management studies"*. Leadership is about motivating or guiding people towards achieving a goal. There are different leadership styles and implications. Differences can be found in leadership on the side of the project manager (the project leader) versus leadership on the side of the project team (Simmons, McCall, & Clegorne, 2020).

Leadership on the side of the project leader is about leading, directing, guiding, influencing and managing the project team, project stakeholders and other participants to accomplish the project objectives (Burke & Barron, 2014). Goleman (2000) explains project leader leadership styles mainly come in two different types: transformational leadership and transactional leadership. Bono & Judge (2004) explain the difference as follows: transformational leadership is about encouraging, coaching and inspiring team members to give them enough

equipment and confidence to look for innovative solutions. Transactional leadership is about monitoring and controlling people by rewarding them. Both Giritli & Topcu Oraz (2004) and Toor & Ofori (2008) conclude that different leadership styles are needed in different phases and situations of a construction project. They explain project managers should have the skills to feel and understand when which leadership style is needed. They also state that during the construction phase in general a more transactional leadership style may be needed, but that the design phase asks for a more transformational leadership style.

A lot of research on leadership focusses on the leadership competences of the team leader (Carson, Tesluk, & Marrone, 2007). However an increasingly amount of research indicates that leadership competences of the team are evenly important to the project performance (Fewings, 2013; Kozlowaki & Bell, 2003; Carson, Tesluk, & Marrone, 2007). This is called shared leadership (Han, Lee, Beyerlein, & Kolb, 2018). It works from the idea that leadership is distributed over different individuals which makes both project leaders and team members essential to the overall project success (Simmons, McCall, & Clegorne, 2020). Carson, Tesluk, & Marrone (2007) give the following reasons why shared leadership is of importance:

- The complexity of projects and teams often makes it unlikely a single leader can successfully perform all needed leadership functions.
- Team members often have high levels of expertise of their field of knowledge which other team members don't have. This requires certain leadership behaviour from them to successfully transfer and apply their knowledge and skills.
- Flatter organizations and self-managing teams ask for leadership within the team instead of leadership of one individual.

Looking at the status of leadership in the construction industry, different researchers write that this industry asks for better leadership skills (Simmons, McCall, & Clegorne, 2020; Toor & Ofori, 2008). (Bresnan, Bryman, Beardsworth, Ford, & Keil, 1986) state that construction professionals are hardly seen as leaders. (Toor & Ofori, 2008) explain that they are perceived rather as technical specialists than leaders. A reason given for this is that traditionally most construction related education focusses on technical and professional competences rather than soft skills needed for leadership (Simmons, McCall, & Clegorne, 2020). This results in a misalignment between industry needs and education outcomes.

Looking at which competences are important to leadership, many research is done stating empathy being an important factor influencing leadership skills (e.g. Duff, 2017; Mahsud, Prussia, & Yukl, 2010; Bakar, Ishak, & Abidin, 2014; Socas, 2018; Kellet, Humphrey, & Sleeth, 2006; Solares Menegazzo, Cruz-Ortiz, Ortega-Maldonada, & Salanova, 2015). Goleman (1995) was one of the first to raise awareness about empathy as a key ingredient for leadership. In his book he linked different emotional intelligence factors (like empathy) to leadership. His research is mentioned a lot in later research. Especially in research on transformational leadership empathy is mentioned often. Duff (2017) states that empathy is included in almost every model of transformational leadership. Several researchers also found a relationship between leadership and integration in project teams where better leadership skills positively influence team integration and team performance (Dionne, Yammarino, Atwater, & Spangler, 2004; Zaccaro & Klimoski, 2002; Salas, Goodwin, & Burke, 2009; Sousa & van Dierendonck, 2016).

2.4 Integration between project participants

Experiences from practice revealed integration between project participants seems very important to project success and that this aspect still leaves room for improvements. Different researchers confirm this importance of the integration between project participants for project success (Demirkesen & Ozorhon, 2017; Herrera, Mourgues, Alarcón, & Pellicer, 2020; Eriksson & Westerberg, 2011; Franz, Leicht, Molenaar, & Messner, 2016). Demirkesen & Ozorhon (2017) however wrote that achieving integration in the construction sector is hard

considering the complex and dynamic nature of construction projects in which many different people with different interests need to be aligned. They also wrote that more research is needed on the relation between integration between project participants and performance as it is essential to successfully manage a construction project. Franz, Leicht, Molenaar, & Messner (2016) conclude that project members need to have a more active role in establishing integration for a better project outcome. Herrera, Mourgues, Alarcón, & Pellicer (2020) write that especially during the design phase it is relevant the involved people interact and integrate with each other on a high level. This has two reasons according to them: (1) decisions made in the design phase can significantly influence following phases and (2) the costs of changes in the design phase are negligible compared to costs in later phases.

When there's a high level of integration, information is exchanged between parties, skills and knowledge are shared and there are limited boundaries between parties (Baiden & Price, 2011). According to Baiden, Price, & Dainty (2006) integration is *"the merging of different disciplines with different goals, needs and cultures into a cohesive and mutually supporting unit"*. Ivany (2019) explains people working in a project need to deal with a lot of different groups of people, often with divergent goals and that relating to these people is important. As explained by Sidwell (2006) people working together in a project organization need to understand each other. The different disciplinal backgrounds and interests of the people involved however make the integration harder (Baiden & Price, 2011). Baiden & Price (2011) explain that these people need to be aware of each other's capabilities and expectations for a good integration.

The relevance of empathy to team and business performance in general has also been highlighted by researchers. Miyashiro (2011) dedicated a book to the importance of empathy to team and business performance. Both Solares Menegazzo, Cruz-Ortiz, Ortega-Maldonada, & Salanova (2015) and Offerman, Bailey, Vasilopoulos, Seal, & Sass (2004) concluded in their research that empathy has an important and positive impact on team performance. Rapisarda (2002) concludes empathy is strongly influencing cohesiveness in teams and team performance. Jolliffe & Farrington (2004) explain people with a lower empathic ability are often more offensive. People can experience negative feelings about working with someone that is not very empathic. They can feel as if they are not being understood, unheard or offended by the non-empathic person resulting in a negative atmosphere at the work environment. A negative work atmosphere often results in a lower performance. Empathy between team members creates trust between them and makes them able to make compromises which is beneficial for how the team performs. It also supports the communication between people. However, none of the aforementioned researches are specifically based on a construction environment.

2.5 The concept of empathy

When diving into literature about empathy, one can easily be carried away in the many different understandings, interpretations or applications of empathy. It is said to be a complex multidimensional concept (Davis, 1980). Gerdes, Segal, & Lietz (2010) explain there's no real consistency on how people define empathy. This makes that people can have different views on what empathy is.

Looking at some common definitions of empathy, empathy is defined by Kohut (1959) as "the capacity to think and feel oneself into the inner life of another person". Baron-Cohen & Wheelwright (2004) explain that empathy allows people to interact with others by understanding their intentions, predicting their behaviour and feeling an emotion as a reaction to this. They also explain empathy consists of a cognitive component and an affective component. The cognitive side of empathy is about understanding someone else's feelings, the affective side about feeling an emotion as a reaction to someone else's emotion (Baron-Cohen & Wheelwright, 2004). Despite the difference, several researchers argue the affective and cognitive component of empathy cannot be seen separately as they are strongly interrelated (Kouprie & Sleeswijk Visser, 2009; Gerdes, Segal, & Lietz, 2010; Davis, 1980). Kouprie & Sleeswijk Visser (2009) conclude: "Having an emotional response (affective) to another's emotional state and being able to reflect on that by perspective taking (cognitive) seems to be the core mechanism of empathy". There are also scientists that linked empathy to neuroscience and investigated which neural mechanisms are related to empathy. An example of this is the research of Decety & Moriguchi (2007) in which they identified four neural components that should be activated in the brain for someone to experience empathy:

- 1. Affective sharing: the subjective reflection of another person's observable experience (mirroring)
- 2. *Self-Awareness*: clearly differentiating between your own experience and that of the person being observed
- 3. *Mental flexibility and perspective taking*: the cognitive ability to learn about the situation that is affecting the other and imagining experiencing the world from the other's position
- 4. Emotion regulation: the ability to turn down your own feelings when mirroring another's experience

Looking at the different interpretations of empathy, it seems most are formulated as a form of understanding and relating to someone else. It is often about placing yourself into the position of the other and experiencing what the other is experiencing as if you were in the others shoes. Also the cognitive and affective components of empathy are often included in explanations of empathy.

Boundaries of empathy

Empathy always takes place between two actors; an individual is always empathic towards another person. The degree to which a person can then be empathic is bounded by someone's ability to be empathic and someone's willingness to be empathic with the other person (Kouprie & Sleeswijk Visser, 2009). Kouprie & Sleeswijk Visser (2009) explain the empathic ability of an individual refers to the degree to which someone is able to empathise beyond certain characteristics of his or her own group. This is bounded by someone's 'empathic horizon'. Next to this they explain someone's willingness to be empathic refers to the personal engagement of this person. The willingness can be influenced by someone's personal connection to the other person, someone's emotional state (e.g. someone can be tired) or someone's commitment to the project. This means someone can have a high empathic ability, but if this person simply does not want to be empathic towards a certain person he or she will most likely not be empathic.

Empathy versus sympathy

In literature about empathy the difference between empathy and sympathy is often highlighted (e.g. Kouprie & Sleeswijk Visser, 2009; Baron-Cohen & Wheelwright, 2004; Wispe, 1986; Köppen & Meinel, 2015). The researchers explain it is important to understand these terms are different as they are often confused. According to Baron-Cohen & Wheelwright (2004), sympathy is a special case of empathy. They explain sympathy as: *"feeling an emotion triggered by seeing/learning of someone else's distress which moves you to want to alleviate their suffering"*. Contrary to sympathy, empathy is when one does not feel the desire to take away someone's suffering. Where the goal of empathy is understanding the other person, sympathy is concerning about the other's wellbeing (Kouprie & Sleeswijk Visser, 2009). Wispe (1986) explains empathy is about knowing something about the other, sympathy is about relating to the other.

Internal and external empathy

Several times different types of empathy have been mentioned in literature. Köppen & Meinel (2015) introduce this as internal empathy and external empathy. They explain external empathy as empathy towards the end user or client (i.e. the person you are designing for) in a design process. Here it is about taking the perspective of the client or end user to create an understanding of the problem and the client or end user's needs. Internal empathy is explained as empathy towards team members or colleagues (Köppen & Meinel, 2015). Adamson, Loomis, Cadell, & Verweel (2018) named this interprofessional empathy. It is about working in an often big and multidisciplinary

team where people need to cooperate. To do so, people sometimes need to adjust their own viewpoint in favour of other perspectives (Köppen & Meinel, 2015). Köppen & Meinel (2015) explain the aim of empathy here is mutual understanding to improve collaboration. To do so one has to accept the differences of the other, but not put one's own believes aside (otherwise it would be sympathy). Akgün, Keskin, Cebecioglu, & Dogan (2015) write about collective empathy. It seems collective empathy relates to internal empathy as it also takes place in teams. However Akgün, Keskin, Cebecioglu, & Dogan (2015) explain empathy is a collective phenomenon within a team. They conceptualize it as "a shared state of empathy that includes more than one person and indicates the extent to which team members collectively empathize within the team during the project". Nevertheless, they don't clearly elaborate how this then exactly works on this collaborative scale. It seems that collective empathy is when the individual team members all empathize with other team members. In this way empathy is still something like an individual experience. Akgün, Keskin, Cebecioglu, & Dogan (2015) also state that too much or too little empathy within a team could harm the potential for insightful thinking of the team members. They explain too much empathy could result in group thinking and too little empathy could result in ego-centricity and narcissism of team members. How this exactly works they don't further explain.

2.6 Empathy in the construction sector

A direct relation between empathy and construction project performance is not really found in previous research. In other sectors different researches advocate for empathy as an important competence (see the next section on the potential of empathy), but it seems to be a relatively new link made for the construction sector. Nevertheless one research was found connecting empathy and the construction sector. In this research by Butler & Chinowsky (2006) the relation between different emotional intelligence factors (one of which is empathy) and transformational leadership has been examined for the construction industry. They firstly conclude there is a strong relationship between emotional intelligence and leadership behaviour. Next to this they found people working in the construction industry score low on empathy. The authors state a change is needed in the construction sector where new construction professionals should be selected by recognizing the value of emotional intelligence. They conclude that especially on the empathy component additional attention is needed. However they don't elaborate on how this should be done and why or how this then would benefit a construction project. The statement by the authors that empathy is lacking in the construction industry is also rather broad. The construction industry covers many different aspects and activities in which many different people are involved. The general statement about the lack of empathy does not reveal any information about which people specifically score low on empathy.

Butler & Chinowsky (2006) give as a possible explanation for the lack of empathy in the construction sector that historically empathy was not an important competence in the industry. In the traditional way of working contractors received a design and executed this design based on the lowest bid. This is more a transactional process where it was less needed to be aware of, understand and appreciate feelings of other involved people. However with the recent, more integrated ways of working and other assessment criteria for the tender bids, this statement no longer holds and it could be more important to empathize with others.

2.7 The potential of empathy

In research not focussed on the construction sector, interesting research results are found about empathy in general or its relation to performance. To begin with, an individual's level of empathy can be measured (see the next section 2.8). Different tests exist with which empathy can be measured (Gerdes, Segal, & Lietz, 2010). There are also researchers that argue that empathy can be trained (Chiu, Lam, Kolomitro, & Alamparambil, 2011).

Empathy is also mentioned a lot in literature about design processes, it seems to be a common practice in this field. Looking at a design process in general, different researchers argue design processes should be seen as social

processes (Smulders, Lousberg, & Dorst, 2008; Bucciarelli, 1988). Empathy is included a lot in design processes to empathize with the user (user-centred design). Koskinen, Battarbee, & Mattelmäki (2003) introduce 'Empathic Design' as a design method where designers "get closer to the lives and experiences of users in order to increase the likelihood that the product meets the user's needs". Köppen & Meinel (2015) explain empathy as the first step in a Design Thinking process to explore the problem and understand the user and the user's needs. They also explain that often personification is used for this. Kouprie & Sleeswijk Visser (2009) further specify empathy in design processes by proposing a framework to support an empathic approach in a design process. In their research, Sandman, Meguid, & Levänen (2020) conclude that in the architecture sector, an empathic approach could reduce the distance between users and designers which improves the quality of the design. Blanco, López-Forniés, & Zarazaga-Soria (2017) conducted a research in which they discuss different design methods that could improve external empathy and teamwork for students in the IT sector. Another research in the IT sector done by Dobrigkeit, Pajak, de Paula, & Uflacker (2020) investigated which Design Thinking methods could stimulate internal empathy as well as external empathy and combined this into a toolbox to support agile development teams. On the side of solely internal empathy, Adamson, Loomis, Cadell, & Verweel (2018) developed a four-stage model of internal empathy for the health care sector to improve teamwork.

2.8 Measuring empathy

In the previous section it has been mentioned empathy can be measured. In literature different tests can be found with which this can be done. Gerdes, Segal, & Lietz (2010) explain it is hard to draw a conclusion on the best way to measure empathy because different definitions of the term empathy are often used. Below the different tests found in literature will be elaborated on. It is important to note that all tests listed below are self-report tests which means the respondent fills in a questionnaire about his or her own behaviour. Alternatively, observation methods exist to measure empathy where someone else (the researcher or a therapist for example) observes and reports about the empathic behaviour of a person (Gerdes, Segal, & Lietz, 2010). Another method to measure empathy is via a neurological scan with an fMRI machine in which it can be measured how much someone is able to activate the four neurological components of empathy as given by Decety & Moriguchi (2007) (see section 2.5) (Gerdes, Segal, & Lietz, 2010). It must be noted there are researchers that argue some of the self-report tools are measuring sympathy instead of solely empathy (Gerdes, Segal, & Lietz, 2010).

When measuring the empathic ability of a group of people often a distinction is found between gender where women score significantly higher on empathy than men (Baron-Cohen & Wheelwright, 2004; De Corte, et al., 2007; Davis, 1980). Baron-Cohen & Wheelwright (2004) conclude that people with forms of autism score lower on empathy in a measurement.

Interpersonal Reactivity Index (IRI)

The Interpersonal Reactivity Index or IRI is one of the most widely used methods in literature to measure empathy (Gerdes, Segal, & Lietz, 2010). It was designed by Davis (1980) to multidimensionally measure individual differences in empathy. It tries to measure both cognitive and affective components of empathy. Other desirable aspects of this test are the fact that it is relatively short for the respondent to fill in, but comprehensive in how it measures empathy (De Corte, et al., 2007).

To develop the test, Davis started with an original test consisting of 50 questions. Via a factor analysis these questions/items have been categorized by Davis into four groups:

- 1. *Fantasy (FS)*: scoring high on this group means the respondent can identify strongly with fictional characters in movies, books or plays.
- 2. *Perspective-taking (PT)*: scoring high on this group means the respondent has a tendency or ability to adopt the perspective, or point of view of someone else.

- 3. *Empathic concern (EC)*: scoring high on this group means the respondent is able to experience feelings of warmth, compassion or concern for other people that experience negative experiences.
- 4. *Personal distress (PD)*: scoring high on this group means the respondent is able to experience feelings of discomfort and anxiety when observing a negative experience of someone else.

After the factor analysis not all questions could be categorized in these four groups. So after the factor analysis it was decided by Davis to not include items not scoring on one of these factors or adjust/add some items. After this Davis repeated this process with the questions left resulting in a final questionnaire of 28 questions. There are seven questions per category FS/PT/EC/PD. Respondents answer the items by indicating on a 5-points scale from 0 (describes me completely not) to 4 (describes me very well) how much the statement describes them.

Categories PD and EC assess the affective component of empathy; PT the cognitive component; FS is harder to characterise as affective or cognitive, but it is often included as an assessment of the affective component of empathy (De Corte, et al., 2007). However, De Corte, et al. (2007) also mentioned that it seems that especially the EC category measures more sympathy instead of empathy. Baron-Cohen & Wheelwright (2004) add to this that they think the IRI test is one of the best measures of empathy, however they do suspect it measures more than just empathy. They explain they think some items assess someone's imagination (mostly in the FS group) or emotional self-control, and these factors may be correlated with empathy but they are not empathy.

A Dutch version of the IRI test was presented by De Corte, et al. (2007). They translated all questions and tested with a factor analysis if they were still loading on one of the groups. They also assessed the internal reliability and construct validity of the scores. This resulted in a validated Dutch IRI test to measure people's empathic tendencies. The IRI test seems the only test with a (validated) Dutch translation.

Empathy Quotient (EQ)

Baron-Cohen & Wheelwright (2004) introduce the Empathy Quotient (EQ) as a measure for empathy for adults of normal intelligence. They created a test that consists of 40 questions measuring empathy. Next to this 20 filler questions are added to the test that are not related to empathy to make sure the respondent is not solely focussed on thinking about empathy or steered into that direction. This makes the test consist of a total of 60 questions. Baron-Cohen & Wheelwright (2004) also explain the test does not separate affective and cognitive components of empathy as they think the two are related and co-occur.

Respondents answer all questions of the test on a 4-point Likert scale going from strongly agree to strongly disagree. Answers get scored 0, 1 or 2. The maximum amount of points a respondent can obtain is 80 and the minimum 0. A low score on empathy according to Baron-Cohen & Wheelwright (2004) is a score < 30 points. People with (forms of) autism often score below 30. Being super empathic is considered as a score > 62. In their study women scored on average 47.2 points, men 41.8. It the research of Sleeswijk Visser (2009), the EQ scores are interpreted as 0-32 low, 32-52 average, 53-63 above average and 64-80 very high.

Empathy (EM) Scale

The EM scale is developed by Hogan (1969). The test has 64 questions that can be grouped into four categories/factors: social self-confidence, even-temperedness, sensitivity, and nonconformity. It can be questioned however if these groups are fully measuring empathy. Baron-Cohen & Wheelwright (2004) state: "As can be seen from these factors alone, it is clear that this scale is also not a pure measure of empathy. In fact, only one of these factors is directly relevant to empathy (sensitivity). The scale may be better thought of as a measure of social skill". Also it does not distinguish affective and cognitive items as it combines scores to both into a single empathy score (Davis, 1980).

Questionnaire Measure of Emotional Empathy (QMEE)

The Questionnaire Measure of Emotional Empathy (QMEE) is presented by Mehrabian & Epstein (1972) as a measure of empathic tendency of an individual. The test consists of 33 questions categorized in seven subscales of aspects measuring empathy. Respondents answer on a 9-points scale of -4 (very strong disagreement) to +4 (very strong agreement). The seven subscales are: susceptibility to emotional contagion; appreciation of the feelings of unfamiliar and distant others; extreme emotional responsiveness; tendency to be moved by others' positive emotional experiences; tendency to be moved by others' negative emotional experiences; sympathetic tendency; and willingness to be in contact with others who have problems. Baron-Cohen & Wheelwright (2004) are critical towards the QMEE and explain they think some items in the test measure affective empathy, but the scale as a whole may be confounded. Innamorati, Ebisch, Gallese, & Saggino (2019) add to this that the QMEE is not an unidimensional measure of empathy and its different dimensions don't clearly relate to a theoretical structure of emotional empathy.

Other tests

Next to the more commonly used tests as described above, there are many other tests that claim to measure empathy. Below some of the most commonly known tests will be presented briefly. However, during a short literature review different constraints were found of using these tests. For this reason the research will not further elaborate in-depth on these tests.

Chapin Social Insight Test

The Chapin Social Insight Test was developed by Chapin (1942) as a cognitive definition of empathy. Questions in the test are presented as hypothetical scenarios of which the respondent has to choose the most effective course of action from four options (Baron-Cohen & Wheelwright, 2004). However, it is missing interpersonal functioning (Davis, 1980). Baron-Cohen & Wheelwright (2004) add to this that the test clearly involved more than just measuring empathy because choosing an effective course of actions might be based on culture, social rules and so forth.

Index of Empathy for Children and Adolescents (IECA)

Bryant (1982) developed the Index of Empathy for Children and Adolescents. This test however is more suitable to measure empathy for younger people.

The Empathy Test

The empathy test was developed by Kerr (1947) and later validated and evaluated by Kerr & Speroff (1954). Davis (1980) however criticises this test: *"it was an attempt to measure directly an individual's ability to take on the perspective of other person. However the test itself asks to estimate how a group would react. So it is more about general knowledge than that it measures individual perspective taking".*

3. Theoretical Framework

Based on what has been found in literature an opinion can be formed about the topic and what should still be researched. This chapter will now present the boundary conditions of the research in the form of a theoretical framework and it will further explain key concepts relevant to this research. First conclusions will be drawn about the topic and existing knowledge by an interpretation of what has been found in literature in 3.1. Next the theoretical framework will be supplemented with information supporting the search for the role of empathy in the preconstruction phase in 3.2 to 3.5. Finally a conceptual research model will be presented in 3.6 and the chapter ends with a problem statement in 3.7 to indicate what is still unknown and what is still to be solved.

3.1 Interpretation of the literature review

In this section what has been found in the literature review of chapter 2 will be interpreted by the researcher. It is the question what the found information means for this research and what knowledge is still missing.

Improving project performance via empathy during the preconstruction phase

The literature review confirmed the relevance of focussing on empathy in this research. It revealed that several factors are known that are important to project success that can be linked to empathy. An example of this is the conclusion from several studies that the success of a project is dependent on the competences of people involved (leadership competences in particular) and that empathy is a key ingredient for leadership (e.g. Toor & Ofori, 2008; Giritli & Topcu Oraz, 2004; Simmons, McCall, & Clegorne, 2020; Pinto & Trailer, 1998; Cheung, Suen, & Cheung, 2004; Duff, 2017; Mahsud, Prussia, & Yukl, 2010; Bakar, Ishak, & Abidin, 2014). The literature review also provided more context to the focus on the preconstruction phase of the research. It for example revealed decisions made in earlier project phases influence the project outcome the most by having a significant influence on following phases and lower costs of changes compared to following project phases (Kuprenas, 2007; Young, 1997; Herrera, Mourgues, Alarcón, & Pellicer, 2020; Oberlender, 1993). Based on these literature review results there is a strong expectation empathy is beneficial for a construction project during the preconstruction phase as it could promote the collaboration between involved project participants in different ways. It is still unclear however for which people exactly it would be crucial to be empathic during the preconstruction phase for a good project outcome. Information about which processes exactly take place in the preconstruction phase and which actors are involved is also still missing. The next section 3.2 will therefore fill this gap by adding this information to the theoretical framework to support the researcher in the search for the relationship between empathy and project success during the preconstruction phase.

Literature also showed that an increased focus on improving collaboration in a construction project could cause that collaboration becomes rather the objective of the project than a means for successful project delivery (Eriksson & Westerberg, 2011). For this research this means it is important to not just focus on achieving as much empathy as possible in general, but really look at when or when not empathy could or should be a means to achieve a higher project performance. Empathy is not the end goal, the end goal is a higher project performance. The following definition for project performance will be used in this research: "to what extent the project scores on its success criteria or KPI's". The objectives of the project define the success criteria or KPI's. This definition is derived from the different definitions of project performance by de Wit (1988), DeCotiis & Dyer (1979) and Cheung, Suen, & Cheung (2004). Projects can have different objectives and thus different interpretations of when a project performed well. As explained by Takim & Akintoye (2002) the expectations of stakeholders can influence the objectives of the project or it can be an objective to satisfy stakeholder expectations. This makes that the project participants should be aware of and understand the expectations of the different stakeholders. Empathy could be an important competence for this. If the project participants are not able to relate to what the other stakeholders want and need, this could have a negative impact on the project outcome. This, on its turn, is then visible in whether the project reaches the targets of the iron triangle or other success criteria

Definition of empathy

People could have different views on what empathy is. The definition of empathy used in this research is "*the ability to understand and share the feelings of another*" - (Lexico Oxford Dictionary, 2021), where it is assumed that empathy has a cognitive and affective side. It is possible that in certain situations during the preconstruction phase the affective side of empathy is more relevant and in other situations the cognitive side. It is interesting to see if these cognitive and affective differences of empathy can be linked to the construction process.

This research also adopts the difference in internal and external empathy as found in literature of Köppen & Meinel (2015). For a construction project external empathy is interpreted in this research as empathy towards the client and stakeholders to understand their perspectives and/or context adoption of the project. External empathy then could help to understand the expectations and wishes of stakeholders and the client. Internal empathy for a construction project is interpreted as empathy within the project organization between team members or colleagues. Internal empathy could help to improve the collaboration and integration between different disciplines in the project by understanding what someone else needs or thinks. Next to this internal empathy could promote team performance by improving the relationship between the team members. Both internal and external empathy seem relevant to a construction project where on one hand the designed project must comply with the wishes of the client and/or end user and on the other hand many different people working together in multidisciplinary teams need to deliver and/or execute this design.

A lack of empathy in the construction sector

The literature review revealed that it is said that construction professionals in general score low on empathy (Butler & Chinowsky, 2006). If empathy is indeed an important factor to construction project performance, the lack of empathy might be causing underperformance of projects. Further information about this lack of empathy was however missing. It is interesting to investigate if this is true and gain a better understanding of how empathy is distributed amongst different actors in the construction industry. This information is needed to be able to draw conclusions about where it would be effective to focus on empathy to improve project performance. This means the empathic ability of people in the construction sector has to be measured. Also, for some people in certain disciplines it might not be a problem if they score low on empathy as it is less needed for them to be empathic in their daily work. This is related to the question where in the preconstruction phase it would be important for project participants to be empathic towards another involved actor for a good project outcome.

When it comes to measuring empathy, this research only focuses on self-report tools. In the literature review different self-tests have been found. These tests are mostly developed for the field of psychological research. To decide which test is most suitable to use in this research, the most common tests have been compared to each other. This has been done based on their advantages and disadvantages as found in literature in section 2.8 and on the opinion of the researcher of this research. Table 1 gives an overview of the advantages and disadvantages of each test. Based on the advantages and disadvantages it has been decided the Interpersonal Reactivity Index (IRI) is most suitable for this research to measure empathy of people working in the Dutch construction sector. The fact that a validated Dutch version of the IRI test from De Corte, et al. (2007) is available was considered as a major benefit. This is because people in the Dutch construction sector mostly speak Dutch and not everyone is as advanced in English. A second decisive factor was the fact that the test makes the distinction between the cognitive and affective sides of empathy. It is interesting for this research to also investigate if there are cognitive/affective empathic differences in the construction sector. Finally, the length of the test was also advantageous.

Test	Advantages	Disadvantages
IRI test (Davis, 1980)	 Validated Dutch translation available Widely used Distinction between cognitive and affective empathy Short test Comprehensive in how it measures empathy 	 Not always clear if it measures solemnly empathy or also sympathy Some items may assess someone's imagination or emotional self-control and not empathy
EQ test (Baron-Cohen & Wheelwright, 2004)	 Widely used Filler questions to distract the respondent from empathy 	 Long test No distinction between cognitive and affective empathy
<i>EM Scale test</i> (Hogan, 1969)	No specific advantages found	 Long test No distinction between cognitive and affective empathy Not clearly a test to measure empathy, but more a measure of social skill
<i>QMEE test</i> (Mehrabian & Epstein, 1972)	 Short test Wider answer scales for more spread in the collected data 	 It can be questioned if the scale as a whole completely measures empathy Dimensions don't clearly relate to a theoretical structure of emotional empathy

 Table 1: Comparison of the most common empathy measurement methods

3.2 The preconstruction phase

To support the search for the role of empathy during the preconstruction phase it is needed to clarify what happens during the preconstruction phase. The preconstruction phase consists of different subprocesses in which many actors are involved. Only looking at the relevance of empathy for the whole preconstruction phase in general doesn't generate a lot of useful information. Instead it is more interesting to investigate for which specific activities it is important for the involved people to be empathic for a good project outcome. For some roles in some situations empathy might be crucial for project success. A visual representation of the complete process of the preconstruction phase is therefore presented in Figure 2. This is the preconstruction phase for integrated construction projects where the (final) design is made by the project team of the contractor after the contract has been awarded. This process is visualised from the perspective of the contractor as they are responsible for most of the work, but in all processes there's interaction with the counterpart process of the client. The information about what the preconstruction phase looks like in this section is obtained via the construction company with which this research has been executed. It should be noted that it is a generic construction process. This process is visualised to structure the search for the role of empathy in the preconstruction phase. What the preconstruction phase looks like in Figure 2 serves as a boundary condition for the research and the data collection will be based on this process.

In this research, the preconstruction phase starts with the tender phase. The main participants in the tender phase are the client, who initiated the tender, and the tender managers. Project managers and project controllers have an advisory role to the tender managers during the tender phase to advise on what is possible and feasible from a practical point of view. Stakeholder managers are involved to help analyse the requirements and wishes of the

stakeholders and to help to decide how to include these in the tender bid. The technical management team is involved to make the tender design. After the contract has been awarded and accepted the project team is composed and starts with the preparation of the construction project. This means the (sub-)processes and teams for Project Control, Contract Management, Stakeholder Management and Technical Management start simultaneously with their workflows. This is guided, facilitated, and controlled on a higher level by the project managers. During gate reviews, it is analysed if the work done by the different processes is aligned enough and to decide on how to further proceed. If all (sub-)processes are finished with their preparation and during the final gate review agreement has been found on how to proceed, construction starts which means the preconstruction phase ends. What exactly happens within the different (sub-)processes of the preconstruction phase is further elaborated on in Appendix B: The (sub-)processes of the preconstruction phase.



Figure 2: Visual representation of the preconstruction phase (own figure)

3.3 Actors involved in the preconstruction phase

The research adopts the Integral Project Management (IPM) structure for construction project teams to describe which actors are involved during the preconstruction phase. The IPM structure has been selected because the construction company with which this research was executed and the case project of this research both adopted the IPM structure for their organization. In the Netherlands, the public authority responsible for all national infrastructure (Rijkswaterstaat) follows this structure (Rijkswaterstaat, 2021). Rijkswaterstaat is almost always the client for large infrastructural projects in the Netherlands and over the years almost all companies in the Dutch construction sector adopted this IPM structure too. Most information in this section about the IPM model comes from Wermer (2018). In this research both the side of the contractor and the client are included when looking at actors involved in the preconstruction phase. On both sides a project team is active following the IPM structure (assuming Rijkswaterstaat is the client). According to IPM there are five processes in a construction project that are executed by five different roles each representing a different discipline. The different roles are: Project Manager, Project Controller, Stakeholder Manager, Technical Manager and Contract Manager. Each role can be fulfilled by one or more actors. Below every role is a supporting team active. All of these actors are involved in the preconstruction phase. Their final goal is to successfully deliver the project together.

The teams on the client side are much smaller than on the side of the contractor. The project organization on the contractor side is often further split in sub-teams with different roles. This organizational structure of the separate teams on the contractor side are more information about the responsibilities of the different IPM teams is presented in Appendix A: The different IPM teams in a project organization. Following the IPM model, the relationship between the five different roles is hierarchical on the contractor side (Figure 3). Stakeholder Management, Technical Management and Contract Management are more involved in the operational tasks. Project Management and Project Control are less closely involved in the operational tasks, but their task is rather to supervise and control the complete project on a higher level. On the client side the relationship between the different roles is less hierarchical, only contract management has a more overarching role here.



Figure 3: IPM five role model for integral project management (own figure based on (Wermer, 2018))

3.4 Empathy and construction project performance

Unfortunately, no previous research has been found containing a clear description of the relation between empathy and project performance in the construction sector. Nonetheless, based on what has been found in literature, there are expectations about in what ways empathy could benefit construction project performance. It should be noted that this is how the researcher that executed this research interpreted and combined the information found in literature. First it is believed there's a difference in the way how empathy is able to influence project performance. One way is when empathy of an individual has a direct effect on the quality of the work done or a project deliverable. This is for example when empathy helps someone to take the perspective of another stakeholder (for example municipalities or local residents) or the client. By placing oneself into the shoes of the client, a project participant can create an understanding of what kind of specifications this client for example desires in the design of a bridge. Being empathic towards the stakeholder then supports the design to better fit the requirements and wishes of the stakeholder. The empathic thinking of an individual has a direct effect on project deliverables in this way (i.e. on how the design is made). As explained in section 2.1, project performance is related to the expectations of stakeholders (Chan & Chan, 2004; Takim & Akintoye, 2002). The more the work done matches the expectations of the stakeholders, the more the project will be perceived as successful.

Another way in which empathy can stimulate project performance is when it improves collaboration and integration between people involved. In this way the result of empathy is not directly visible in the work done or as a project deliverable. As a result of the better collaboration and integration between these people, the work they will (collectively) deliver will be of a higher quality and it will fit better together which is beneficial for the project performance. Here empathy could for example help to understand what kind of communication with the client should be used. Empathy influences the project in this case in a different way than described in the paragraph above. In the paragraph above the empathic thinking has a direct effect on the design of the bridge, whereas better communication is not directly visible in the design.

3.5 Empathy and the preconstruction phase

Furthermore there are expectations of the researcher about how empathy can then be involved in the processes of the preconstruction phase as presented in Figure 2 and between the actors involved. It is believed empathy can be involved in this phase on three levels: (1) between the different processes (e.g. empathy between someone in the design team and someone of the execution team), (2) on a lower level within each process (e.g. empathy between two people within the design team that together need to make the design) or (3) between people in the project organization and the client or external stakeholders (external empathy). A visual representation of this is presented in Figure 4. The question remains where and on which level it is most crucial for people to be empathic with each other for a good project outcome.

During the research these three levels will be used to structure the search for the role of empathy. The three levels will be further discussed in the next sections. It is decided the research will not focus on one of the three levels specifically as it is not yet clear via which way empathy plays the biggest role and how the project performance can be improved best. However, in literature statements related to certain levels were more often mentioned as important to project success. This caused it is expected by the researcher that empathy between different processes or within processes has a higher effect on project success compared to empathy externally with people outside of the project organization. The research tries to confirm if these expectations are correct or if other levels might be more dominant to project success.

It should be noted that as this research focusses on the preconstruction phase, it is believed these ways in which empathy can be present apply to the preconstruction phase. However, it is not excluded that empathy is not able to influence other project phases in these ways too. For example in later project phases empathy could also be present between people from different processes. This research however not dives into how this exactly works for other project phases.



Figure 4: Visual representation of how empathy plays a role in the preconstruction phase (own figure)

(1) Empathy between different (IPM) processes

It is first of all believed empathy plays a role between people from different (IPM) processes (= internal empathy). Integration between people from different processes is important to project success (Demirkesen & Ozorhon, 2017; Herrera, Mourgues, Alarcón, & Pellicer, 2020; Eriksson & Westerberg, 2011; Franz, Leicht, Molenaar, & Messner, 2016). The different processes are all represented by people with different discipline backgrounds and different interests. For a good project outcome, their work needs to be aligned and they must cooperate. Since they are different types of people, this integration between different disciplines can be difficult. This matches with the experiences from practice where the integration between the different teams is the point of attention. It is believed empathy helps to understand someone from another project (sub-)team or process that has a different expertise of interest which improves the integration between them. In his book, Wermer (2018) gave an extensive overview of the relations between the different IPM disciplines. This overview is listed in Appendix C: Relations between the five IPM roles. Looking at these different relations, it can be concluded people from the different disciplines need to cooperate and integrate their work very often. In many of these relations it seems relevant to expect empathy between two involved people from different disciplines as helpful. For example the design team needs to make a design that meets the requirements drawn up by the stakeholder management team. And to make the execution plan, the execution team should be able to understand what the design team intended with the design. Relating to what someone from another team means, thinks or needs by being empathic seems valuable here. During the research it has been investigated if this is true and indeed empathy is important here.

(2) Empathy within (IPM) processes

Within the different (IPM) processes empathy can also fulfil an important role (= internal empathy). Being empathic could improve team performance by improving the collaboration and integration between team members within a process. This can happen via the manager who's empathic ability improves the team performance. It is said empathy is beneficial for the leadership competences of a (project) manager (Burke & Barron, 2014; Toor & Ofori, 2008; Duff, 2017). It is the task of the manager to guide and steer the team. An empathic manager is able to better feel and understand what the individual team members need or feel. The manager can adjust his/her management to this resulting in the team collaborating and performing better. Empathy can also be present within teams on a lower level via a team member who is empathic with a fellow team member when they need to work together. Empathy would then promote team cohesion, trust and communication between team members which is beneficial for the performance of the team (Miyashiro, 2011; Rapisarda, 2002). It is unknown yet for which processes this is important in particular and how this exactly influences the project success.

(3) Empathy with people outside of the project organization

Finally empathy can be relevant for people within the project organization with people outside of their project organization (= external empathy). This works between people from the project organization of the contractor and people from the project team of the client or towards stakeholders. For example for a designer it could be important to step into the shoes of the client or end user when making the design. In this way being empathic could make sure the design fits better with the wishes of the client/end user. Another example is that for a stakeholder manager empathy could help to create a deep understanding of what external stakeholders envision for the project. Taking their perspective by being empathic could then help in deciding how to keep them on board.

3.6 Conceptual model

As made clear in section 3.1 there is a strong expectation that empathy is an important factor during the preconstruction phase affecting project performance. Based on the literature review and the information in this chapter a conceptual research model has been made. The model is presented in Figure 5. During the research it has been tested if this model can be confirmed.



Figure 5: Conceptual research model

The model can be explained as follows:

What happens during the preconstruction phase determines the outcome of the project. The activities that take place during the preconstruction phase are influenced by the interaction with the client and/or stakeholders. This interaction determines the context of what happens during the preconstruction phase. It is for example about how the wishes and requirements of the client and/or stakeholders should be included in the design. External empathy influences this interaction and relation with the client and/or stakeholders. To reach project results the activities of the preconstruction phase are then collectively executed by the actors in the project organization. This means for example the design is made. Here internal empathy influences how these actors interact with each other and what performance they will eventually deliver.

3.7 Problem statement

Combining what has been found in literature in chapter 2 and the previous sections of this chapter, it can be concluded what is still unknown about the topic. This results in the following problem statement:

"Construction projects often experience a poor project performance which asks for improvements in the construction process. It is said the project performance is influenced by the competences of the people involved in the construction project. A literature review and experiences from practice gave a strong impression that especially empathy with another person involved in the project could be of importance during the preconstruction phase. However it is not yet investigated how during the preconstruction phase empathy with another involved actor can be enhanced in order to improve overall project performance."

The objective of this research is to find a strategy to deal with the above problem.

4. Research Design

In this chapter the research set-up will be explained. First the scope of this research will be explained in 4.1. Next the research questions of the research will be discussed in 4.2. After this the research methodology will be presented in 4.3. Section 4.4 will then discuss the data sampling of the research. Next the data analysis will be discussed in section 4.5. Finally in 4.6 the criteria with which the research has to comply will be elaborated on.

4.1 Scope of the research

In this section the scope of the research will be discussed. The goal is to clarify the boundaries within which the research will be executed.

Included in the scope of this research

As explained before, the research will focus on the role of empathy during the preconstruction phase. This concerns specifically the preconstruction phase of integrated construction projects as this is the most common procurement method at the moment. The preconstruction phase starts with the initiation of the tender and ends when construction starts. The structure of the project organization during the preconstruction phase is the Integral Project Management (IPM) structure in this research. The research looks at both the contractor side of the project organization as well as the project team on the client side.

Not included in the scope of this research

As the research focusses on the preconstruction phase of integrated construction projects, the role of empathy in other phases of the construction process or for other procurement models is not included in the scope of this research. Secondly, as the research follows the IPM structure for construction project organizations, other structures for project organizations (like PRINCE2) are not included in this research.

4.2 Research questions

In order to solve the problem as stated in 3.7, the problem and research objective have been translated into research questions. This is done within the scope boundaries as stated in 4.1. The main research question of this research is:

How to improve the project performance of integrated construction projects by focusing on empathy during the preconstruction phase?

To support finding an answer to the main research question the following sub-research questions have been formulated:

- **Q1:** Can empathy be confirmed as an important competence during the preconstruction phase affecting project performance?
- Q2: Where in the preconstruction phase of an integrated construction project would it be important for project participants to be empathic with others?
- **Q3:** How is the actual level of empathy distributed across project participants of an integrated construction project?

 Q4: Could you improve project performance by stimulating empathy during the preconstruction phase in the fields where it is lacking?

Substantiation of the chosen research questions

In order to solve the problem of this research it is needed to find an answer on how construction project performance can be improved by focussing on empathy during the preconstruction phase. This has been done within the scope boundaries as discussed in 4.1. To do so it is needed to gain information on where and when it would be effective to stimulate empathy during the preconstruction phase. First it is needed to investigate if the conceptual model from section 3.6 can be confirmed and empathy is indeed an important competence affecting project performance during the preconstruction phase (Q1). Second, as the preconstruction phase is extensive, it is important to gain information on where exactly in the preconstruction phase it would be important for the involved people to be empathic (Q2). Knowing for which people it is important to be empathic, it is next needed to investigate how the involved people actually score on empathy. Especially in the fields where people score low on empathy, but where people do need to be empathic (following from Q2) it is interesting to focus on empathy is distributed across project participants (Q3). Based on the answers on Q1, Q2 and Q3 ideas can be formed about how project performance can then be improved if empathy. Finally it is stimulated in the fields where it is lacking (Q4).

4.3 Research methodology

In order to find answers to the research questions as stated in 4.2, the research has been executed in four separate parts following the scheme in Figure 6. Combining the research results of the four parts an answer can be formulated to the main research question of this research. Part I, the literature review of chapter 2 and the theoretical framework of chapter 3, forms the basis of the complete research by identifying what is already known about the topic and supplying input for the three following research parts. The complete research has been conducted via an inductive research approach where the researcher collects specific data and analyses this data to come to a generic conclusion (Dudovskiy, sd). For an inductive approach no hypothesises are formed. For the different parts of the research, different research methods have been used. For Part II the research method was having in-depth expert interviews, for Part III developing and spreading a questionnaire and for Part IV an expert session was held. Considering the research methods for these three parts, the overall research method can be indicated as a mixed-method research as the complete research includes both quantitative and qualitative methods.



Figure 6: Schematic overview of the research design

Research method Part II

Part II of the research tries to find an answer to sub-research questions Q1 and Q2. The chosen research method for this part is conducting **in-depth expert interviews**. In interviews with experts from the sector it has been investigated if the importance of empathy during the preconstruction phase can be confirmed (Q1). Next to this the experts have been consulted to gain insight in where in the preconstruction phase it would be important for project participants to be empathic with others (Q2). According to Boyce & Neale (2006) and Baarda & Bakker (2006), conducting in-depth interviews is a suitable research method when the researcher wants detailed information on the perspective of the respondents on a particular idea, program, or situation, or about someone's knowledge, attitude or opinion. This research method is chosen because it is believed the experts will have a lot
of experience in the sector and working with the integrated procurement model. It is assumed that, based on their experience, the experts have enough knowledge that can be used to answer Q1.

The interviews have been held semi-structured. As the researcher was looking for data about where in the preconstruction phase empathy of project participants would be crucial, some structure was necessary in the interview to make sure no important aspects were skipped. However, as there's a risk the concept of empathy can be rather vague for interviewees if not familiar with the topic, semi-structuredness has been applied to give the opportunity to the researcher to ask follow-up questions if needed to collected the data looking for. Also, as the connection between empathy and the construction sector in research is rather new, it was also interesting to conduct the interviews less structured to see if other relevant information could be revealed. The complete interview is semi-structured with this.

The interview set-up can be found in Appendix D: Interview set-up Part II. As all interviewees and the interviewer are Dutch, the interviews have been held in the Dutch language. The interviewees did not receive a lot of information about the research beforehand to prevent biased answers. The interviews started with broader questions about project success, project failure, collaboration and project improvements to investigate if the importance of empathy to a construction project could be confirmed. In the beginning of the interviews, the term empathy has not been mentioned by the interviewer on purpose to not immediately steer the interviewees in the direction of empathy and prevent biased answers. Then the interviews focussed on empathy specifically, but without mentioning the term empathy. Empathy was formulated as the ability to take the viewpoint of someone else or feel along with someone (*nl: inlevingsvermogen*). Later it has been explained that this is empathy and the interviews zoomed in on the role of empathy specifically for the preconstruction phase. This could increase the risk of biased results, but this has been done anyway as it is important all interviewees understood the concept of empathy before they further shared their thoughts about the topic. Baarda & Bakker (2006) explain it is important for complex topics to first define the concept clearly in the interview and next operationalise it in a couple of questions. Finally it should be noted that during the whole interview, when statements were shared related to empathy, the interviewer always tried to ask why empathy was important in that case, who needs to be empathic and towards whom.

Research method Part III

The third part of the research addresses the third sub-research question Q3. The function of this part of the research is describing the empathic ability of people in a project organization. The chosen research method for this part is developing and spreading a **questionnaire**. A questionnaire is a quantitative research method (Broom, 2005). According to Singleton & Straits (2009) this is a suitable method to research and describe human behaviour. In this case this means describing people's empathic ability. Next to this it is a fast method to obtain a lot of data. The questionnaire has been developed based on the already existing IRI test of Davis (1980) to measure empathy. As explained in section 3.1 this test has been selected as the most suitable empathy measurement method for this research based on its advantages and disadvantages. The final question list itself consists on one hand of questions about empathy coming from the IRI test, but respondents also needed to fill in personal characteristics and information about their role and place in the project organization as this was needed for the data analysis and final result. The complete questionnaire used in this research to measure empathy can be found in Appendix H: Test to measure empathy of people working in the construction sector.

Research method Part IV

The fourth part of the research answers the final sub-research question Q4. It is the question if project performance can be improved by stimulating empathy during the preconstruction phase in the field where it is lacking. To answer this question the final link to project performance had to be made. Based on the research

results of Parts I, II and III a framework has been designed that can be used by the construction sector as a strategy on how to improve project performance via empathy. First it has been decided what the framework should look like by drawing the foundations of the framework. This implies a set of recommendations for interventions related to stimulating empathy that intend to increase project performance. Next to this certain boundary conditions and specifications for these interventions have been listed. The interventions, boundary conditions and specifications are all based on the research results of Parts I, II and III. The main goal of Part IV of the research was to validate these foundations of the framework. This has been done via an **expert session** with experts from the industry. With the results of the expert session the foundations of the framework have been adjusted a bit and the final version of The Empathy Framework could be designed as a guide for construction professionals on how to improve project performance via empathy.

To structure the expert session an interview scheme has been made. This scheme can be found in Appendix J: Interview set-up Part IV. The questions in the interview scheme are all based on the foundations of the framework. 5 days before the expert session all experts also received a document containing background information about the research and the most important research results of Part II and Part III. This was done to save important time during the session that could be better spend on collecting data and to make sure the experts were informed about the research in advance. In this way they could already start thinking about the subject and it was expected they would be more prepared to give suitable and well thought out answers during the session. The expert session has been held semi-structured, just like the interviews from Part II. Semi-structuredness has been chosen because some structure is needed to validate all foundations of the framework. However it is also considered valuable that the researcher is able to ask follow-up questions if needed during the discussions to get to the information needed to answer Q4.

The expert session started with a short introduction round to create a more informal and open environment between the participants. Next the experts were asked if there were still things unclear about the document they received in advance. After this the session started with asking the questions to the experts as listed in the interview scheme. The researcher used an online interactive tool for this. This worked as follows: the experts were presented a question on the screen and on their mobile phones they all had to answer this question. After all experts submitted their answers, the answers were showed on the screen and the group had a small discussion about the answers. This supplied more context to the answers. Next to this it prevented groupthink and biased answers because answers of others were presented after all answers were submitted. The experts were first asked what they recognized as causes of a poorer project performance from a list of possible causes. For factors that don't cause a poor project performance, it is less relevant to see if they can be solved by stimulating empathy. These causes are based on situations of which it is expected empathy is influencing project performance based on Part II and/or III, but where it is not present. After this the experts were asked to rate each intervention in the framework on the basis of its effectiveness to improve project performance. This has been done to validate if (a) the framework tackles the right causes of a poorer project performance and (b) if the interventions in de framework are indeed able to improve project performance. After this the boundary conditions and specifications of the framework have been validated with a couple of questions.

4.4 Data sampling

The data for the three parts of the research has been collected from a case project. It has been decided to collect all data from one construction project to make sure the data sample is representative for a real life construction project. The project is a big integrated construction project in the Netherlands contracted via a DBFM contract. Data has been collected on both the side of the client and the contractor. During the time-span of this research, this project was in the preconstruction phase. This project has also been selected because its project organization on the contractor side consists of a consortium of different contractors and engineering firms. This total project organization consists of 442 people.

For part II and part IV of the research the experts interviewed and invited for the expert session were all working in the project organization of the case project during the research either on the contractor side or the client side. By selecting the experts from one single project it was possible to easily invite experts from different positions in the project organization representing different disciplines. In this way it has been tried to capture potential different views that these people can have towards a single project as much as possible. Next to this it is assumed that because these people at the moment of interviewing worked in the preconstruction phase, they are most capable of developing and sharing thoughts about the role of empathy in the preconstruction phase.

Data collection Part II

To collect the data for this part of the research eleven experts from the industry have been interviewed. The interviewees fulfilled the following roles in the project organization of the case project: the managing board on the contractor side, the stakeholder manager of the contractor, a technical design manager of the contractor, a project manager of the contractor, the technical manager and assistant technical manager of the client, the stakeholder manager of the client and two contract managers of the client. The managing board of the contractor consists of three people: the project director, the technical director and the operational director. The interviewees had between 7 and 31 years of experience working in the construction sector and worked on different projects in different roles during their careers.

Due to the COVID-19 pandemic, all interviews have been held online via Microsoft Teams. Video recordings of the interview meetings have been saved to use for the data analysis. All individual interviews took on average 50-60 minutes.

Data collection Part III

For part III of the research all people working in the contractor project organization of the case project received an invitation to fill in the questionnaire with the test to measure their personal empathic ability as well as the project team of the case project on the side on the client. This part of the research tries to answer the question how empathy is distributed amongst project participants of a construction project. By collecting the data from one case project the data sample for this part of the research represents a real life construction project as much as possible. Next to this, the empathic ability of these people has been measured whilst they were working in the preconstruction phase. This resulted in an actual insight in how these people score on empathy during the preconstruction phase.

The questionnaire has been spread digitally via Microsoft Forms to all people working in the project organization of the case project on the side of the contractor and the project team of the case project on the side of the client. The project organization of the contractor consisted of 442 people who received the questionnaire by email. On the side of the client 72 people received the invitation to fill in the questionnaire. This makes a total of 514 construction professionals received the questionnaire. The questionnaire was open for responses for one week. With the questionnaire it has been tried to draw conclusions about the population of all people working in the Dutch construction sector. Recent numbers about the men-women ratio in the construction sector are missing, but in 2016 9% of the people working in the Dutch construction sector was female (Roelvink, 2019).

Of the 514 people that received the questionnaire, 219 responded which gives a sample size of N=219 and a response rate of 43%. 25 respondents came from the client side, 194 from the contractor. The respondents were

not told that the questionnaire was about empathy to prevent biased answers. Instead they were told the questionnaire was spread for a research about the composition of construction project teams.

Data collection Part IV

Four experts from the industry have been invited to the expert session. It has been decided to invite four participants because it is believed more people would make the expert session too busy which could cause people to feel limited in sharing their thoughts. All four experts came from the project organization of the case project. They were invited based on their roles and position in the organization. The intention was to get a mix of different experts representing different parts of the organization to investigate if people in different positions think the same. For this reason the session consisted of: a member of the project board on the contractor side, the project manager from the client side, a stakeholder manager from the contractor side and a design manager from the contractor side. Two experts were also interviewed for Part II of the research and two not. People already interviewed are more familiar with the subject of the research. It is expected they are therefore very capable of forming an opinion about the final link to project performance. However it is also interesting to invite people to the expert session that are not known with the study yet to see what someone with a neutral vision would say. For this reason the experts invited consisted of a mix.

The researcher used the online tool AhaSlides for the interactive part of the expert session. The tool saved all answers of the experts and provided the data in an Excel form. The expert session has been held in Dutch as all interviewees and the interviewer were native Dutch speakers. Just like the interviews of Part II, the expert session has been held online via Microsoft Teams too due to the COVID-19 pandemic. A video recording of the session has been saved to use for the data analysis. The total expert session took one hour.

4.5 Data analysis

For the data analysis of Part II, first all interviews have been transcribed using transcription software Amberscript. After the transcription of all interviews, the transcriptions have been analysed. To do so, the researcher first searched for all statements related to empathy. This has been done by the researcher without any further interview analysis software. The reason no software was used for this is that human interpretation is better able to indicate whether a certain statement is related to empathy or not. During an interview data analysis it is common to search if a common way of thinking can be found amongst the interviewees. However as explained in section 2.1, different people could have different views on project success. These different views on project success could result in people also having different views on the role of empathy in achieving project success. This means someone with a contrary answer to the common answer, does not necessarily have a wrong viewpoint or wrong answer. Also, people from different disciplines could have different knowledge about the role of empathy for a certain expertise or task. For this reason during the data analysis all statements related to empathy have been included. In the bulk of statements related to empathy, the researcher tried to search for answers to sub-research questions Q1 and Q2. The results of the data analysis of Part II of the research can be found in chapter 5 Research Results Part II.

For the data analysis of Part III, first for each respondent the IRI empathy score has been calculated using Microsoft Excel. Next the scores and personal data of the respondents have been analysed using SPSS software. First the data has been transformed and coded to be suitable for SPSS. In SPSS first the descriptive statistics of the empathy scores for all variables have been analysed. Next the statistical significance of the data sample has been tested for each variable with independent samples t-tests or ANOVA F-tests (depending on the amount of groups in the variable). Based on these results conclusions have been drawn about the distribution of empathy amongst project participants in the construction sector. The results of Part III of the research can be found in chapter 6 Research Results Part III.

For the data analysis of Part IV, the recording of the expert session has been transcribed using Amberscript software. After this the transcription has been analysed by the researcher. This has been done manually without any further help of software. During the data analysis the researcher searched for statements that confirm (or don't confirm) if project performance can be improved by stimulating empathy during the preconstruction phase in the fields where it is lacking. Next to this the data from AhaSlides was exported to and analysed in Microsoft Excel. The results of Part IV of the research can be found in chapter 7 Research Results Part IV.

4.6 Research criteria

There are several criteria with which the research should comply. Below each criterion will be explained. During the research it is important the research will be conducted in such a way that the criteria are met. In chapter 8. Discussion it will be discussed if the research meets these criteria.

Effectiveness

First of all the effectiveness of the research if important. This means the research result should meet the research objective. For this research this means the research should solve the problem as stated in the Problem statement. By finding an answer to the current research questions it is expected by the researcher the problem will be solved. In the Discussion it will be discussed if this is indeed the case and the research objective is met.

Reliability

Second the reliability of the research is important. For the quantitative part of the research this means it is important the used data set and measurement instrument are reliable (Hernon & Schwartz, 2009). Hernon & Schwartz (2009) explain that this means a consistent data should be chosen and a measurement instrument that measures the same way each time it is used. A consistent data set means that with a different data sample from the population more or less the same research results will be found. For the qualitative part of the research the reliability refers to the consistency of the data (Hernon & Schwartz, 2009). To make sure the reliability of Part I and III is safeguarded, the interviews and expert session will be recorded. According to Baarda (2017) this increases the reliability. Next to this it is expected that collecting the data from a complete project organization increases the consistency and thus reliability of the data set.

Reproducibility

Next the research should be reproducible. This means another or the same researcher should be able to execute the research in a similar way and obtain more or less the same research results (Klumpers, 2018). To make sure the research is reproducible all decisions and steps made in the research have been elaborated on in this final report. Next it is important the reliability of the research is of a high level to make sure the research is reproducible (Hernon & Schwartz, 2009).

Integrity

The research should also be conducted with integrity. This means the research should be performed with high standards of professionalism and rigour, in an ethical way (Klumpers, 2018). Klumpers (2018) explains this would:

- Improve the reproducibility of the research because it stimulates trust amongst researchers.
- Increase the quality of the research
- Increase the overall effectiveness

To do so the researcher has had regular meetings with the research supervisors to check if the research has been executed with integrity.

Validity

Lastly the research should comply with a high level of validity. A difference can be indicated between internal and external validity of the research. External validity means the research should have a sound degree of generalisation (Hernon & Schwartz, 2009). Hernon & Schwartz (2009) explain this means the research results should not just explain relations about the sample data set, but the research results should be generalizable to the whole population. For this research this would mean the research results are not only true for the people working in the construction industry that participated in the research, but the research results must also be able to be used by the rest of the construction industry. It is assumed that by collecting the data from the case project the data set used for this research is as representative as possible for other construction organizations. The internal validity of the research asks on one hand if the measurement instrument measures what it should measure and on the other hand it asks if the findings of the research are interpreted in a correct way by the research (Hernon & Schwartz, 2009).

MASTER THESIS

Part II

5. Research Results Part II

In this chapter the research results of Part II of the research will be discussed. Part II of the research tries to answer sub-research questions Q1 and Q2. To do so eleven in-depth expert interviews have been held with experts from the industry to collect data. The chapter will first elaborate on success factors of a construction project in 5.1. Next the results of the data analysis will be presented by clustering statements about empathy in 5.2. After this it will be investigated where empathy is the most important during the preconstruction phase for satisfying project success in 5.3. In 5.4 it is then indicated where empathy would not be important during the preconstruction phase. The chapter will end with section 5.5 with a conclusion of the results and an answer to sub-research questions Q1 and Q2.

5.1 Success factors of a construction project

The interviewees were first asked what according to them success factors are to a construction project. The quotes in this section are some examples of what interviewees responded to this question to show that interviewees mentioned success factors related to empathy. An overview of all quotes of what has been answered per interviewee to this question are presented in Appendix E: Part II interview data analysis – quotes about success factors. Empathic aspects are often mentioned, which implies empathy is regarded as important in these collaborations.

First of all the collaboration and relationship between client and contractor is named as important by eight interviewees. They explained client and contractor need to be able to take the other's perspective and understand each other's interests. One interviewee even mentioned *"empathizing with the interests of the other"*. Next to this it was mentioned several times there should be openness between the parties and a good collaborative relationship. It seems communication between them is important.

"Risks can always take place and then everybody tries to shift responsibilities to the other party. Then the collaboration between client and contractor always gets put to the test when consequences in time and money come up for discussion. That's where it often goes wrong. In the end it is about big interests and **being able to take perspective**. Then you come at the phenomenon of **empathizing with the interests of the other**. And that goes beyond the interests of involved companies or involved authorities, but it is also about individuals and the project manager who is responsible. What happens when there are disturbances and discussions about time and money evolve? [...]. And this is of course very hard. [...]. For example now we need to cut trees for the project, but because of the image towards stakeholders it is forbidden to us to cut those trees. But because we are not able to cut those trees we cannot start follow-up activities in the construction process. This results in a domino delay effect in our planning. It seems the client has **not enough perspective for the domino effect** that results from this. [...]. **You need to want to see this and be able to see it**."

Second of all the integration between different disciplines (in particular design and execution according to interviewee 1) is mentioned as a success factor by different interviewees. They need to "have feeling for each other" (interviewee 1), "look broader" than their own discipline (interviewees 9 and 10), understand how to "talk to each other" (interviewee 1), and understand "the interference between other processes and interfaces (interviewee 10)". They also need to understand what other people do and why they make certain choices. Empathy was not directly mentioned here by the interviewees, but it seems 'having feeling for each other' and understanding each other can be linked to empathy. Having feeling for each other looks like the affective side of empathy, understanding each other the cognitive.

"What I also think is important is that there are a lot of **different interests and requirements** in a project, a lot of techniques and a lot of processes. And you need to **consider them all in an integral way**. Because it is a lot. A lot of people think this is a challenge, but still worth striving for that you don't look at separate aspects, but that you have **a more broad perspective** and that you look to its relation to other matters. [...]. When I look at different people, it is not that important that you understand everything they technically do in depth. But it is about **the interference between other processes and interfaces**. So having a broader perspective."

Thirdly, the relationship between people in a team seems important. It was mentioned the team members need to work together "with good dynamics and solidarity" (interviewee 2). They should be aware of possible different personalities they have and respect this (interviewee 3). By empathizing with a team member one is able to understand and feel what this person feels. This could help to understand the other's personality and behaviour. It was also mentioned that in the end people need to enjoy their work (interviewee 3). Empathy could help to improve relationships between people resulting in solidarity and a joyful work environment. Openness between team members also seems important (interviewee 5). Finally it was mentioned it is the task of the managers to support the good relationships between team members. Next to this managers should be able to feel how to activate and involve team members (interviewee 3). Again, being empathic could help to feel and understand how to do so.

"Collaboration, in an integral way. Daring to ask for help. Of course you need very good people that are content-wise very skilled to manage such a complex project in an integral way. So it is partly about technical competences, but also **how do I function in a team**. I think that is very important. [...]. In a rapidly growing team you need to be able to really get the right culture and **values within the team**. **Openness** is also very important. You can say anything as long as it is in a normal, **respectful** way. [...].This resulted in a high engagement of people to the project. People **feel more heard** and welcome. That is very important."

Finally interviewee 6 also mentioned that the interests of stakeholders are important to keep in mind during a construction project. It was also mentioned by one interviewee (interviewee 5) that the collaboration and integration between people working together in a construction consortium is important. They need to understand each other's interests. Interviewee 4 mentioned empathizing with the interests of the other is important between client and contractor; it seems this can also apply to empathizing with the interests of stakeholders or people in the construction consortium.

All interviewees mentioned success factors that can be linked to empathy. Only the success factor about stability in scope named by interviewee 11 seems not linkable to empathy. This shows other factors can also influence project success that are not related to empathy. Also, as interviewee 11 mentioned, unforeseen circumstances can always take place and affect the success of the project. However, despite these others factors, factors with a connection to empathy still seem to play an important role. To conclude what success factors are to a construction project (related to empathy) it seems the relationship between client and contractor, the relationship between team members, the involvement of interests of stakeholders and the integration between different disciplines are all factors influencing the success of a project. It can be concluded it are all relationships of which it is believed they are supported by internal or external empathy. Comparing this to the conceptual research model of Figure 5, this is similar to the way of which it was expected that empathy affects project performance. This means both internal and external empathy are still relevant at this point of the research and the conceptual model cannot be rejected based on this information.

5.2 Clustering statements about empathy

The transcriptions of the interviews have been further analysed to see if it can be confirmed empathy is an important competence during the preconstruction phase for construction project performance (Q1) and

investigate where in the preconstruction phase it would then be important for the involved people to be empathic with others (Q2). The interviewees shared in what ways, when or by who empathy is important during the preconstruction phase. All statements related to the importance of empathy during the preconstruction phase found in the interviews have been collected and clustered on the basis of the three different ways in which empathy is able to influence project performance (empathy between people from different processes, empathy between people within a process or between people in the project organization with people outside of the project organization). A table with the results of the clustering is listed in Appendix F: Part II interview data analysis – statements about empathy. The next sections will elaborate on these results per cluster. Appendix F also contains an overview of quotes of interviewees about empathy. The conclusions drawn in this chapter are based on these quotes.

What stood out in general is that interviewees coming from the client side mostly shared what role empathy plays in the collaboration between client and contractor. Interviewees from the contractor side also shared a lot of information about the role of empathy internally. This shows the different perspectives of the two towards the subject. It however doesn't mean it can be concluded yet the role of empathy is more relevant between client and contractor based on this information.

Next to statements related to the sub-research questions, the interviews also revealed other interesting information not directly related to answering one of the sub-research questions. This is still valuable secondary information to take into consideration during this research, for example when making the framework. An extensive overview of this information is listed in Appendix G: Part II interview data analysis – secondary information. The following main points can be summarized from this:

- Interviewees mentioned a situation that is conducive to empathy supports people in being empathic. For example during the COVID-19 pandemic interviewees explained it became much harder to empathize with people whilst working from home and only speaking to them via a screen.
- Interviewees mentioned they think that to what extent someone is able to empathize with someone from another discipline is also supported by one's experience. Someone in the design team for example that in the past worked in the execution preparation team can more easily empathize with someone from the execution team and put himself in the shoes of this person.
- Interviewees think it is more important for people to be empathic as early as possible in the project. This
 gives the expectation that it would be more effective to project performance to stimulate empathy earlier
 in the project.
- Interviewees mentioned they think it is a good intervention to select people in the organization based on their (empathic) competences.
- Interviewees think there's a relationship between the importance of empathy and the complexity of a construction project. They explained they think empathy is more important for projects with a high complexity and less important for projects with a lower complexity.

Empathy between different processes

It can be concluded that between different processes empathy seems to play a role in multiple ways. First of all it seems that in general people in a project organization from different processes should be empathic towards each other. Together these people need to deliver the project and being empathic apparently supports the collaboration and integration between these people by creating trust, understanding how to communicate to each other, taking a broader perspective and understanding what type of person the other is. This is however still a very general conclusion.

"I think you need an empathic ability to be able to **empathize with how someone else thinks**, how someone else works, what kind of interests someone has to deal with and what kind of problems someone experiences. That asks

from people that they are able to **look further than just their own task, or their own thing**. Because that is just a small piece in a big network needed to finally deliver the project. The ability to look further than your own task, your own personality and you own interest is crucial to come to a collaborative success."

Next to this the interviewees shared statements specifically about the relevance of empathy between people from different IPM processes. It seems it is mainly the task of the managers of the different processes to be empathic towards each other. Interviewees explained has its own expertise and these people have different personalities. What is needed here is being aware of the fact that the other has a different expertise and different personality. Being empathic here would support a good project outcome by understanding how to communicate with someone from another discipline. It is about understanding each other, understanding how to communicate information from your own expertise to the other, and about being able to think along with the other to support collaboration and integration between the different disciplines. This seems important between processes on the contractor side as well as the client side.

"Well of course empathy is important. Because if you don't understand each other, for example in a project when execution doesn't have the knowledge and doesn't understand what design is doing, these people do need to have the ability to **empathize with what has been designed and how that can be executed in practice**. [...]. These people need to understand each other and the different worlds they are in. **They should not just stay in their own world**. And if these people are able to communicate and ask each other the right questions, then they can **help each other and think along**. [...]. It is **about feeling what kind of communication is needed** to let the other understand."

Empathy between design and execution

Next to this interviewees mentioned it is specifically important people from the design and execution team, mainly the managers of the teams and design leaders, are empathic towards each other. The interviewees explained that people from the design and execution team not only have a different expertise, but they are also different types of people who communicate in different ways. Interviewees mentioned they 'speak different languages'. Empathy is needed here to understand how to communicate with someone from the other discipline and to understand what is going on in the other's process. This would support the integration and collaboration between the design and execution team.

"Designers **speak a different language** than execution people. Execution people are more direct and can communicate more harsh than designers. That can clash. And it is a very **important interaction** between those departments that should go well. And also of course in the involvement of maintenance up front. Empathy plays a role here by **listening to another instead of pushing your own opinion trough**, and also activating people in joint sessions. That starts with the design managers and head of execution that people collaborate. And of course there will always be conflicts, but they need to be solved quickly."

Empathy of the project manager/project board

It has also been stated by interviewees that it is important that the project manager/director or project board are empathic towards people in the project organization. They should be empathic to understand how to communicate the interests of the project to the whole project organization and how to involve people. On the other side the board still has a very transactional role in making decisions for the processes in the project, so they also need other business skills next to being empathic. Interviewees think that it is also important the project board is empathic as exemplary behaviour. If you want people lower in the project organization to be empathic towards each other, the project board should also be a certain level of empathic to set the example for the rest of the organization. This would be needed if you want to create a certain empathic and open culture in your organization.

"They need to be able **internally to communicate interests** and they must be accountable towards the others. That asks a certain level of empathy towards the rest of the organization."

Empathy between parties in a construction consortium

Finally it is expected if the project organization consists of a consortium of different companies, these companies also need to be empathic towards each other. This was already mentioned as a success factor by interviewee 5. Later the quote below was also shared by an interviewee about the relation between empathy and parties in a consortium. Apparently, for an optimal cooperation between these companies, they shouldn't strive for their own interest. Instead they should consider the interest of the project as a whole and the interests of the other companies too. This is the task of the managers of the different companies in the consortium who need to be empathic towards each other to understand what the interests of the others are and set their own interests aside sometimes. Next to this these parties should be empathic towards each other to understand how the other companies work and what their processes are. Being aware of this would improve the cooperation and integration between the different parties.

"I think the composition of parties in a consortium is a success factor. **It is about the competences of the parties**. The project board members should be empathic here. Are they in there on the basis of collaboration of individual interest?"

Empathy within processes

On the basis of the interviews it also seems that empathy plays a role within processes. Empathy then plays a role within teams between team members and between managers and their team members. This will be further elaborated on in the next paragraphs.

Empathy within teams

During the interviews it was mentioned empathy is very important for a productive and successful project organization in which the people in the teams are happy and satisfied with their job. Interviewees explained that people who do not enjoy going to work will be less productive and involved. If team members are more empathic towards each other trust between them will be created, it will create a certain level of solidarity and they will be more satisfied with their job and colleagues which apparently supports their productivity. Next to this by being empathic team members can understand how to communicate to each other which supports the collaboration between them. When asking the interviewees what would happen if empathy would not be present within teams they responded that this would hurt the performance of the project. If people are not empathic towards each other, people will not help each other anymore and cooperate. Other team members will feel this too. Also, people can get less satisfied with their job, which could cause their dedication to the project will reduce and their individual and group performance will get lower. It is okay to sometimes clash with a colleague, but interviewees explained you should be able to get over it and solve the situation with respect for each other.

"I think empathy is important everywhere. Because people can always disagree with each other, but **they need to be able to still discuss this in an empathic way**. [...]. Even a drawer, well he also needs to function in team meetings and not always react gruffly. He needs to be **approachable** and **able to communicate** his struggles."

Empathy between managers and team members

Interviewees mentioned that managers should be empathic with their team members too. Team members need to be empathic towards each other, but it was first of all mentioned this should be stimulated and facilitated by their managers. They must show exemplary behaviour. Next to this managers should be empathic towards their team members to understand how to involve and activate the team members. Interviewees mentioned it could be the most quiet engineer in a team meeting that has the best idea or solution in his head. Managers should

therefore be aware of someone's personality and behaviours to stimulate this person such that he will share his thoughts and the project is able to benefit from it. The managers of the teams should be empathic towards team member to understand how to involve team and understand that it is needed to involve those people. Next to this managers should be empathic to understand how to communicate plans to their team members. The result of being empathic towards team members is that they will feel more involved and welcome to the project. They will feel heard which makes they will be more productive as a result.

"It is not only about understanding the other's personality, expertise or understanding what someone means. Because when you are in a big meeting, there are always three people that don't say much. But those three people can bring in the most smart ideas. If you are not empathic to those people than you don't activate this knowledge. If you **understand what type of person it is** you can think about **how to activate that person**. You need to listen to this person such that this person will share his knowledge and expertise. And if you know where what expertise is located and how you can activate it, you can reach a beautiful project together."

However it seems the other way around is also important and team members should also be empathic towards their managers. They should understand why their managers make certain decisions and the reasoning behind why certain things are needed. Nonetheless, this can still be turned around and it can be argued it is still the responsibility of the manager to inform the team well enough and understand the feelings of the team in this.

"I think it really helps if everybody understands what is going on and that you truly **understand why things happen**. For example if a constructor needs to re-calculate something that has been changed. Then people can think: 'do I need to do this again!?' and feel annoyed. But if you know why that needs to be done, then you understand you need to do it for the project and with a reason."

Empathy with people outside of the project organization

Empathy towards people outside of the project organization seems important towards the client and towards external stakeholders. The following sections will further elaborate on this conclusion.

Empathy between client and contractor

Starting with empathy towards the client, all interviewees mentioned client and contractor in general should be empathic towards each other. This is the responsibility of the management teams or boards of the contractor and client towards each other and the project manager(s). They should understand how to communicate with each other and understand what each other's interests are. Interviewees mentioned that often in a project it goes wrong because the parties are not aware of the interests of the other. Not empathizing with the other to understand what is possible, feasible or reasonable for the other party results in having expectations from the other party that are not realistic. Eventually this causes that plans don't work out or have to be adjusted which could cause the project to exceed budget, schedule or scope. It was also mentioned, if the client and contractor are not empathic towards each other, you already start the project on a wrong foot without trust and looking at each other's perspective. This is apparently not beneficial for the cooperation between client and contractor and eventually the success of the project.

"Empathy is important to stay open and honest with each other. Even if you have a business conflict it is about realizing what kind of effect that conflict has on the other party, in this case the client. And that the client also goes through very complex procedures and show understanding for that and help if possible."

"Empathy is involved in that you try to envision; if I take a certain action or I say something or I ask a question to my counterpart, that I **try to envision how the other receives that**. **What does this mean for the other person**? Can it

have a different meaning than it has for me? If you are aware of this and you can ask yourself those questions, then you can think about **how to ask questions or bring a message** to start the right conversation with each other."

On a lower level than the management board it seems also important people from the client and contractor are empathic towards each other. Interviewees explained from each discipline/IPM team there are managers that are in contact with their counterparts from the client. They should be empathic towards this counterpart to understand how to communicate things and to understand the interests of the other party. Interviewees also mentioned that especially contract managers should be empathic towards the contract managers of the client. They need to empathize with them to understand how to communicate contractual issues and to understand what language to use in the contract.

"If you have no empathy for the way of writing, I'm talking about contract management, if you have no empathy and you just start writing very black-and-white. Yes that can reach the client in a very offensive way and in some cases **the client can be very sensitive for that**. This causes you can get into a conflict together very easily. The contract managers should not just write very juridically, **they need to be more empathic about how what they write reaches the client**."

The interviewees also mentioned managers from the technical management team specifically should be empathic towards the client. It can be concluded this is on one hand needed to understand what is stated in the contract and the reasoning behind it to understand how to implement this in the design. On the other hand it is needed to understand how to communicate with the client.

Some interviewees mentioned that already during the tender phase specifically empathy with the client is important. During the tender the tender managers should be empathic towards the client to understand what the client wants and needs to win the tender. If they can empathize with the client they are more likely to submit a bid that meets or even exceeds the clients expectations. Next to this showing empathy in the tender could be the start of a good collaboration between client and contractor for the next project phases.

"It is already important during the tender phase, because if you don't have it there, then you don't win. Because one of the most important things is that you are able to empathize with the client. Because you don't win your tender just on price, but on making a good total plan and for that you need your empathy. Because what wants the client? You need to understand the thinking behind the question. **You must feel what the client wants you to score points on**. [...]. This is important for the tender manager and the stakeholder manager because you also often also win based on stakeholder satisfaction."

Empathy towards stakeholders

Towards external stakeholders interviewees mentioned empathy is already important in the tender phase. In the tender, a bidder also scores points on how they are planning to engage and satisfy stakeholders. For this reason it is important stakeholder managers are empathic towards the stakeholders to understand their expectations of the project to decide how to incorporate this in the tender bid. It should be noted an interviewee explained the stakeholder managers are not in contact with the stakeholders yet at this point in the process, so they should empathize with the stakeholders without speaking to them.

"Stakeholder managers also fulfil an important role in this phase. Because the stakeholder analysis is also part of it. Then you need to **understand how to involve these people**. The stakeholder managers need to be able to **sense the environment**." Then after contract is awarded and preparation starts, it seems still important for stakeholder managers to be empathic towards stakeholders. It seems that it is important to be empathic with them to understand their wishes, concerns and thoughts about the project to decide how to engage them. It was mentioned that for a lot of stakeholders that oppose the project it is sometimes already enough if they feel heard and understood. They understand they can probably not oppose the whole project, but they want to share their concerns and feel acknowledged in these concerns. Interviewees mentioned it is very important here the stakeholder managers are empathic towards these stakeholders to get them on board for the project and make sure they will not counteract.

When asking the interviewees what would happen if empathy would not be present towards the external stakeholders, they explained these stakeholders can put in a lot of resistance against the project. It can come to a certain point they will oppose the project so much that it would thwart the project. This could cause for example permits will not be granted, the project could get negative media attention, processes will be disrupted and eventually the project will exceed the set time, budget or scope. However if you would be empathic towards these stakeholders and just make them feel heard or maybe adjust the project plans a little to their wishes, this could be prevented. As a result a decision can be taken for the project which the majority of involved parties supports

"You need to **realise that certain stakeholders will be affected by the project**. That asks communication and understanding those people. You need to **empathize with these people to understand how to act towards these stakeholders**. If you don't do this you get a lot of resistance against the project. And in the end you will experience that when requesting permits there are a lot of constraints, negative stories will reach the newspaper. Eventually you will not make progress, because that resistance will block your processes. If you are bit empathic here, maybe with a small twist of the project plan a clash and a lot of constraints can be taken away."

"Yes I think it is very important, especially for stakeholder managers. They need to **search for the interests of the others**. Of course you always need to verify if these interests are also the best for the project, but sometimes you can really make a win-win situation out of it. And what we try to do is localise these wishes or by all means acknowledge them. What some people want we just cannot implement in the project. But I also understand those people and I think empathizing is important here. You need to **respect their views**. I worked in the past on a project that got a lot of resistance from local residents, but for them the most important thing was just **being acknowledged in their opposite view.** That was often enough to start the conversation. Because those people understood that they were not going to stop the construction of the whole road. But we could have a conversation in which we were not trying to convince them of the success of the project, but in which **we showed we understood** they thought the project was not a success. We asked if they wanted to talk to us about finding a way in which the project would be tolerable for them. Eventually for the success of the project this caused we could get a decision on the infrastructure planning act (nl: tracébesluit) that had the support of the majority of the stakeholders."

Finally it was mentioned specifically design managers should be empathic towards external stakeholders to understand how to incorporate their wishes and requirements in the design.

"The designers need to cope with the stakeholder requirements in the design. So here empathy coming from design is also important. It is about **interpretation of the requirements**."

5.3 Empathy and the importance to project success

The previous sections revealed that the interviewees mentioned different ways or situations in which empathy should be present during the preconstruction phase for the involved people. However in some situations empathy might be more important than in others for the success of the project. To gain more insight in this the interviewees were asked when empathy would be the most important during the preconstruction phase to support construction project performance. Table 2 gives an overview of this according to each interviewee. In the last

three columns it is indicated to which of the three ways the statement applies: (1) empathy between people from different processes, (2) empathy between people within a process or (3) between people in the project organization with people outside of the project organization. Some interviewees mentioned multiple situations where empathy would be the most important or they gave a ranking of importance.

Interviewee #	Empathy is the most important during the preconstruction phase to construction project performance	1*	2*	3*
Interviewee 1 (Design manager – contractor)	Between people from the design team and execution team to support a good collaboration and integration between these disciplines.	x		
Interviewee 2 (Project manager – contractor)	Within teams to support job satisfaction of people in the project organization. People who enjoy their work and their colleagues are more productive which supports project performance.		х	
Interviewee 3 (Project board – contractor)	Within teams to involve people and towards stakeholders.		x	х
Interviewee 4 (Project board – contractor)	(I) For the project manager/project director, (II) towards the client, (III) for stakeholder management towards stakeholders, and (IV) for contract management	x		x
Interviewee 5 (Project board – contractor)	(I) Within teams and towards the client, and (II) between people from the design team and execution team to support a good collaboration and integration between these disciplines.	x	х	х
Interviewee 6 (Stakeholder manager – contractor)	Between the client and contractor.			х
Interviewee 7 (Contract manager – client)	Between the client and contractor in the tender phase because there starts the good collaboration between the two.			х
Interviewee 8 (Technical manager tender/contract manager – client)	Between the client and contractor.			x
Interviewee 9 (Technical manager – client)	(I) Between the client and contractor (especially during the tender phase), and (II) between people from different disciplines	x		х
Interviewee 10 (Technical manager – client)	Between the client and contractor.			x
Interviewee 11 (Stakeholder manager – client)	Between the client and contractor.			x

 Table 2: Where empathy is the most important during the preconstruction phase to construction project performance

 according to the interviewees

As can be seen from Table 2, empathy of the project participants seems important for the success of the project between processes, within processes or towards people outside of the project organization. Empathy categorized as empathy with people outside of the project organization was named most often as most important. Looking at between who empathy is then most important, it can be said that between processes empathy is the most

^{*}1 = empathy between people from different processes; 2 = empathy between people within a process; 3 = between people in the project organization with people outside of the project organization

important between people from different processes in general, between people from the design team and execution team specifically, and for the project manager or project director towards the other people in the project organization from the different processes. Within processes it is important team members are empathic towards each other to support job satisfaction and managers should be empathic towards their team members to understand how to involve them. Finally, externally it is important for the success of the project that client and contractor are empathic towards each other, that contract managers are empathic towards the client to understand how to communicate contractual issues, and that stakeholder managers are empathic towards external stakeholders.

"If you look at all budget exceedances, they started internally. So internally you need to make sure everything is organised. But also *that people with the right empathic ability talk to the client if there are things that need to be solved. Because you can make sure you fixed everything internally, but if you are in a conflict with the client it will still not be a successful project."*

It should be mentioned however that these results in Table 2 might be biased based on the role of each interviewee in the project organization. For example interviewees 7 to 9 came from the client side and mostly revealed information about the role of empathy in the relationship between client and contractor and less about internal empathy. They also mentioned empathy between client and contractor as most important. Interviewees 3 to 5 are the project board of the contractor who are in a lot of contact with the client. They also mentioned empathy here as most important. Only interviewees 1 and 2 didn't mention external empathy as most important, but they are also less in contact with the client and stakeholders based on their roles so this is not unexpected. To indicate where empathy would then be the most important the researcher had to search for an overall interpretation of empathy and project success in the interviews. Reading all the transcripts of the eleven interviews, it seems there's a lot of emphasis on the relationship between client and contractor and empathy. Most interviewees spend a lot of words on this aspect and many quotes could be found relating to external empathy between client and contractor. When interviewees gave examples of things that are not going well in projects this was also often related to external empathy. It is therefore believed that in terms of how project performance can be improved a focus on external empathy is more effective. Nevertheless it is also believed internal empathy is important too, but to a slightly lesser extent. Finally, it is believed internal empathy within teams is also less clear-cut to focus on as a strategy to improve project performance, because everyone in the project is part of a team. This would mean everyone in the project organization has to be empathic. Looking at interventions to improve project performance it would be more efficient if instead interventions can be formed that are targeted at certain places in the project organization.

5.4 Where empathy would not be important

The interviewees were also asked where they think empathy is not or to a lesser extent important during the preconstruction phase for construction project performance. In Table 3 it is listed what each interviewee responded to this question.

Interviewee #	Statement(s) about where empathy would not be important during the preconstruction phase
Interviewee 1 (Design manager – contractor)	The lower in the organizational structure, the less important it is to be empathic.
	The further the preconstruction phase proceeds, the less empathy is important to construction project performance.
Interviewee 2 (Project manager – contractor)	The lower in the organizational structure, the less important it is to be empathic.

Interviewee 3 (Project board – contractor)	For people in the project control team it is less important to be empathic.
Interviewee 4	-
(Project board – contractor)	
Interviewee 5	For people in the technical management team low in the organizational
(Project board – contractor)	structure (engineers, drawers, designers, etc.) it is less needed to be empathic.
Interviewee 6 (Stakeholder manager – contractor)	For people in the project control team it is less important to be empathic. For people in the technical management team low in the organizational structure (engineers, drawers, designers, etc.) it is less needed to be empathic. Towards stakeholders who do not oppose the project it is less needed to be
· · · -	empathic.
(Contract manager – client)	For people in the project control team it is less important to be empathic.
Interviewee 8 (Technical manager tender/contract manager – client)	For people in the technical management team low in the organizational structure that are not in contact with the client it is less needed to be empathic. For people in the project control team it is less important to be empathic.
Interviewee 9 (Technical manager – client)	For people in the technical management team low in the organizational structure that are not in contact with the environment it is less needed to be empathic.
	The further the preconstruction phase proceeds, the less empathy is important to construction project performance.
Interviewee 10 (Technical manager – client)	For people in the project control team it is less important to be empathic.
Interviewee 11	-
(Stakeholder manaaer – client)	

 Table 3: Where empathy would not be important during the preconstruction phase to construction project performance according to the interviewees

It should be noted that three out of eleven interviewees mentioned they think empathy is on a certain level always important for everyone. They explained that everyone in the project organization should be empathic enough to function well in a team. However the interviewees did agree that in certain situations and for certain people it is less important to be empathic considering the influence on the project outcome. Only interviewees 4 and 11 did not give a clear answer about where it is less or not important to be empathic.

"I think **empathy is required in all roles**, but of course not in very role it has direct influence to the main objectives of the project. But **if people are not able to empathize** with each other (in all processes) this has no direct effect on the project itself, but **disturbances will occur**. And if there are too many disturbances, then it can indeed affect the project success."

Furthermore, based on Table 3 it can be concluded it seems it is less important for people in the following roles to be very empathic: people in the project control team and people lower in the organizational structure (especially low in the technical management team, and people that are not in contact with external parties). These are all related to internal empathy. Next to this it can be concluded it seems less important to be empathic towards stakeholders who do not oppose the project.

"I think for people in the project control team empathy is less important. **You don't need to be very empathic in prescribing how to register disturbances**, how to prove requirements, to make the planning, to monitor costs and to fill in risks registers."

5.5 Conclusion Part II

Based on the findings in this chapter, a conclusion can be drawn about the results of Part II of the research. This means sub-research questions Q1 and Q2 can be answered.

Q1: Can empathy be confirmed as an important competence during the preconstruction phase affecting project performance?

Based on the research results of Part II, it is believed it can be concluded empathy is indeed an important competence during the preconstruction phase affecting project performance. During the interviews, all eleven interviewees confirmed the importance of empathy during the preconstruction phase and that it would be important for people in the project organization to be empathic for a good project outcome. Looking at what the interviewees identified as success factors for construction project performance most success factors have, according to the interviewees, a relationship with empathy. It is believed this confirms the importance of empathy to project performance. Empathy then would lead to a better collaboration between project participants. When the interviewees were asked what would happen if empathy would not be present during the project outcome would be harmed (in what way the project outcome would be harmed depends on the situation where empathy is not present). The fact that the project performance would be harmed if empathy would not be present in certain situations also seems to confirm the importance of empathy during the preconstruction phase.

Q2: Where in the preconstruction phase of an integrated construction project would it be important for project participants to be empathic with others?

It seems that for a good project outcome it is important for certain project participants to be empathic during certain situations or activities in the preconstruction phase. A general conclusion is that it seems that empathy to a certain extent should be present in the whole organisation. Looking at the success of the project it can be concluded it seems especially important project participants are empathic in the following situations: *Within processes*

- Managers should be empathic towards their team members during the preconstruction phase.
- Team members should be empathic towards each other during the preconstruction phase.
- Between processes
 - People from different disciplines and IPM processes should be empathic towards each other (especially the managers of the different IPM processes).
 - People (mainly managers, design leaders and head of execution) from the design and execution team specifically should be empathic towards each other during the preparation phase.
 - The project manager/project director should be empathic towards other people in the project organization from the different processes during the preconstruction phase.

Towards people outside of the project organization

- Client and contractor (mainly the boards/management teams of the two) should be empathic with each other during the preconstruction phase (including the tender phase).
- Contract managers should be empathic towards the client to understand how to communicate contractual issues during the preconstruction phase.
- Stakeholders managers should be empathic towards stakeholders during the tender as well as after the tender in the preconstruction phase.

This means, based on which activities they are involved in during the preconstruction phase, the following project participants in particular should be able to be empathic for the success of the project: managers of teams, design leaders, head of execution, the project manager(s)/project director, the project board/management board of the contractor and client, contract managers and stakeholder managers. Team members are not included in this list as everybody in the project organization is a member of a team. This implies everybody would have to be empathic which is a too broad conclusion.

Looking at where empathy would then be the most important it seems that especially external empathy between client and contractor is important to project success. It seems this is also an important direction where improvements can be made.

It seems less important to be empathic for people in the following roles:

- People in the project control team
- People lower in the organizational structure (especially low in the technical management team).

Next to this it seems it is less important to be empathic towards stakeholders who do not oppose the project.

It is believed that the information obtained out of the interviews matches with the conceptual research model as presented in 3.6. It seems empathy is indeed important for construction project performance during the preconstruction phase via internal empathy as well as external empathy.

MASTER THESIS



6. Research Results Part III

In this chapter the research results of Part III of the research will be discussed. Part III of the research tries to answer sub-research question Q3. To do so data has been collected by spreading a questionnaire to measure empathy of people working in the construction sector. A complete data analysis is presented in Appendix I: Part III questionnaire data analysis. As the amount of collected and analysed data is extensive this chapter will present an overview of the results of the data analysis relevant to the research. First the characteristics and representativeness of the collected data sample will be discussed in 6.1. Next in 6.2 the average distributions of empathy will be discussed per group characteristic. After this the average distributions of empathy per IPM process will be elaborated on in 6.3. Then in 6.4 the results of Part II of the research will be compared to the results of Part III. The chapter ends in 6.5 with a conclusion of the results as an answer to research question Q3.

6.1 Data sample characteristics and representativeness

The data sample consists of N=219 responses of people working in the project team of the case project. The questionnaire started with some personal questions. Table 4 presents the distributions of answers the respondents gave to these questions. As explained in Appendix I all distributions are as expected. It can be concluded the data sample is characterized by a much higher percentage of male respondents than female respondents and overall most respondents came from the contractor side. The distributions of age, contact with the client, work experience and managing positions seem quite evenly distributed. Concerning the distribution of responses coming from different disciplines it stands out that a lot of respondents came from the Technical Management - Design team. Furthermore people coming from Contract Management and Technical Management – Maintenance are low represented in the data sample.







Table 4: Data sample characteristics

6.2 Average distribution of empathy

In literature people scored on average around 65 on the total empathy score and the following scores on the subscales: FS = 16,5; PT = 17; EC = 19; PD = 11,5. These scores are based on a combination of the research results of De Corte, et al. (2007) and Davis (1980) weighted by the sample size of their data. It should be kept in mind the data sample of Davis (1980) is however based on a group of psychology students. This is not a very representative comparison for people in the construction industry as it seems reasonable to believe psychology students might be more empathic. However, as the sample size of the research of Davis (1980) was much smaller than the data sample of De Corte, et al. (2007) the data it is still combined and used to compare the data of this research with. Figure 7 shows the distribution of empathy for the total data sample compared to these literature means. The average score on empathy for all respondents is 57,19. The scores vary from 29 to 89 and are normally distributed as can be concluded from Appendix I: Part III questionnaire data analysis. It can be said people working in the construction sector on average score lower on total empathy compared to averages from literature. This matches with the research results of Butler & Chinowsky (2006) who also concluded construction professionals score on average lower on empathy. This lower score on empathy for the construction sector could be explained by the fact that women score on average often higher on empathy combined with the fact that women are less represented in the data sample (and in the construction sector in general). In the research of Davis (1980) and De Corte, et al. (2007) the higher percentage of female respondents could have caused a higher average score on empathy. Further looking at the scores on the subscales it can be concluded that this low score on empathy in the data sample is caused by lower average scores on the scales FS, PD and EC. For the PT scale (the cognitive component of empathy) construction professionals score above average as found in literature. This shows construction professionals score lower on the affective component of empathy and higher on the cognitive component.



Figure 7: Graphical distribution of total empathy scores

The average scores on empathy have been analysed per group characteristic too. The following sections contain the results of the average scores on empathy per characteristic.

Empathy per gender

In literature of De Corte, et al. (2007) and Davis (1980) men scored on average 59,5 on total empathy and women. Based on the results of the test on statistical significance in Appendix I, it can be concluded the averages scores on empathy per gender (except for the scores to Perspective Taking (PT)) are significant and can be generalised to the rest of the construction sector. The average scores on empathy per gender in the data sample can be found in Figure 8.



Figure 8: Graphical distribution of total empathy scores per gender

Based on the figure it can be concluded females working in the construction sector score on average significantly higher on empathy than males. This is also the case for the sub-scores on the categories FS, PD and EC. For PT no conclusions can be drawn with certainty. The scores also show that men and women in the Dutch construction

sector on average both score below averages of previous research per gender. For men this is caused by lower scores on the scales FS and EC. For PT and PD men score on or above average. For women the overall lower score on empathy is caused by slightly lower scores on the FS, PD and EC scales. For PT women scored above average. With this information it can be concluded men and women both scored above average on the cognitive component of empathy, men also score above average on the affective PD component of empathy. However taking in mind the insignificance of the PT scale distribution, this is only an expectation and not a clear conclusion for the rest of the construction sector.

The scores on empathy per gender have also been compared per IPM discipline. Based on the analysis in Appendix I it can be concluded that women in the following IPM processes scored on or above the average score on empathy of women in the data sample (>66,24): Contract Management, Stakeholder Management, Project Control – Process Management, Technical Management – Design and Technical Management – Execution Preparation. In the following IPM process teams women scored below average on empathy (<66,24): Project Management, Project Control – Financial Management and Technical Management – Maintenance. However, the data sample of women for most processes is only small which causes no clear conclusions can be drawn about the score of women for the different IPM processes. Men scored low or just below the average score on empathy for men in the data sample (<55,53) in the following IPM processes: Project Management – Execution Preparation. For the IPM processes Control – Financial Management and Technical Management – Execution Preparation. For the IPM processes Contract Management, Technical Management - General and Technical Management – Maintenance the data sample for men is however small and thus no clear conclusions can be drawn here.

Empathy per age category

The results of the test of significance in Appendix I show for the total score on empathy no significant differences have been found in average scores on empathy that are generalisable to the population. This means no conclusions can be drawn with certainty based about the distribution of empathy per age category. The data sample only reveals expectations about possible differences. Figure 9 shows the average scores on empathy per age category. It can be said that people between the age of 26 and 45 working in the construction scored higher on empathy compared to people below 25 or older than 45. It seems logically that when young people get more mature their empathic ability grows by their increase in experience. It is unclear however what could have caused the decrease in empathic ability when people exceed the age of 45. Maybe the fact that these people are older and in the past worked with the older traditional contract forms in which empathy was less needed caused they have a lower empathic ability.



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Empathy on the contractor side and client side

Based on the results of the test of significance in Appendix I it can be concluded significant differences in the total empathy score, the FS score and the EC score have been found for the distribution of empathy for people coming from the client or contractor side. For PT and PD no significant differences could be found. As can be seen in Figure 10 average scores on empathy for people working on the contractor side are lower than the scores for people on the client side. On the client side, people scored similar to the averages as found in literature. For the PT score even above average. On the contractor side people scored below averages from literature (except for the PT score). This means it is expected that construction professionals on both the client and contractor side have an above average cognitive empathic ability. People on the client side probably have an average affective empathic ability, people on the contractor side a below average affective empathic ability.



Figure 10: Graphical distribution of the total empathy scores client/contractor

Empathy and contact with the client

The people that worked on the contractor side in the project organization were asked how often they are in contact with the client. Figure 11 shows the average scores on empathy and how often people are in contact with the client. The test of significance in Appendix I showed no significant differences have been found for empathy scores compared to how often people are in contact with the client. As can be seen from Figure 11, it seems people that are more often in contact with the client are on average more empathic in the data sample. They also scored higher on the subscales, except for the PD scale. People that are often in contact with the client score above average. However based on the non-significance, this conclusion can't be generalised with certainty to the population of people working in the construction sector.



Figure 11: Graphical distribution of the total empathy scores compared to contact with the client

Empathy and work experience in the construction sector

The results of the test of significance in Appendix I showed significant results have been found for the average total score on empathy and the scores on the scales FS, PT and PD. Figure 12 shows the average distribution of total empathy per amount of work experience in the construction sector. Based on these findings it can be concluded people with below 20 years of experience in the construction sector are on average slightly more empathic than people with above 20 years of experience. However, the differences are very minimal.



Figure 12: Graphical distribution of the total empathy scores compared to work experience in the construction sector

Empathy of managers and non-managers

Figure 13 contains the average scores on empathy for people that have a managing role in the project organization and non-managers. A manager is someone that manages one or more people in a team. Based on the test of

significance in Appendix I it can be concluded the differences found for managers and non-managers in the sample are significant for the total score on empathy and the score on the PD scale. This means it can be concluded managers score on average lower on empathy than non-managers in the construction sector. This is mostly caused by lower scores on the FS, PD and EC scales. On the PT scale managers score above average. This means managers score especially lower on the affective component of empathy.



Figure 13: Graphical distribution of the total empathy scores managers/non managers

In the questionnaire, managers were also asked how many people they had below them in the project organization. This information was asked to determine where in the hierarchical organizational structure someone is employed. Figure 14 shows the distribution on the total empathy score compared to the amount of people the respondent had below him or her in the project organization. Combining the average scores on empathy of the top 7 people in the organization (leading more than 51 people), these 7 managers score on average 49,71 on empathy which is lower than the average of managers lower in the organization structure. Based on this information it can be concluded that people with higher managing positions score on average lower on empathy compared to people in managing positions lower in the organizational structure.

Further looking at which managers in general then specifically score low on empathy, it can be concluded from Appendix I especially managers of the following IPM processes score lower on empathy compared to non-managers: Contract Management, Project Control – Process Management, Project Management, Stakeholder Management, Technical Management – Maintenance and Technical Management – Execution Preparation. Technical Management – Design and Technical Management – General are the only IPM process where managers score higher on empathy than non-managers.



Figure 14: Graphical distribution of the total empathy scores compared to the amount of people below them in the project organization

6.3 Distribution of empathy per process

For this research it is most interesting to compare how empathy is distributed amongst people of the different IPM processes. This distribution can be found in Figure 15. Based on the test of significance in Appendix I it can be concluded significant differences in the data sample have been found for the total score on empathy and the PD score. The first thing that stands out is that in the data sample people in almost all processes on average score below the average score on empathy as found in literature (which is a score between 63,85 and 65,97). Only respondents from Contract Management and the two respondents from Technical Management - General scored above averages from literature. Looking at the average score on empathy for the total data sample (56,24) it can be concluded people in the teams of Contract Management, Stakeholder Management, Technical Management – Maintenance, Technical Management – Design, Technical Management - General and people not involved in any of the IPM teams (Else) score above the average of people working in the construction sector. It can also be concluded people working in the teams of Project Control – Financial Management, Project Management and Technical Management - Execution Preparation score lower on empathy compared to colleagues from other processes. People score especially low on the FS, PD and EC scales. On PT people score in general on or above average.



Figure 15: Graphical distribution of the total empathy scores per IPM process

The distributions of empathy per IPM process have also been analysed for the client team and contractor team separately. The following sections will elaborate on these results.

Empathy per IPM process - contractor team

Figure 16 shows the distribution of empathy per IPM team on the side of the contractor. In the project team of the contractor, people in almost all IPM processes score below averages as found in literature (literature mean: 64-66). Only the two people in the contract management team scored above literature averages. Comparing the scores to the average score on empathy of the total data sample (57,19), it can be concluded people in the following IPM teams scored on average on or above this average of the data sample: Contract Management, Stakeholder Management, Technical Management – Maintenance, Technical Management – Design and people in the category 'Else'. People in the Project Control teams, the Project Management team and the Technical Management – Execution Preparation team scored lower on empathy.



Figure 16: Graphical distribution of the total empathy scores per IPM process of the contractor team

Empathy per IPM process - client team

Figure 17 shows the distribution of empathy in the team of the client. On the side of project team of the client people in all processes scored on or above average scores on empathy from literature (literature mean: 64-66), except for people in the following IPM teams: Contract Management, Project Management and people in the category 'Else'. However, comparing these scores to the average score on empathy of the total data sample (57,19) they still scored above this average. Except for the one respondent from the Project Management team who scored a little below. With this information it can be concluded people in the project team of the client scored in almost all IPM processes on or above average.



Figure 17: Graphical distribution of the total empathy scores per IPM process of the client team

6.4 Comparing results of Part II and Part III

As a result of Part II of the research information is obtained about which people in the project organization exactly need to be empathic during the preconstruction phase and who don't. Next it is interesting to compare how these people actually scored on empathy in Part III of the research. In Table 5 it is therefore listed which people do and do not need to be empathic during the preconstruction phase and how these people scored on empathy in the questionnaire.

People in the following roles need to be empathic during the preconstruction phase:	Average score on empathy (literature mean: 64-66)
Managers of teams (contractor side)	54,24
Managers high in the project organization/project board (contractor side)	49,71
Managers from the design team (contractor side)	58,94
Managers from the execution preparation team (contractor side)	52,50
Design leaders (contractor side)	54,50
Head of execution (contractor side)	53,40
Project managers	53,96
Contract managers	64,83
Stakeholder managers	59,64
The project team of the client	65,16

People in the following roles don't need to be empathic during the	Average score on empathy			
preconstruction phase:	(literature mean: 64-66)			
People in the project control team	54,19			
People lower in the organizational structure on the contractor side	57,66			
(especially low in the technical management team)	(technical management team: 57,02)			
Table F. Average accurs an empethy of nearly whe should be empethic based on Dout II				

Table 5: Average scores on empathy of people who should be empathic based on Part II

It is interesting to see that almost all people that should be empathic in the project organization scored below the average for construction professionals as found in this research (average = 57,19). Only managers from the design team, stakeholder managers, contract managers and the project team of the client scored above average. People in the project control team and low in the organizational structure that don't have to be empathic during the preconstruction phase also don't score very high on empathy. What is interesting however is that people low in the organizational structure do score a little bit above average. The final thing that is interesting from these results is that the project board/management team of the contractor scored on average especially very low on empathy compared to the average.

Based on this information from Part II and III gaps can be indicated of which people should be empathic, but scored low on empathy. Part II revealed that especially external empathy between client and contractor seems important to project success. This is the responsibility of the management teams/boards of the two. Part III showed however that on the contractor side the management scored very low on empathy. On the client side the team scored above average. Next to this, internally managers in general should be empathic, but scored low on empathy (especially project managers and managers from the execution preparation team). Finally the design leaders and head of execution scored low on empathy, but they should be empathic based on Part II. This means that gaps are present in external empathy from the management of the contractor towards the client. When it comes to internal empathy there are gaps between the design and execution team. Next to this internally there's a gap in the empathic ability of managers. Here especially managers from the following teams scored low on empathy: Contract Management, Project Control – Process Management, Project Management, Stakeholder Management, Technical Management – Execution Preparation. These gaps leave room for improvements.

It should be mentioned that these construction professionals mainly scored low on the affective component of empathy. A logical line of reasoning would be to believe that it would be effective to look into improving project performance via affective empathy. However, this can be questioned as different researchers argued that affective and cognitive component of empathy cannot be seen separately as they are strongly interrelated (Kouprie & Sleeswijk Visser, 2009; Gerdes, Segal, & Lietz, 2010). Also related to this is the critique of De Corte, et al. (2007) and Baron-Cohen & Wheelwright (2004) to the IRI test of Davis (1980). They argue that it is not completely clear in how it measures differences in cognitive empathy, affective empathy and sympathy. The results of this measurement therefore only present an indication of how cognitive and affective empathy might be distributed, but it is not proven this is how it is actually distributed and if there's such a clear difference.

6.5 Conclusion Part III

Based on the data analysis of Part III of the research an answer can be formulated on the third sub-research question Q3.

Q3: How is the actual level of empathy distributed across project participants of an integrated construction project?

First of all it project participants of an integrated construction project on average score lower on empathy compared to averages as found in literature. It seems this is caused by a lower score on the affective component of empathy, on the cognitive component construction professionals score above average. Next to this general conclusion, the following conclusions can be drawn about the distribution of empathy amongst project participants:

- Women in the construction sector score on average higher on empathy than men. Both however do score on average below averages for men and women as found in literature. This is mostly caused by lower scores on the affective components of empathy. Men and women both score above literature averages on the cognitive component of empathy, men also score above average on the affective Personal Distress (PD) component of empathy.
- In the following IPM process teams specifically women score below average on empathy: Project Management, Project Control – Financial Management and Technical Management – Maintenance.
- Men scored below average in these IPM processes: Project Management, Project Control Process Management, Project Control – Financial Management and Technical Management – Execution Preparation.
- Construction professionals in the age of 26 to 45 score on average higher on empathy than people of different ages.
- Construction professionals with between 0 to 20 years of experience working in the construction sector are slightly more empathic than construction professionals with above 20 years of experience.
- Managers score on average lower on empathy than non-managers. This is caused by a lower score on the affective component of empathy. Looking at the which managers score lower on empathy it can be concluded managers in position higher in the project organization score lower on empathy compared to managers lower in the organizational structure. Concerning the different IPM processes especially managers of the following IPM processes score lower on empathy than non-managers: Contract Management, Project Control – Process Management, Project Management, Stakeholder Management, Technical Management – Maintenance and Technical Management – Execution Preparation.
- People working on the client side score on average higher on empathy compared to people on the contractor side. People on the client side score similar to averages as found in literature, people on the contractor side below literature averages. People on the client side score on average on the affective component of empathy, people on the contractor side below average on the affective component. When it comes to the cognitive side of empathy construction professionals on both the client side as well as the contractor side score above average.
- On the contractor side people in the following IPM teams have on average a lower empathic ability compared to people in other IPM teams on the contractor side: Project Control, Project Management and Technical Management Execution Preparation. People in the following IPM teams on the contractor side have an average or above average empathic ability (compared to the average score of construction professionals): Contract Management, Stakeholder Management, Technical Management Maintenance, Technical Management Design
- On the client side people in all IPM teams scored above the average score on empathy of construction professionals. Comparing the scores to averages in literature it can be concluded that only people in the Contract Management team and Project Management team scored below the literature average.

The above conclusions about the distribution of empathy in the construction sector can be drawn with certainty based on the statistical significance of the data sample. However, the data also contained non-significant results that only revealed expectations about the actual distribution of empathy in a construction project organization. Based on these results it is expected that in a project organization:

• People from the contractor side that are more often in contact with the client tend to have a higher empathic ability.

Finally conclusions can be drawn about how project participants that need to be empathic during the preconstruction phase scored on empathy:

- All people that need to be empathic score low on empathy compared to average scores found in literature, except for contract managers and the people from the project team of the client.
- People in the following roles that need to be empathic scored below the average score on empathy of construction professionals: managers of teams, team members from the contractor side, managers from the execution preparation team, design leaders, head of execution, project managers and the project board/management team.
- People in the following roles that need to be empathic scored slightly above the average score on empathy of construction professionals: managers from the design team, stakeholder managers, contract managers and the people from the project team of the client.
- Especially the managing board of the case project scored on average relatively low on empathy.
- People that don't need to be empathic (people in the project control team and people low in the organizational structure) also don't score very high on empathy.

MASTER THESIS


7. Research Results Part IV

Based on the previous parts of the research ideas have been formed about how via empathy the project performance could possibly be improved. Based on these ideas a framework has been designed that can be used by the construction sector as a strategy to improve project performance via empathy; The Empathy Framework. The goal of this final part of the research is to form an answer to sub-research question Q4 by investigating if project performance can be improved by stimulating empathy in the fields where it is lacking. To do so The Empathy Framework has been validated in an expert session. The chapter will first present the foundations of the framework in 7.1. Section 7.2 will then present the results of the validation. Based on the results of the validation the final framework has been composed which will be presented in 7.3. Finally in 7.4 a conclusion is drawn in the form of an answer to the fourth sub-research question Q4.

7.1 Foundations of the framework

Based on the research results of Parts I, II and III it has been decided what The Empathy Framework should look like. This section will present this as the foundations of the framework. The framework will consist of a set of recommendations for interventions related to stimulating empathy that intend to increase project performance. First it can be indicated where these interventions should be implemented to improve project success. They are listed on the basis of their expected effectiveness to improve project success:

- 1. It is believed it is most effective to stimulate empathy between client and contractor. This is because Part II showed it seems that external empathy is most important to project success. This is the responsibility of the management teams or boards of the contractor and client with each other and the project manager(s). The interviewees shared more openness is needed between client and contractor. They should understand how to communicate with each other and understand what each other's interests are. It is said this is already important during the tender. In Part III also a gap has been found in empathy here as the management of the contractor scored low on empathy and project managers scored low. This shows potential for improvement here. The client scored similar to literature averages. As this is still not a very high score it is believed on the side of the client interventions would still be effective. This results in the following interventions:
 - Stimulate or train that client and contractor learn to empathize more with each other's interests..
 - In the tender phase select the contractor, amongst other things, based on empathic competence
 Stimulate more openness between client and contractor

Not only on the management level empathy between client and contractor would be important, but Part II also showed it seems important that designers empathize with the client to understand how to include wishes and requirements in the design. This is the responsibility of design managers. Next to this it seems contract managers should empathize with the client to understand how to communicate contractual issues. This results in the following interventions:

- Stimulate that designers learn to empathize more with the wishes and requirements of the client and stakeholders when making the design
- Stimulate that contract managers of the contractor learn to empathize more with how they can communicate contractual issues best to the client
- 2. It is believed empathy should be stimulated internally of managers with their team members. The managers should be empathic towards their team members to understand how to involve and activate the team members. In Part III managers scored low on empathy compared to non-managers which shows there is a gap here and thus room for improvement. As a result of this gap it is believed this is an effective intervention compared to other interventions. This gives the following intervention:
 - Make sure managers are more empathic (contractor side)

- 3. With the same effectiveness as stimulating empathy of managers, it is believed it would be effective to stimulate empathy between people from the different disciplines or processes (mainly between people from the design and execution team). Empathy would important here to understand how to communicate with someone from another discipline. It is about understanding each other, understanding how to communicate information from your own expertise to the other, and about being able to think along with the other to support collaboration and integration between the different disciplines. Part II showed there are gaps in empathy here of lower scoring design leaders, head of execution and managers from the execution preparation team. This shows potential for improvement in this field and why it is believed that interventions here would be effective. The following interventions result from this:
 - Stimulate that different disciplines learn to empathize more with each other (contractor side and client side)
 - Stimulate that design and execution learn to empathize more in how they should collaborate
- 4. Also as a result of the importance of external empathy it is believed empathy towards stakeholders should be stimulated. This starts in the tender phase where it is important to understand their expectations of the project to decide how to incorporate this in the tender bid. After the contract has been awarded empathy towards stakeholders is important to understand their wishes, concerns and thoughts about the project to decide how to engage them. Stakeholder managers scored on average on empathy which is not a very bad score, but also not a very high score. It is therefore believed interventions would still be effective, but they are ranked below the other interventions as there is no gap in empathy indicated here. The following interventions result from this:
 - Make sure that there's more empathy towards stakeholders and their wishes and requirements
 - Stimulate that designers learn to empathize more with the wishes and requirements of the client and stakeholders when making the design
- 5. It was also indicated by interviewees in Part II that it would be helpful if different parties in a construction consortium would be empathic with each other. This will also be included as an intervention in the framework, but with a lower effectiveness to improve project performance compared to the other interventions. They should empathize with the interests of the others are and set their own interests aside sometimes. This is the responsibility of the managers of the different companies in the consortium. This results in the following intervention:
 - Stimulate that different parties in a consortium learn to empathize more with each other
- 6. As a final intervention empathy can be stimulated between team members. Interviewees in Part II indicated that it is beneficial for the project if team members are empathic with each other. If team members are more empathic towards each other trust between them will be created, it will create a certain level of solidarity and they will be more satisfied with their job and colleagues which supports their productivity. Next to this by being empathic team members can understand how to communicate to each other which supports the collaboration between them. In Part III people in teams in general also scored low on empathy which shows there might be room for improvement here. However as this intervention would mean everybody has to be empathic this is categorized as the least effective intervention as it is not very targeted.
 - Stimulate that team members are more empathic with each other (contractor side)

Second it is believed there are certain boundary conditions and specifications for the interventions:

As explained in Appendix G, interviewees mentioned they think it is a good intervention to select people in the organization based on their competences. It is therefore believed it is effective to select people on key positions based on empathic competence. Another option to encourage more empathy would be to stimulate the empathic behaviour of the people involved. Literature showed different researchers reported that they think this can be done by following different methods or trainings (Chiu, Lam, Kolomitro, & Alamparambil, 2011; Blanco, López-Forniés, & Zarazaga-Soria, 2017; Dobrigkeit, Pajak, de Paula, & Uflacker, 2020; Adamson, Loomis, Cadell, & Verweel, 2018).

- The interventions are more effective for projects with a high project complexity. As explained in Appendix G some interviewees mentioned they think the more complex a project is, the higher the relevance of empathy is. For projects with a low complexity it would be less important that projects participants are empathic. This causes that it is believed that for projects with a low complexity it is less effective to stimulate the empathic thinking of project participants.
- The earlier in the project the interventions are implemented, the higher the effect on the project outcome. Interviewees in Part II explained they think the importance of empathy decreases towards the end of the preconstruction phase. This also matches with the statements found in literature that decisions and actions made in earlier project phases can influence the project outcome the most compared to lather project phases (Oberlender, 1993).
- It helps people to empathize with another person if they have experience working on the side of that particular person. This can be facilitated for example by job rotation. As explained in Appendix G, several interviewees shared that someone's experience also seems to play a role in whether someone is able to empathize with another person. For example a designer is more likely to empathize with someone from the execution team if this person also has experience on the execution side. This seems related to someone's willingness to be empathic as people can develop a more personal connection with each other in this way.
- The results from Part III revealed that construction professionals scored mainly low on the affective component of empathy. It is therefore reasonable to believe that it would be more effective to stimulate affective empathy. However, this can be questioned as different researchers argued that affective and cognitive component of empathy cannot be seen separately as they are strongly interrelated (Kouprie & Sleeswijk Visser, 2009; Gerdes, Segal, & Lietz, 2010). Also related to this is the critique of De Corte, et al. (2007) and Baron-Cohen & Wheelwright (2004) to the IRI test of Davis (1980). They argue that it is not completely clear in how it measures differences in cognitive empathy, affective empathy and sympathy. It is therefore important this boundary condition will be validated as it can be questioned if based on the results on this research it can be concluded that it would be more effective to stimulate affective empathy.

Furthermore the following conclusions of Parts I, II and III will be included in the framework design:

- In the literature review of Part I it became clear that to what extent someone is empathic is depending on someone's empathic ability but also on someone's willingness to be empathic (Kouprie & Sleeswijk Visser, 2009). This means one can try to reach more empathy by trying to increase someone's empathic ability and/or increasing someone's willingness to be empathic. The willingness can be influenced by someone's personal connection to the other person, someone's emotional state (e.g. someone can be tired) or someone's commitment to the project (Kouprie & Sleeswijk Visser, 2009).
- As explained in Appendix G, people are more likely to empathize with some else in a situation that is conducive to empathy. Interviewees in Part II explained that they experience it is much harder to empathize with people whilst working from home during the Covid-19 pandemic. This shows to stimulate the empathic behaviour of people the situation and their work environment must allow to do so.
- Part III of the research showed that women in the construction sector are on average more empathic than men. This means if one wants to include more empathic people in the project organization, involving more women helps to do so.

7.2 Validation of the framework

The foundations of The Empathy Framework have been validated amongst four experts from the industry in an expert-session. To do so the experts were first asked what they recognized as causes of a poorer project

performance from a list of possible causes. For factors that don't cause a poor project performance, it is less relevant to see if they can be solved by stimulating empathy. After this the experts were asked to rate each intervention in the framework on the basis of its effectiveness to improve project performance. This has been done to validate if (a) the framework tackles the right causes of a poorer project performance and (b) if the interventions in de framework are indeed able to improve project performance. After this the boundary conditions of the framework have been validated in the expert session. A detailed overview of the data analysis of the expert session can be found in Appendix K: Part IV expert session data analysis. Table 6 shows the list of possible causes of a poorer project performance. These causes are based on the interventions as presented in 7.1. For example it is an intervention to stimulate more empathy towards stakeholders to understand how to involve them in the project. Then the possible cause of a poorer project performance is that stakeholders are not being involved enough in the project.

	Possible causes of a poorer project performance
1	Stakeholders are not being involved enough in the project
2	Client and contractor don't understand enough what each other's interests are
3	There's no sufficient integration between design and execution
4	There's not enough team spirit/solidarity within the project team
5	There's not enough openness between client and contractor
6	Managers do not know how to involve the people lower in the organization enough in the project (contractor side)
7	The design is not enough tailored to the wishes of the client and/or stakeholders
8	Contract managers (contractor side) do not understand well enough how to communicate contractual issues towards the client
9	People in the project team of the contractor don't enjoy going to work
10	The management team of the contractor is not empathizing enough with the client
11	Different disciplines work too much on 'islands' and don't integrate well enough with each other
12	De different parties in a construction consortium don't collaborate well enough
13	In the tender a contract has been made that serves the individual interest more than the interest of the project

Table 6: List of possible causes of a poorer project performance based on Part II of the research

Based on the results of the data analysis it first of all can be concluded that all possible causes were recognized by the experts as causes of a poorer project performance. Factors related to external empathy between contractor and client or stakeholders were more often rated as causes of a poorer performance compared to factors related to internal empathy. When asking the experts if they could substantiate their choices they explained the following:

"They are all causes of a poorer project performance because **they are all factors related to how people work together**. It is about **collaborative performance**. So you need **to be able to take the perspective of the interests of the other**. And I recognize this in all these causes. It is not about content, but about **how to deal with each other** and **how to involve each other**, also the other way around. And about **how to get teamwork done** and **enjoy your work**. The same goes for stakeholders; if you don't take **the perspective of stakeholders**, disturbances will occur and things will go wrong. You need continuous attention for that."

"What I think is relevant to highlight is that there is a certain prioritizing of to what extent each cause contributes to a poorer performance. Some of us have seen a lot of projects in the past and there you do see one common denominator of what is causing most disturbances in projects. For example **stakeholder management is extremely important**. With that you create the boundaries of the project that needs to be realised. If you don't do this well, you think you can start the project, but immediately at the start you will notice obstacles in the execution. That is typically

what went wrong on the North-South line project. City districts were not involved enough in the plans and that resulted in a lot of resistance against the project which caused a lot of obstacles in the progress. [...]. And I also think a good collaboration between client and contractor is more important, especially when things go a bit rough in the project. And have the required openness and transparency in that and to think about each other's interests."

Second of all it can concluded that the experts validated the effectiveness of the interventions in the framework. For each intervention they were asked to rate the effectiveness from 1 to 5 where: 1 = totally not effective, 2 = little effective, 3 = neutral, 4 = effective, 5 = very effective. Figure 18 shows the outcome of the average rating per intervention. It can be concluded that overall all interventions were validated as effective considering the project outcome. The interventions tackling a lack of external empathy where rated as most effective. This is a logical outcome following the answers to the question about causes of a poorer project performance where it was also indicated factors related to external empathy are more likely to cause a poorer performance. This supports the framework by validating that it seems that the biggest improvement in performance can be reached by stimulating the external empathy between client and contractor. The experts however didn't validate that it would be more effective to stimulate internal empathy of managers and between disciplines compared to stimulating external empathy with stakeholders. They think it is more effective to stimulate empathy with stakeholders. The quotes below show some substantiation of the experts about their choices.

"Again I tried to rank differences in effectives for the different factors. But I think for the success of the project that we can reach the biggest improvement, and of course it is important that within a team you are on good terms with each other, but asking about **the biggest improvement I think that is more to be found in other factors than within a team**. That's why I rated this one [about empathy within teams] lower."

"I think all interventions lay very close to each other, but **that especially stimulating that client and contractor learn to empathize more with each other's interests would be very effective**. [...].. You do need to have an eye for each other and help each other and enjoy your work, but I think when it comes to the effectiveness to project performance seeing each other's interests weighs heavier in the end."

"I want to say something about empathy inside the organization of the contractor, because I also see a lower priority there when it comes to project success. I think it is between client and contractor much more important, especially when it comes to **seeing each other's interests** and **having an empathic attitude towards each other**. Of course it plays a role how the teams of the contractor or the teams of the client function individually, but that is a bit of secondary importance to project success. Because when you look at failures in projects, that is much more **related to the relationship between client and contractor or the relationship with stakeholders**. And not much related to how the teams works together. That is of course of importance, but not primarily in causes of failures in big projects."

"I don't completely agree with that, because I also saw projects in the past where the parties in the consortium were really in conflict with each other. But it is about prioritizing, because **there the collaboration with the client went wrong in the first place which caused that internally people also started getting into conflicts**. Because big losses occurred and they searched someone to blame for that. So the effectiveness of your solution is **first getting the collaboration with the client right and then within the consortium things will also go better**. But of course also there profits can be gained."



Figure 18: Rating of the effectiveness per intervention to project performance

Finally the experts were presented four questions to validate the boundary conditions and specifications of the interventions. First it can be concluded all experts validated that stimulating empathy earlier in the project would have a higher impact on the project performance.

"Yes, the earlier the better. What you do in the beginning of the project is much more determining the project outcome compared to when the project further proceeds. **If your project is almost finished, there is not a lot of performance to reach anymore.** Then it is very hard to go back or make changes in case a wrong decision has been made. So the effect is the highest if you start with it from the beginning of the project. For the relationship between client and contractor this means starting in the tender phase."

When it comes to the boundary condition of project complexity and improving project performance via empathy, all four experts disagreed to the statement that for projects with a low complexity it would be less effective to stimulate the empathic thinking of project participants. This contrary opinion means it can't be validated the framework would be more effective for projects with a higher project complexity. The experts explained the following:

"I think it is always important, **even for projects that are not that complex you need a certain level of empathy**. Maybe a little bit less, but it is always needed I think."

"What popped into my head **is a very small infrastructure project** where a contractor needs to deliver a small piece of asphalt in an outer area, but **forgets to involve the stakeholders and the stakeholders start to revolt** because of the road blockage. Well this is a very non-complex little project, but it can still go very wrong in this way."

After this the experts could also not validate that it would be more effective to stimulate affective empathy above cognitive empathy. Two experts answered both are important to stimulate. The other two experts indicated that it differs per situation what is most effective. This was substantiated by one of the two experts as:

"I chose it differs per situation and with that I tried to say; they are both of importance but what is the most important differs per situation. There are situations in which the emotions and openness, well **openness is to my opinion always of importance**, but **showing emotions in a certain situation or discussion is not always relevant**. But it think **understanding is always important**."

The other expert that chose 'it differs per situation what is relevant' agreed to this. Asking in what kind of situations showing emotions would not be important one of these two experts responded the following:

"I find that a hard question. Look, there are situations to think of in projects in which you affect a big team of people in which emotions can start to arise. Not that much for the actors who need to discuss things to each other, but **it is important to realize that decisions that are made can provoke certain emotions within teams**. And I think that is important to keep in mind."

It seems that apparently it can't be validated that cognitive and affective empathy can be separated very clearly in terms of interventions as none of the experts chose that it would be more effective to stimulate solely affective empathy. This matches with the different researchers that concluded affective and cognitive component of empathy cannot be seen separately (Kouprie & Sleeswijk Visser, 2009; Gerdes, Segal, & Lietz, 2010). Finally the experts were asked if they think that it is more likely that people will empathize with another if they have experience on the side of the other person. Three experts agreed to this. The expert that selected disagree however not completely disagreed but explained he just thinks it is not per se necessary. Based on these results it is therefore believed it can be still validated that it helps people in being empathic if they gained experience on the other side.

"I think **it is not per se necessary that to understand another, that you also need to have fulfilled that role** of the other. I think that is also impossible to walk along with everyone. Than you need to do that many times. But I think being open to what drives another or what happens for another or in what way your actions influence the work of the other, well to my opinion that doesn't have to be facilitated or increased by fulfilling that role of the other."

7.3 Designing the Empathy Framework

In this section the Empathy Framework will be presented. It is designed as a strategy for construction professionals from both the client and contractor side of construction projects to indicate how construction project performance can be improved by stimulating empathy in the preconstruction phase. Based on the validation during the expert session the foundations of the framework as discussed in 7.1 have been adjusted a bit. First of all the framework will be designed for all construction projects regardless of their complexity instead of solely for complex projects. Next to this the framework will not make a difference in interventions related to cognitive empathy or affective empathy as the two cannot be clearly separated. Finally it was first believed it would be more effective to stimulate empathy internally of managers and between people from different disciplines; keeping in mind the gaps in empathy in these fields. However this couldn't be validated by the experts. Instead it seems stimulating empathy. Finally it has been decided to not include the intervention 'stimulate more openness between client and contractor' in the framework as it is not directly related to empathy. It is however believed that more empathy between client and contractor is conducive for the openness between them too. All other foundations have been validated and are therefore included in the design of The Empathy Framework.

The final framework is presented in Figure 19. The goal of the framework is to give an overview of how project performance can be improved by stimulating more empathy of the involved people in certain situations. The Empathy Framework is intended to be used as a guideline by construction professionals to improve the project performance of integrated construction projects regardless of their complexity. The framework consists of two

parts. Part A consists of the recommended interventions to be followed by the client and contractor of the construction project during the different phases of the preconstruction phase. The recommended interventions are presented from higher to lower effectiveness to improve project performance. It is recommended to prioritize the implementation of these interventions on the basis of their effectiveness. For each intervention it is indicated which people in the project organization need to be more empathic for this.

Part B consists of recommendations on how more empathy can be facilitated if recommended by an intervention from Part A. For example if from Part A follows that stakeholder managers should be more empathic with stakeholders, Part B will explain how to facilitate that stakeholders managers will be more empathic. All measures from B can be linked to all interventions from A, apart from the intervention 'Select the contractor on the basis of empathic competence'. The framework shows facilitating more empathy can be done in two ways: (i) by selecting people based on empathic competences, and (ii) by stimulating the empathic behaviour of people. This distinction is made because it is not always possible to select people on the basis of empathic competences. It is not realistic to assume there are unlimited empathic people available to involve in the project. Next to this, as explained by the experts, when the project already started it is often hard to still switch people in certain key roles. Also one should have insight in which people exactly have a high empathic ability. Stimulating the empathic behaviour of people already involved in the project could therefore be more suitable in some situations. However, it is likely this will be done via things like workshops, teams sessions or trainings. As these kind of interventions often cost money this is however probably the more expensive option. The management of the project responsible for implementing the interventions should decide on which of the two (or both) is more favourable and suitable to use in each situation.



- Create more gender diversity; involve more women as women in general have a higher empathic ability
- Select people based on empathic competence as early as possible in the project; later will be less effective

for a day) Make sure the situation is conducive to being empathic. Facilitate interaction between people and create a work environment where people are able to find each other more easily (i.e. not only working remotely)

7.4 Conclusion Part IV

Based on the information collected in Part IV of the research an answer can be formulated to the fourth subresearch question Q4.

Q4: Could you improve project performance by stimulating empathy during the preconstruction phase in the fields where it is lacking?

It seems that project performance can indeed be improved by stimulating empathy during the preconstruction phase in the fields where it is lacking. Looking at the effect on the performance of the project, it is believed the highest effectiveness can be reached by stimulating empathy between client and contractor, and empathy with stakeholders. Reason for this is that when you look at what causes a poorer project performance this seems often related to an insufficient collaboration between client and contractor, and/or insufficient involvement of stakeholders. Stimulating empathy here would benefit the collaboration and the involvement of stakeholders which is beneficial for the project performance. Stimulating empathy internally within teams or between teams would also have a positive effect on improving project performance by improving the collaboration and integration between team members and disciplines, but it seems this is to a lower extent influencing project success compared to external empathy.

The Empathy Framework as presented in Figure 19 can then be used by the construction sector during the preconstruction phase as a strategy to improve project performance via empathy. It is believed this will be beneficial for the project which will be visible in to what extent the project reaches its project objectives and how the project scores on its success criteria.

Comparing these results to the conceptual research model as presented in section 3.6 it can be concluded that it seems that empathy has a bigger influence on the performance of a project via external empathy compared to internal empathy (Figure 20).



Figure 20: Conceptual model - focus on external empathy

8. Discussion

In this chapter the interpretation of the research results will be discussed. First it will be discussed if the research meets the research criteria in 8.1. Next it will be discussed if the obtained results match with the expected results of the researcher in 8.2. After this limitations of the research will be discussed in 8.3. Next in 8.4 the added value of the research will be discussed. Finally the researcher will propose recommendations for further research in 8.5 and recommendations for the construction sector in 8.6.

8.1 Verifying the research criteria

In section 4.6 the following research criteria have been presented that the research should comply with: effectiveness, reliability, reproducibility, integrity and validity. In the next sections it will be discussed if these criteria are met.

Effectiveness

The effectiveness of the research is about if the objective of the research is met. This means the research should try to search for a strategy to cope with the problem as stated in the Problem statement in section 3.7. The problem was that it was unknown how the overall project performance could be improved by enhancing empathy with another involved actor during the preconstruction phase. Looking at the results of the research, it is believed The Empathy Framework as presented in Figure 19 is a strategy to cope with this problem. It can be concluded that the research objective is met and the research has been effective.

Reliability

A reliable research means that a consistent data set is chosen. By collecting all data from one case project it is believed the consistency of the data set is high. If a different case project would have been chosen it is expected that more or less the same research results would have been found. This is on one hand because again all people in all roles would be present in the project organization and would have received the invitation to fill in the questionnaire. On the other hand for the interviews and expert session easily people from the same positions in the project can be invited. However, in the data sample of Part III of the research respondents from certain positions in the project organization where low represented. For example on the client side each process was only represented by a small amount of people. This lowers the reliability of the conclusions drawn based on these responses. For Part III reliability also means that a reliable measurement instrument has been used. It is believed that spreading the questionnaire digitally via an online tool is very reliable. Recording the interviews and the expert session also contributed to a higher reliability.

Reproducibility

Next the research should be reproducible. It is believed the research is of a high reproducibility as all steps followed and decisions made during the research are elaborated on in this research report.

Integrity

The research should also be conducted with integrity. The researcher has had regular meetings with the research supervisors to make sure the research has been executed with integrity.

Validity

Lastly the research should comply with a high level of validity. First the external validity should be high which means there should be a high level of generalisation of the research results to the rest of the construction sector. It is believed that by collecting all data from one case project in which different construction companies were

involved the research results are representative for the rest of the construction sector and have a sound degree of generalisation. Adding to this, it is believed that by analysing the statistical significance of the research results of Part III it was possible to indicate which results exactly could be generalised to the rest of the construction sector and which not. This also supported the external validity.

The internal validity asks if the measurement instrument measured what it should have measured and if the method is trustworthy. For Parts II and IV of the research the method was interviewing experts about the role of empathy. However it seemed that empathy is still a complex concept for people to fully understand. This harms the internal validity because it cannot be said with 100% certainty that all interviewees completely understood what empathy is. This harm the trustworthiness of the interviews. Looking at the research results of Part III, there are some doubts about the internal validity of the empathy measurement method; the IRI test of Davis (1980) translated to Dutch by De Corte, et al. (2007). As explained in Appendix I, there were several respondents that left the remark in the questionnaire that they found the questions of the IRI test rather hard to understand. This shows that apparently it was not always clear for the respondents what was meant with the questions and they could have misinterpreted them. This gives a risk of incorrect empathy scores of these respondents. It can be questioned if this test is a self-report test which also lowers the internal validity of the research. A self-report test asks for a certain amount of self-knowledge of the respondents. It could be that people think they are much more empathic than they really are. Or people that are in real-life quite empathic could have been very modest in their answers which resulted in a lower empathy score. This lowers the trustworthiness of the measurement method.

8.2 Research results versus expected results

The research results match with the expectation beforehand that empathy is indeed of importance to construction project success. It looks like the conceptual model could be confirmed and indeed empathy is able to influence project performance via internal empathy and external empathy. However it was expected beforehand that internal empathy would be more important to project success than external empathy. The research results however showed the opposite and revealed that external empathy has a higher effect on improving project performance. Looking back it is believed that this wrong expectation on forehand was caused by the experiences from practice that lead the researcher in a certain direction. For this reason the literature review also focussed a lot on internal empathy and less on external empathy which only increased the expectation that internal organization and externally they are in a relationship with each other. This means that internal and external empathy might be partly overlapping each other in certain cases which could make it harder to differentiate them.

Looking at the results of Part III of the research, based on the research of Butler & Chinowsky (2006), it was already expected that project participants in the construction sector would score relatively low on empathy. However new insights are how the empathic ability is actually distributed amongst project participants in terms of differences in gender, age, experience, discipline, role, etcetera. It has been surprising to find out that managers actually scored lower on empathy compared to non-managers. Especially because the interviews of Part II revealed that it is important that managers should have a certain level of empathy. The lower score on empathy however could possibly be explained by the fact that managers are often selected on the basis of other competences than empathy like assertiveness, proactivity or verbal power. These competences may not often go hand in hand with empathy. Maybe people that are more empathic are also the people that are a bit softer in their personality and less assertive or proactive. Managers also should be able to make tough decisions and sometimes it is maybe better if they are not too empathic for this.

8.3 Limitations of the research

It is believed the research has a few limitations. First of all there are some limitations to the measurement of empathy in Part III. As explained in 8.1 the internal validity of this part of the research can be questioned. Next to this there was a low response rate for people of certain processes. This makes that the conclusions drawn based on these responses are less reliable. A second limitation is that the literature review focusses a lot internal empathy and less on external empathy. Maybe if the literature review would have focussed more on external empathy too more context could have been provided to this side of empathy and its relation to project performance. A third limitation is that the data in Parts II and IV was collected via interviews with people that possibly could have had an unclear vision of what empathy was. This also harmed the validity of the research.

Other limitations of the research are based on the chosen scope of the research. The research only investigated the role of empathy during the preconstruction phase of integrated construction projects following the IPM model. The IPM model is a Dutch model and not based on literature. It is believed that the research results partly might also apply to other project phases and models. For example the data obtained with the measurement of empathy in Part III would be still relevant in other project phases and for other models. It is also believed that empathy can also play a role in other types of projects between people from different processes, within teams and externally with the client and stakeholders as these relations are present in all types of construction projects. It is however not known how these different ways relate to each other in other projects. For example for traditionally procured projects empathy between client and contractor is maybe not the most important as the relationship between the two here is different. Next to this it is for example not known if external empathy is also most important in other project phases. Maybe in later project phases internal empathy becomes more important because then most plans are already made and they just need to be executed. Here interaction with the client might become less important. Further research is needed to investigate if this is true.

Finally the developed Empathy Framework has not been tested in practice. The effectiveness of the interventions and certain specifications have been validated during the expert session, but the effectiveness and applicability of the complete framework have not been verified yet. The research only consisted of one validation with only four experts. Next to this the framework leaves the choice open how more empathy can be facilitated in the organization by proposing two ways via which this is possible. It is however unclear which of these two ways is more suitable to use in practice and more effective to improve project performance. Also the framework and the research talk about stimulating empathy. However it is not completely clear yet if empathy can truly be stimulated. Maybe it is more effective to compensate for lower empathy via other measures.

8.4 Added value of the research

The research has added value in both a practical sense as a scientific sense. The research first of all has a practical added value for real-life construction projects in the construction sector. The information obtained out of this research and the developed Empathy Framework can be used by the construction sector as a strategy to improve construction project performance. As nowadays still a lot of big construction projects underperform it has a lot of value to use tools like this framework that promise to improve the performance. Next to this as a focus on collaboration is becoming more important in the winning tender bid, contractors can use the information obtained during this research when making their bids. They could show the client that they make use of the Empathy Framework which promises to improve collaboration between involved parties. If the construction sector is not able to acknowledge the importance of empathy during the preconstruction phase, there's a risk that construction projects will continue to be delivered with a poor performance. Also, the research focussed on the preconstruction phase of integrated projects, but as explained in the previous section it is believed empathy would also be beneficial on a bigger scale in other types of construction projects and in other project phases.

When it comes to the scientific value of the research it is believed this research is an interesting first step in investigating the relationship between empathy and the construction sector. On the basis of the literature review in chapter 2, it could be concluded the link between empathy and the construction sector was relatively new. A research of this size about the subject had never been done before. Next to this a measurement of the empathic ability of a complete construction project organization of this size with these insights reported also had not been done before. This shows that in terms of scientific knowledge a lot of new insights have been gained.

8.5 Recommendations for further research

As explained in the previous section this research was an interesting first step in the research about the relationship between empathy and the construction sector. This means there's still a lot of room for further research about the subject. First of all more research is needed on the effectiveness of The Empathy Framework. It would be very interesting to use the framework in practice and implement it in a construction project. This would then be a nice example of testing the framework and its effectiveness. It is interesting to see if it is suitable to use in practice. This would be a more long-term research strategy for the topic and the framework as construction projects often last a few years which means it takes a while for results to become visible. Also more research can be done on the content of the framework. The framework for example leaves the choice open to facilitate more empathy by choosing people on the basis of empathic competences or by stimulating empathy of people already involved. Further research should clarify if there's a difference in the effectiveness of these different types of interventions. Next to this, when it comes to stimulating empathy, further research is needed about how this can be done best in each situation and if this is possible. As explained in section 2.7, different researchers propose methods that promise to stimulate empathy. However the exact effectiveness of these methods to stimulate empathy should still be researched for each situation. Maybe it turns out it is better to compensate for lower empathy via other methods.

Second of all additional research should provide more insight in the role of empathy in other procurement models and other phases of the project too. This would give more insight in the application of the research on a bigger scale. This research only focussed on the role of empathy during the preconstruction phase of integrated construction projects. As explained in Appendix G, interviewees in Part II of the research already shared they think empathy has an even greater role in the procurement of two-phase contracts that are becoming more popular at the moment. It is therefore interesting to investigate the role of empathy during other project phases and for other procurement models too to get a more complete picture of the subject. It would be for example interesting to use the framework in practice in other types of projects to investigate if it would be effective there. If the framework works it might prove itself to be a valuable method to improve project performance.

Third of all, as explained in 8.2, the researcher expected that internal empathy would be more important, but instead it turned out external empathy is more important to construction project performance. The literature review therefore focussed a lot on internal empathy and less on external empathy, because that was what the researcher had in mind. It is therefore interesting to further investigate what is said in literature about (things related to) the subject of external empathy in construction projects. This could provide more context to this side of empathy and potential further research directions.

Finally, as explained in 8.1, the questions in the IRI test used to measure empathy in Part III of the research were sometimes hard to understand for the respondents which resulted in a questionable internal validity of the research results of Part III. It is therefore interesting to execute additional research investigating if the results of the measurement can be validated by measuring empathy of construction professionals with a different test than the IRI test. It is the question if the same research results will be obtained or if maybe a different test gives different

research results. In case of the latter it is interesting to investigate which test is more suitable to measure the empathic ability of people in the construction sector.

8.6 Recommendations for the construction sector

For the construction sector it is recommended to dedicate more attention to the importance of soft skills like empathy in construction projects. It is believed this research demonstrates that other factors than just technical skills are also important to the success of a project. When it comes to empathy in specific it is recommended to spend more time on acknowledging the importance of empathy in construction projects. It is believed an open mind is needed for this as it might be contrary to what people are used to. The Empathy Framework is presented as a suggestion to do so.

9. Conclusion

In this chapter a final conclusion will be drawn about the research results in the form of an answer to the main research question. The sub-research questions Q1 to Q4 have already been answered in the chapters about the research results of Part II, Part III and Part IV. They will therefore not be repeated in this chapter.

It seems that construction professionals on average score low on empathic competence and that in certain situations it is important for project participants to be empathic for a good project outcome. This results in a gap in the construction sector between required empathy and actual empathic competence which demonstrates there's room for improvement in this area. The research further investigated which interventions related to stimulating empathy are most effective to facilitate this improvement in project success. Based on the information obtained out of the separate parts of the research, an answer can be formulated to the following main research question of the research:

How to improve the project performance of integrated construction projects by focusing on empathy during the preconstruction phase?

It is believed that the project performance of integrated construction projects can be improved by focussing on stimulating more empathy between client and contractor and towards stakeholders during the preconstruction phase (= external empathy). The reason that the performance of construction projects can be improved via external empathy is that when looking at what mostly causes projects to perform badly, it is often related to a bad collaboration between client and contractor and/or insufficient involvement of stakeholders. Especially in the relationship between client and contractor there would be room for improvement as there's a gap in required empathy of the contractor. Improving this collaboration and the involvement of stakeholders by focussing on more empathy then supports a better project performance. Stimulating more empathy between the client and contractor helps to do so by supporting both parties in understanding each other's interests and to understand how to communicate with each other in an open way. It forms the basis for a good relationship between them and it is therefore already of importance from the beginning of the tender phase. In case a conflict or other issue occurs it helps them to solve the situation in a collaborative way. It are the management teams of the client and contractor specifically who should be more empathic towards each other in this case and people of the contractor in general that are in contact with the client who should be more empathic to their counterparts of the client. Towards stakeholders it seems also important to be more empathic. Being empathic with them makes them feel heard and acknowledged in their opinions. It helps to understand how to involve them, how to keep them satisfied and how to communicate important information about the project to them. If stakeholders are not involved enough they could thwart the project a lot which disturbs the construction process and planning. Eventually this could harm the project outcome in the form of delays and extra costs. It is mostly the responsibility of the stakeholder managers to be more empathic with stakeholders. Next to this also technical design managers should be more empathic towards stakeholders to understand how to cope with their wishes and requirements when making the design.

It is also believed that project performance can be improved by focussing on stimulating more empathy internally in the project organization within teams and between people from different disciplines. However, this would have a lower effect on improving the performance of the project compared to stimulating external empathy. It is said that internally relationships between people in the project organization can be very good, but if for example the relationship with the client is not good this would still affect the project outcome in a negative way. Looking at how stimulating internal empathy then benefits the project performance it is believed that within teams it is important that team members are empathic with each other to create a good work environment. Empathy helps them to understand what type of person the other is, how to communicate with this person and it creates trust and respect between them. This will support the relationship between them and their job satisfaction. If team members enjoy going to work and being part of their team this will benefit their productivity and thus the project performance. Next to this it is believed managers should be empathic with their team members to understand how to activate these people and to involve them in the project. Some people are for example more quiet, but could have very good ideas that benefit the project. It is about being aware of this and understanding the other's personality and how to involve them. Next to this empathy would be important internally in the project organization of the contractor between the different parties involved in the construction consortium. It is believed they should be able to empathize with each other's interests and work processes and not only focus on striving for their own interest. Finally internally empathy would be important between people from different processes or disciplines. This is mostly the responsibility of managers of the different processes. It is said people from different disciplines are often very different types of people but the integration between them is still of high importance to the project. It is therefore believed it is important they empathize with each other to understand the other's personality, to understand how to communicate with the other and to understand how to think along for a good integration between them. This seems especially of importance between people from the design and execution team. Here empathizing more with each other is the responsibility of the managers, design leaders and head of execution.

The Empathy Framework as presented in Figure 19 in chapter 7 is developed as a strategy for construction professionals on how project performance can be improved via empathy. The framework presents a guideline of the interventions based on stimulating empathy of which it is believed they are able to improve project performance. The interventions are presented on the basis of their effectiveness to improve project performance. It is recommended to prioritize the implementation of the interventions on the basis of their effectiveness. Both client and contractor have a role in improving project performance in the framework. It is recommended for all construction projects, regardless of their complexity, to follow the framework during the preconstruction phase to understand how to improve project performance via empathy. This should be done as early in the project as possible. As the research was however of an exploratory nature it should be noted these are just first drafts of how empathy could play a role in construction projects. Further research is needed to confirm these conclusions.

A critical note should be made to the fact that unforeseen circumstances or other risks can of course always occur and affect the performance of the project, even if the framework has been followed and the organization focussed on stimulating more empathy. Nonetheless it is believed being more empathy still benefits the final project result in this case. This is because if these risks occur it is important that together in a collaborative way the involved parties find a way to deal with the situation and still make the best out of the project. Their relationship is being put to the test if this happens. There's a risk these parties want to blame each other for what happened and they could start acting in favour of their own interests. If these parties are not able to find each other, take each other's perspective or understand each other's interests the situation would not improve and could get into a downward spiral. In the end this could make the project outcome even worse. Instead having an empathic and open attitude towards the other party helps to prevent this and opens doors to find ways to solve the issue together and make the project outcome better.

10. Reflection

Looking back at the executed research I think the research went smoothly and as planned. I could finish my research within the planning I made and I enjoyed working on it. Especially the data collection phase I liked because it allowed me to speak to various construction professionals and listen to their stories and experiences. Myself I don't have a BSc background in civil engineering and I had no experience working in the construction sector. At the beginning of my research I realised that, due to this lack of experience, I was missing practical understanding of certain processes in a construction project, which actors are exactly involved and how they interact. In the master of Construction Management & Engineering we learn a lot about construction projects, but more on a scientific basis. During the research I however learned more about how construction projects take place in practice. I find it very valuable I learned more about this aspect as it prepares me for my career in the construction industry after my study. Next to this I have the ambition to be the manager of a team or even a project manager at some point in my career. I think during my research I learned a lot about the value of good management and I hope that someday I can apply this knowledge in practice.

Looking at my planning, I never had the feeling I couldn't finish my research in time. The only small hiccup in my research was the fact that de data collection on the client side took relatively long compared to collecting data on the side of the contractor. On the client side it took longer for them to confirm if I could conduct my research within their organization. This caused that I already had my data collection from the contractor finished one month before I started the data collection on the client side. As my deadline to finish the research report neared, my whole planning delayed a bit after this which caused I still had to do quite some work before my deadline. Looking back it would have been better if I would have known the data collection on the client side would take longer to confirm. In this way I could have taken this into account and spread the work differently making sure I didn't have to do a lot of work right before the deadline.

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MASTER THESIS



Appendix A: The different IPM teams in a project organization

This appendix gives an overview of the different roles and organizational structure of the different IPM teams within a project organization on the side of the contractor. The different IPM teams are: the Project Management team, the Project Control team, the Stakeholder Management team, the Technical Management team and the Contract Management team.

Project Management team

Project Management focusses on quality assurance, support for the project and the integration between the different processes and actors. The project manager or project director carries the final responsibility for a good project result and is therefore on the top of the pyramid. He or she carries the responsibility for meeting all project goals. One level lower, regular project managers are more involved in steering the operational tasks than the project director. They can also be responsible for part of the project. Then above every process is a project leader or junior project manager responsible for a certain process or activity. Figure 21 shows the structure of the project management team.



Figure 21: Project management team organizational structure

Project Control team

Project Control focusses on managing all risks and control aspects in the project. It covers the following subdisciplines: risk management, financial control, information management, document control, auditing, improvement management, scheduling and evaluating. The manager project control is responsible for identifying and controlling all (possible) integral risks. Project control is often divided into financial management and process management. There are advisors involved for the separate sub-disciplines. The a visual representation of the Project Control team is presented in Figure 22.

Project Control team Manager Project Control Process Manager Advisors

Figure 22: Project control team organizational structure

Stakeholder Management team

Stakeholder management is about balancing the relation with all stakeholders and the environment of the project during the project. The contact with the environment and stakeholders is the responsibility of the Stakeholder manager. Stakeholder management covers 13 domains, each represented by advisors of that expertise. Some advisors can be responsible for multiple domains. The 13 domains are: permit management, stakeholder management, communication, damage management, land availability, side project coordination, pipes and cables coordination, non-exploded explosives coordination, archaeology, soil and environment, traffic management, and ecology. The stakeholder management project team follows the structure as shown in Figure 23.





Technical Management team

Technical management is about managing what is to be built and how this will be built. The technical manager is responsible for the technical content of the project. Technical management is often divided into different subprocesses: Design, Execution and sometimes Maintenance if included in the contract. Each part then also has a separate technical manager and a different team below. Within these different subprocesses the teams are divided into the expertise's for Civil, GRW (Ground, Road, Water) and Technical Installations. Figure 24 shows this team structure.

Technical Management team



Figure 24: Technical management team organizational structure

Contract Management team

Contract management is about managing the risks that can possibly occur between the client and the market. This starts in the tender phase. The contract manager is responsible for the contact and contracts with the different market parties involved. This is mainly the contact between client and contractor. Next to the contract managers, some contract coordinators are active to guide this process. During the tender phase, the tenders managers are mostly involved. They are also part of the contract management discipline, but they are not really involved in later project stages. Below the tender managers there are MEAT (most economically advantageous tender) managers who are focussed on winning the tender. The Contract Management team organizational structure is shown in Figure 25.



Figure 25: Contract management team organizational structure

Appendix B: The (sub-)processes of the preconstruction phase

This appendix gives an overview of the different (sub-)processes that take place within the preconstruction phase. This covers the process of the tender phase and the different IPM (sub-) processes. Figure 2 in section 3.2 gives an overview of how these processes work together in the complete process of the preconstruction phase.

Tender phase

For integrated construction projects, the tender phase in the Netherlands follows the UAV-GC guidelines. The client initiates the tender and different contractors can participate. A contractor is represented by tender managers. The project managers and project controllers are involved as advisors to the tender managers to advise on what is possible and feasible from a technical and operational point of view. The technical management team is involved on the contractor's side to make the tender design. For the contractor, during the tender phase the main focus is on the winning tender strategy. The tender starts with a preparation phase where client and contractor(s) prepare the tender. Next the starting phase of the tender takes place where tender strategies are made. Here the contractor starts generating different plans/bids. Then one bid is chosen that is further developed into a final bid. Finally the client awards a contract to a contractor with the best offer. This process is shown in Figure 26. During this process the client and contractor have different responsibilities. These responsibilities are listed in Table 7.



Figure 26: UAV-GC tender process (own figure)

Responsibilities Client	Responsibilities Contractor
 Announcing the tender 	 Assess the tender
 Make selection criteria 	 Collect information for application and
 Make application criteria 	selection
 Make award criteria 	 Make tender plan
 Invite selected bidders 	 Ask questions to client about the tender
 Inform selected bidders 	 Participate in information events
 Assess bids 	 Submit a tender bid
 Make selection advise based on award criteria 	 Accept or deny contract
 Inform bidders about the selection 	
 Award contract to contractor 	

Table 7: Responsibilities client and contractor during the tender phase (Projectburo B.V., 2015)

Design

After the contract has been awarded, the design team start with the design process. They will design what is to be built. This process is shown in Figure 27. When the design phase starts, the team starts with a design strategy and the design planning. During the design phase there are different review moments where integration occurs with the other project teams. First when choosing a design, the managers of design, execution and optionally maintenance come together to make this decision. Then in every gate review the managers of all five different processes come together to align their plans and decide how to further proceed.



Figure 27: Design process in the preconstruction phase

Execution Preparation

The execution team is mainly operational in the construction phase where they will execute the design. However during the preconstruction phase they already need to prepare this execution. This is done following the process in Figure 28. For each version of the design that the design team generates, the execution preparation team needs to prepare the work. Therefore, the interaction between the design team and the execution preparation team is high. The process ends with making the work instruction, preparing the construction site and making the final work plans. After this is done, the construction can start.



Figure 28: Preparation execution process in the preconstruction phase

Maintenance Preparation

If a maintenance component is included in the awarded contract, the maintenance team starts with the maintenance preparation. This means they will develop along the way an asset management plan, a maintenance plan and finally a maintenance work instruction. This is done following the process in Figure 29.



Figure 29: Maintenance preparation process in the preconstruction phase

Stakeholder Management

Figure 30 shows the process for stakeholder management during the preconstruction phase. Stakeholder management is carried out following the thirteen domains of stakeholder management (i.e. permit management, stakeholder management, communication, damage management, land availability, side project coordination, pipes and cables coordination, non-exploded explosives coordination, archaeology, soil and environment, traffic management, and ecology). How to deal with the thirteen domains sets conditions for the technical management processes. Interaction with them is therefore required. Some also argue stakeholder management is part of technical management for this reason. During the preliminary design phase, stakeholder management starts with analysing all stakeholder requirements. With this information they develop a stakeholder strategy and a connectivity, liveability, safety & communication (CLSC) plan. These requirements already need to be included in the preliminary design by the design team. When after the gate review it is decided how to further proceed for the final design, the stakeholder management team can further develop their stakeholder management plans. This means they will further calculate their plans and designs. They will also further develop their plans of action on how to include the environment and arrange permits. After the second gate review they will finalize their plans for stakeholder management.



Figure 30: Stakeholder management process in the preconstruction phase

Contract Management

During the preconstruction phase the contract managers constantly need to assess whether the plans made by the other teams match with what has been agreed on in the contract. If things are not matching, the contract manager should try to advocate to align the plans with the contract. If this is not possible they should get in contact with the client to discuss on how to further proceed.

Gate reviews

During the gate reviews the managers of the different processes come together to align their work and decide on how to further proceed. If they cannot find agreement or the plans made by the different teams don't fit well enough together, the teams need to go a step back and revise their work before they can proceed.

Project Control

When the preconstruction phase starts, the project control team starts with their control processes. This covers the following activities: risk management, financial control, information management, document management, auditing, improvement management, scheduling and evaluating. It is about making sure the project performs within the boundaries set for budget, schedule and quality (iron triangle). Project control oversees the other processes to check whether what they are doing matches with these requirements.

Project Management

The following activities are part of project management during the preconstruction phase: making the project management plan, project assessment, project steering and decision making. It is about supervising the project and bringing all processes and people together.

Appendix C: Relations between the five IPM roles

This appendix gives an overview of the relations between the five different roles of the IPM model in a construction project. This is based on the overview as given by Wermer (2018) in his book about IPM. Some relations are more relevant for the side of the client, but most relations are also present on the side of the contractor.

Relation between the stakeholder manager and the technical manager

- The stakeholder manager collects, mainly in the preparation phase or tender phase, the wishes and requirements of the stakeholders. The technical manager then sees wat is technically possible (scope and boundaries) and makes the technical and functional specifications. The technical manager assists the stakeholder manager with possible options and solutions. For big decisions with big (financial) consequences or politically sensitive choices, the project manager will be involved.
- The stakeholder manager informs the stakeholders, in a way that is understandable for them, about the possible solutions in a transparent way.
- The planning and realisation phase will be better integrated by the collaboration between the stakeholder manager and technical manager.
- This integration between the planning phase and realisation phase can be beneficial for the project result: the creativity of the market can be consulted before everything is fixed in a contract. The relation between the stakeholder manager, technical manager and contract manager is very important here.
- Together with the technical manager, the stakeholder manager makes sure the functional requirements can be explained to the stakeholders.
- Conclusion: it is important to involve stakeholder management in an early stage for an optimal cooperation with technical management and contract management.

Relation between the technical manager and the contract manager

- The contract manager has to decide on the market strategy based on the present risk profile and in relation to the developed solutions. De technical manager supplies here the solutions, options and specifications from the technique.
- There's a translation from the technical and functional specifications (technical manager) to the contractual arrangements (contract manager).
- The contract manager is in the early stages of a project obliged to perform a market scan. A market consultation is optional. By using these instruments, the time of buy and the type of contract are brought forward. De marketability of solutions and options in a certain environment are relevant here.
- The technical manager contributes to the total system with which the contract manager must approach the market.
- Technical management makes based on its expertise assessment criteria to assess the contractor on risky
 processes and products. Technical management is responsible for the quality of the assessments.
- The technical manager delivers the assessment capacity to contract management.
- The contract manager is responsible for de time of execution of the assessments and for the actions that follow from the assessments. The contract manager also has the responsibility for paying the contractor.
- If the contractor proposes adjustments, technical management will do a technical examination. If required the stakeholder manager will inform all stakeholders and assess the adjustments on public or private juridical boundaries.

Relation between the stakeholder manager and the contract manager

- The stakeholder manager is responsible, via the contract manager (or technical manager), to communicate environmental aspects to the stakeholders.
- When there are more environmental aspects the responsibility of the contractor, the stakeholder manager and contract manager need to work more closely together
- Considering the wishes of the environment, the stakeholder manager will, via the technical manager and contract manager, express the environmental aspects in the contract depending on the risk profile.
- Depending on the risks given to the contract manager, the stakeholder manager will decide on which environmental assessments should be done by the contractor
- In every phase the environmental manager has to explain the decisions made in the contract to the stakeholders. Next to this the environmental manager has to explain how the contract assessment will take place during execution.

Relation between the project control manager and the other roles

- The project control manager makes the project management plan and the internal quality assurance plan.
 With this he or she touches all the other roles and fields of attention.
- The manager project control is responsible for the internal quality assurance and with this interference with all the other roles. It also fulfils partly as supporting role.
- The manager project control is responsible for the risk management and touches all other roles with this. All roles themselves are responsible for applying the proper risk management.
- The manager project control is responsible for financial management and scope management and touches all other roles with this.
- The manager project control has the financial knowledge in its team and supports the technical team and contract team with this.
- When it comes to risk management all other roles are challenged by the manager project control.

Relation between the project manager and the other roles

- The project manager carries the final responsibility of the total project towards the client and steers the project. With this he/she touches all other roles.
- The project manager is responsible for the reports towards the client that are made by the project control manager.
- The project manager steers the team and is responsible for the integration and interfaces between the different roles.
- The project manager is responsible for teambuilding and has to intervene when the team is not collaborating.
- The project manager supports the other roles if that is being asked.
- The project manager often, in cooperation with the stakeholder manager, maintains the contact with the stakeholders.
- The project manager is responsible for enough capacity from the organization for the project and makes sure this is controlled by the project control manager.
- The project manager is responsible for making an escalation model for the project organisation and in collaboration with contractor.
- The project manager makes sure the project team and its work get assessed in an independent way if he/she thinks this is necessary.

Appendix D: Interview set-up Part II

This appendix will cover the interview set-up for the interviews held during part II of the research. An interview scheme has been made to structure the interview. This is based on the guidelines for interviews from Baarda (2017). The drawn up interview scheme can be found in Table 8. The interviews followed this scheme with topics and questions to discuss.

The interviews start with an introduction. During the introduction the researcher discusses the following aspects with the interviewee:

- Topic of the interview
- Goal of the interview
- Confidentiality of the interview
- Results of the interview
- Duration of the interview
- Boundaries of the interview
- Ask the interviewee if there are any questions left
- Ask the interviewee some neutral questions about his/her personal information (e.g. name, function)

After the introduction the interview starts with a starter question. The starter question is a broader formulated question to warm up the interviewee. After this several topics will be covered during the interview in multiple questions. The interviewer will start with easier questions and end with the more complex topics. As the interview is semi-structured the interviewer can ask follow-up questions in certain situations if desired. Finally the interview will end with a closing.

Introduction	Торіс
	 Competences of project participants during the preconstruction phase
	Goal
	 To gain more information about the role of the competences of projects participants in the preconstruction phase
	Confidentiality
	 Interviewees will not be mentioned by name in the research. Responses will
	be anonymised.
	Results
	 The interviews will be transcribed and analysed. The results will be included
	in the final research report.
	Duration
	 1 hour
	Conditions
	 By participating in this interview the interviewee agrees that the answers to the questions can be used for the research. Next to this the interviewee agrees that the interview will be recorded.
	Questions
	Are there any questions before the interview starts?
	Questions about personal information:
	 Name
	 Employer
	 Function/expertise
	 Experience in the industry

Starter question	What are in your eyes critical success factors for a construction project?
Topics	 Are there things not going well at the moment in construction projects when it comes to collaboration between involved people? How can we achieve a better project outcome? Do you think the capability of project team members to relate to other project team members plays a role in construction projects? (if yes, where/when/to whom would that be?) Is it then about relating to the other person's specialism/ knowledge/methods/communication?
	Show the schematic overview of the preconstruction phase
	 If we look again at the preconstruction phase, could you name all the points where you think it is important for the involved people to be empathic towards each other? For who is it then important then to be empathic? / with whom? / why? Could you rank these points based on where empathy is the most important? What would be the effect on the project outcome if empathy would be not or less present at these points? Are there points where empathy is less important according to you? Concluding, what do you think is the role of empathy a construction process?
Closing	 Introduce that we came to the end of the interview Ask if the interviewee missed anything in the interview or if he/she still would like to add something Summary of the interview Ask the interviewee if he/she can give a very short summary of the most important aspects of the interview Thank the interviewee Give contact details to the interviewee

Table 8: Interview Scheme Part II - English

To test the functioning of this interview scheme, a test interview has been conducted before the official interviews took place. The interview scheme above is the final scheme after some adjustments based on the test interview.

As the interviewees and the interviewer are both native Dutch speakers, the interviews have been held in Dutch. This is done to support the interviewees in not feeling limited by a language barrier in their answers. The translated Dutch interview scheme that has been followed can be found in Table 9.

Introduction	Topic Competenties van project teams in de preconstructie fase
	 Goal Het verkrijgen van meer inzicht in de rol van de competenties van project teams in de preconstructie fase. Confidentiality

	 Geïnterviewden zullen niet bij naam worden genoemd in het onderzoek.
	Antwoorden zullen worden geanonimiseerd.
	Results
	 De interviews worden getranscribeerd en geanalyseerd. De resultaten worden gebruikt in het uiteindelijke onderzoeksrapport.
	Duration
	■ 1 uur
	Conditions
	 Door deel te nemen aan dit interviews gaan de geïnterviewden er mee akkoord dat hun antwoorden kunnen worden gebruikt in het kader van het onderzoek. Hiernaast gaan de geïnterviewden ermee akkoord dat het interview wordt opgenomen.
	Questions
	 Zijn er nog vragen voordat het interview start?
	Questions about personal information:
	 Naam
	 Werkgever
	 Functie/expertise
	 Ervaring in de constructie sector
Starter question	Wat zijn in uw ogen succes factoren voor een constructie project?
Topics	 Zijn er dingen die, in uw ogen, op dit moment niet goed gaan in
	bouwprojecten met betrekking tot samenwerking?
	Hoe kan men tot een beter project resultaat komen denkt u?
	 Denkt u dat het inlevingsvermogen van de project team leden in andere
	project team leden een rol speelt in het bouwproject?
	 (zo ja, waar/wanneer/richting wie zou dat zijn?)
	 Gaat het dan om het inlevingsvermogen in de ander zijn
	werkspecialisme/kennis/methoden/communicatie?
	Laat de schematische weergave van de preconstructie fase zien
	Als we kijken naar de preconstructie fase, zou u dan alle plekken kunnen
	aanwijzen waar u denkt dat het belangrijk is voor de betrokkenen om
	empathisch te zijn richting de andere betrokkenen?
	Voor wie is het dan belangrijk empathisch te zijn? / Richting wie moet deze
	persoon empathisch zijn? / Waarom moet deze persoon empathisch zijn?
	 Zou u deze plekken kunnen ranken op basis van waar het hebben van
	empathie het belangrijkst is?
	 Wat zou de invloed zijn op de project uitkomst als deze mensen niet
	empathisch zijn richting elkaar?
	Zijn er plekken waar empathie niet belangrijk is volgens u?
	 Samenvattend, wat denkt u dat de rol is van empathie binnen het
	constructie proces?
Closing	Introduceer dat we aan het einde van het interview zijn aangekomen.
	Vraag of de geïnterviewde nog jets miste of jets zou willen toevoegen.
	Samenvatting van het interview

	 Vraag of de geïnterviewde een korte samenvatting van geven van de
	belangrijkste punten uit het interview in 1 minuut
	Bedankt de geïnterviewde
	Laat contact gegevens achter bij de geïnterviewde
Table 9: Interview Scheme Part II - Dutch	
Appendix E: Part II interview data analysis – quotes about success factors

This appendix presents an overview of what each interviewee in Part II of the research indicated as success factors to a construction project. Table 10 shows this overview.

Interviewee #	Quotes about success factors to a construction project
Interviewee 1	"Mostly that you have a good collaboration between the design team and the execution team. Especially during the preconstruction phase we need to design something that later will be build outside. []. And I think one of the most important competences that both teams should have is feeling for each other. So the design team needs to have feeling for the execution team. They need to be able to talk to each other, but they also need to know what the most important points are to discuss. On the other side the execution people need to be able to think along with the design team. I think that is internally the most important competence."
	"If you look between us as contractor and Rijkswaterstaat in this case as the client, then that you understand what each other's interests are . []. When we start with making the design we see things that are just not right or impossible in the contract. That are contractual changes that need to be made, but that is complicated. We just want to get the contractual change, but the client first wants to make the whole package complete before making a change. And that gives a lot of tension between the two parties. Because we need to finish the design, but we want that what we design is contractually covered. []. And apparently the other way around we are not sufficiently skilled enough to communicate what is needed for the contractual change such that it is clear for the client why it is needed. []. We don't see what they need as substantiation."
Interviewee 2	"Solidarity. Only if you have a good team, with good dynamics and solidarity, in which you are there for each other and you know how to find each other , only then you have good communication and good communication is just essential to be able to set the right steps together. []. You will always get people in a team that are not the most ideal person in terms of personality or profile. But of course you can cope with that in multiple ways, especially for projects with a long planning. It is worth investing in that. []. The managing layers need to facilitate this throughout all levels in the organisation. []. And also as the director or project board that you are open to signals in the organisation that are not always spoken out loud."
	"It is also important that people delve into what is going on . [].It is still about people. It is important to start the conversation with certain project employees to hear the story behind certain choices . Are people satisfied with the design? []. They need to look at other layers in the organisation and think about who did this and why did this person do this? The see why certain choices are made and how things are integrated."
	"Better envision what the client wants in the design. []. Be more open with each other and talk more to each other. By communicating you get a better vision of what you expect from each other. The client creates understanding for how we did certain things and in the end we all know that these kind of projects are a way of give-and-take."
Interviewee 3	"Succes is always the people. If us people are not able to find each other, then you can have as much tools but still everything will collapse. So I always say people are the most important thing. []. I need to learn to make the project a success together. I need to be able to communicate interests , I need to involve people in why we go a certain way, why we have a certain vision. To convince them of the need and the bigger interest. []. That together you can make it a success and can reach consensus. []. You don't

	always need to tell everything to the whole organization, but you do need to involve people. []. There needs to be openness . And people need be proud and enjoy their work. []. How do you involve other people? Some people are very different in their personality and if you can respect each other and the other's personality, they you can build together. You cannot change someone else, but you can adapt to someone. You always need to see that in the other . Then you can further connect and talk about the content. Because in the end it is about the content. []. If you can't do this you lose each other. Already at the project board level this is important and should be projected to lower layers in the organization."
Interviewee 4	"That starts with the request from the client and that the client asks a clear question to the market parties and what they desire from market parties. And of course that that question gets picked up by a suitable team from market parties and gets guided by a suitable team from the client. []. For a market party it is always very hard to fathom in a short period of time what the client wishes to achieve and what their goals are. So the market needs a clear market request. There's an important responsibility for the client to ask a well-defined question and to realise how you want to communicate this to the market".
	"Risks can always take place and then everybody tries to shift responsibilities to the other party. Then the collaboration between client and contractor always gets put to the test when consequences in time and money come up for discussion. That's where it often goes wrong. In the end it is about big interests and being able to take perspective . Then you come at the phenomenon of empathizing with the interests of the other . And that goes beyond the interests of involved companies or involved authorities, but it is also about individuals and the project manager who is responsible. What happens when there are disturbances and discussions about time and money evolve? []. And this is of course very hard. []. For example now we need to cut trees for the project, but because of the image towards stakeholders it is forbidden to us to cut those trees. But because we are not able to cut those trees we cannot start follow-up activities in the construction process. This results in a domino delay effect in our planning. It seems the client has not enough perspective for the domino effect that results from this. []. You need to want to see this and be able to see it ."
Interviewee 5	"Collaboration in an integral way. Daring to ask for help. Of course you need very good people that are
Interviewee 5	"Collaboration, in an integral way. Daring to ask for help. Of course you need very good people that are content-wise very skilled to manage such a complex project in an integral way. So it is partly about technical competences, but also how do I function in a team . I think that is very important. In the tender phase we therefore put a lot of effort in drawing core values for the project that are still important. []. In a rapidly growing team you need to be able to really get the right culture and values within the team . Openness is also very important. You can say anything as long as it is in a normal, respectful way. []. What we did in the project in the beginning we put technical people on more soft-skill positions. They
	didn't like this, but it really helped to let them take a different perspective and help each other more. After this we shared a lot what we did content wise, people really dared to ask for help , there was a lot of interaction and knowledge sharing . []. You need to explain what we stand for all together. This resulted in a high engagement of people to the project. People feel more heard and welcome. That is very important."
	didn't like this, but it really helped to let them take a different perspective and help each other more. After this we shared a lot what we did content wise, people really dared to ask for help , there was a lot of interaction and knowledge sharing . []. You need to explain what we stand for all together. This resulted in a high engagement of people to the project. People feel more heard and welcome. That is very important." "The combination of parties and how they work together is important. You can all step into the project striving for your own interest or you can say we try to deliver this project in an integral way and share profits. That basis on management level is important for the success. So it is about thinking about the interest of the project and not only individual interests . The interests of the project are top priority. I have seen this is past projects that at the highest level in the project this is not going well and that repeats itself lower in the organization. []. Next to this you need to engage sub-contractors. If they don't feel engaged to the project they will really behave as a sub-contractor when they can fulfil a very important role to the project. Then you get a misalignment there."

	other and collaborate to find a solution together. []. I think what's important there is trust and seeing each other's interests. Also the client needs to be involved in the project. []. In the end it is important you operate in a triangle between the interests of the contractor, the interests of the client and the interests of stakeholders. And how do you bring those interests together and do you make sure you walk the right path together. But in practice that is very complicated."
Interviewee 7	<i>"If you dare to act vulnerable, dare to tell what's wrong.</i> Name the risks and don't always give the politically desirable answer. But say: 'I see that you as the client envisioned something, but I think that that is not possible or that it causes extra risks' for example. That you really start the conversation about that together and you feel comfortable to say what holds you back in that and you try to find a solution together. And that is between client and contractor. []. I think there's a lot of interaction there what you need to do well. And at the same time if you don't pay attention to that it can go very wrong. You need to get to know each other. []. If this is not happening you can really talk past each other, you get inefficiency, you don't get the results you want and things go slower. But what also happens is that you get irritations."
Interviewee 8	"That the contractor is able give the project a twist, he needs to be able to differentiate himself from others. Not only by being the cheapest, but also by being the smartest. And that together as a team from the client and contractor you share ideas, and discuss risks. You are preparing successes in which a good collaboration is essential .[]. Always tell what's on your plate so we can talk about it together. Maybe it can be solved with a quick call to a stakeholder which could prevent a lot of delay or costs. So it is about acting vulnerable, openness, sharing problems and daring to speak about that in openness without falling into juridical procedures. []. It is extra important to put energy in that openness. []. It is about choosing people on competences instead on technical knowledge only and that asks for courage in the construction sector. []. If we want to win we don't only need to be the best on technical level, but also on the personal side, the competence side we need to connect . Because if you don't like the person you are speaking to that works differently than when you have a good relationship. That is fundamental for the collaboration."
Interviewee 9	"I think it is essential you are open to the different interests and different disciplines in the whole line , and that you really need to deliver the project together and that you need to be open and transparently make clear what's going on. So if you are too focussed on your own project phase or discipline, they you don't make progress. And you need to try to look broader and really stay in conversation with each other. []. Because yes within disciplines, yes there things go quite well. That's what they already focus on. And those people are very good at thinking inside their old columns. So yeah within your own process you know what's going on and how to deal with that. But people often forget to think a step further than that."
Interviewee 10	"A separation between informal and formal communication lines. What I'm trying to say with that is that you always have the contractual context that you need to respect. But next to that it is very helpful if you can also have an informal meeting where you can speak freely . I think it is very important you can organise that with each other to make sure no surprises get into the formal route. []. And that is specifically between client and contractor."
	"What I also think is important is that there are a lot of different interests and requirements in a project, a lot of techniques and a lot of processes. And you need to consider them all in an integral way . Because it is a lot. A lot of people think this is a challenge, but still worth striving for that you don't look at separate aspects, but that you have a more broad perspective and that you look to its relation to other matters. []. When I look at different people, it is not that important that you understand everything they technically do in depth. But it is about the interference between other processes and interfaces . So having a broader perspective."

Interviewee 11	"That you have stability in scope and that the client knows that he wants to build. That they looked more into detail."
	"The collaboration between client and contractor. Unforeseen circumstances can always take place, but it is about the cooperation and the attitude of both parties that should be good to cope with this. []. If you collaborate in a project from the beginning you should be open and direct about issues. So don't hold the cards against the chest. I think that helps no one. Because if there are unforeseen circumstances, and maybe that is a naïve thought of myself, then often you can solve it together. But both need to contribute to that and be committed to the project. []. It is about asking 'how do we want to cope with this?'. Yes that openness and honesty and looking what you can do together. []. And I think that is partly culture, so attitude and behaviour. Alternatively you can look at it very juridically. []. You can always let it be the problem of the other and if one of the two parties has such a culture, yes, then it just goes wrong. You should be willing to finish the project together and try to solve things together."
	Table 10: Quotes per interviewee about success factors of a construction project

Appendix F: Part II interview data analysis – statements about empathy

This appendix presents an extensive overview of statements shared by interviewees in Part II related to the importance of empathy during the preconstruction phase and a clustering of these statements.

Statements about the role of empathy during the preconstruction phase

In the next sections quotes of interviewees are presented about the role of empathy during the preconstruction phase. They are categorized by the type of situation in which empathy is relevant. On the basis of these quotes conclusions have been drawn in chapter 5.

Empathy between different processes in general

Quote 1: "If you are open to each other, trustworthy, everything can be said, you have respect for each other. If you don't do this [this = being empathic] you don't get a good organisation. This applies to everyone in the organization."

Quote 2: "I think you need an empathic ability to be able to empathize with how someone else thinks, how someone else works, what kind of interests someone has to deal with and what kind of problems someone experiences. That asks from people that they are able to look further than just their own task, or their own thing. Because that is just a small piece in a big network needed to finally deliver the project. The ability to look further than your own task, your own personality and you own interest is crucial to come to a collaborative success."

Quote 3: "Empathy is needed to understand what type of person the other is, what someone else can do and what someone might need and thinks."

Quote 4: "Knowledge and experience are not always enough. It is about realizing the effect of certain things for certain people and being supportive in this."

Quote 5: "Internally in your organization you also need empathy. Because for example for our team of stakeholder managers we need to be able to communicate the interests of the environment into the organization. And then we do need to empathize with the internal organization. For example that design manager, how does that person think? Or the execution manager, how does he think? And of course we need to help them. Because eventually we need to build something outside according to the planning they made. So yes we do need to support them. [...]. And the other way around if the organization is totally not aware of the environment this won't work either."

Quote 6: "I really notice differences in people in the project team. And when there's tension in the project, then people tend to pull back to their own island so to say. Like 'this is my discipline and I need to make sure for my discipline that it goes well'. They build a certain fence around themselves. This happens in the contractor team as well has client team. And if you don't involve people in what you are doing or what your concerns are, yes then people don't know what to do with it. The key managers of the different processes need to be more empathic with each other. They need to show exemplary behaviour to make sure their team will act in the same way."

Quote 7: "Empathic ability is important between people on all aspects. Because for example stakeholder managers are in general often more sensitive types compared to for example execution people. They also need to be able to cope with each other. It is about the different types of people you have." Quote 8: "Well of course empathy is important. Because if you don't understand each other, for example in a project when execution doesn't have the knowledge and doesn't understand what design is doing, these people do need to have the ability to empathize with what has been designed and how that can be executed in practice. [...]. These people need to understand each other and the different worlds they are in. They should not just stay in their own world. And if these people are able to communicate and ask each other the right questions, then they can help each other and think along. [...]. It is about feeling what kind of communication is needed to let the other understand."

Empathy between design and execution

Quote 9: "And that is hard to get clear what is going on. So for designers, what is going on in the execution team? And the other way around what is going on in the design team? So people want information, but they don't get it because they didn't ask the right questions and they are busy with other things. Because if you don't know what the other is doing or what's going on, then you don't know why certain things happen and what others need. [...]. And this is mostly the responsibility for the organizational layer of the design leaders."

Quote 10: "Designers speak a different language than execution people. Execution people are more direct and can communicate more harsh than designers. That can clash. And it is a very important interaction between those departments that should go well. And also of course in the involvement of maintenance up front. Empathy plays a role here by listening to another instead of pushing your own opinion trough, and also activating people in joint sessions. That starts with the design managers and head of execution that people collaborate. And of course there will always be conflicts, but they need to be solved quickly."

Quote 11: "Design, execution and maintenance are the engine of the project. They really must be able to communicate to each other and collaborate. Because that's eventually where the work gets designed and build."

Empathy of the project manager/project board

Quote 12: "Yes is think it is very important the project manager has this competence to be able to reach the project objectives in the end. [...]. The project managers needs to activate the whole team and has and exemplary position."

Quote 13: "If managers are not empathic it will also not reach the layers in the organization below. [...]. Exemplary behaviour should come from the top."

Quote 14: "As the project board, we need to understand what is really important and further communicate this to the rest of the organization."

Quote 15: "Well then you won the tender and then it is the biggest challenge to transfer the obtained knowledge to the rest of the organization with a fast growing team. This is the responsibility of the managers."

Quote 16: "They need to be able internally to communicate interests and they must be accountable towards the others. That asks a certain level of empathy towards the rest of the organization."

Empathy between parties in a construction consortium

Quote 17: "I think the composition of parties in a consortium is a success factor. It is about the competences of the parties. The project board members should be empathic here. Are they in there on the basis of collaboration of individual interest?"

Empathy within teams

Quote 18: "Empathy is most important for work satisfaction. You only enjoy your work if you have a nice team, that is able to find each other and is there for each other. But also that they are able to have complex discussions together. So the goal there is creating a safe environment, good communication and trust."

Quote 19: "I think empathy is important everywhere. Because people can always disagree with each other, but they need to be able to still discuss this in an empathic way. [...]. Even a drawer, well he also needs to function in team meetings and not always react gruffly. He needs to be approachable and able to communicate his struggles."

Quote 20: "We want to enjoy going to work. And at one point it can just go wrong if big projects get into trouble. Tensions get into the organization and people don't enjoy going to work anymore. That has a very big effect on people and their families."

Quote 21: "If you don't do this you have a big problem. Then people will stop doing things for each other. The rest of the team will feel this too and it becomes a snowballing effect. And of course you can always clash, but it does need to be solved and that you handle it with respect."

Empathy between managers and team members

Quote 22: "And you can still have very intelligent, maybe a little bit autistic people. You need them. They will have the most amazing ideas, but we still need people that know how to connect them. This is the task of the managers."

Quote 23: "And the techie who is maybe a bit less empathic should also be put into his power. This is the task of the project board and the direct manager. [...]. You need to understand how someone works and how you can approach this person best. [...]. If you compose a team you really don't need only very empathic people, but you do need to know how to approach and activate those people. To activate them to participate in the team. How do you let them cooperate? This asks for insight in how people are in the group and how to make them active"

Quote 24: "You also have very introvert people, especially in the design team. They easily get less productive, less involved in the integration of the project, they miss the emotion we sometimes search for. And first of all you need to sense this from the other. So for the more introvert people, the interaction with others is crucial for how they do their jobs."

Quote 25: "It is not only about understanding the other's personality, expertise or understanding what someone means. Because when you are in a big meeting, there are always three people that don't say much. But those three people can bring in the most smart ideas. If you are not empathic to those people than you don't activate this knowledge. If you understand what type of person it is you can think about how to activate that person. You need to listen to this person such that this person will share his knowledge and expertise. And if you know where what expertise is located and how you can activate it, you can reach a beautiful project together."

Quote 26: "Managers need to understand that it is important to look at all aspects of a decision. Sometimes they keep things too much to themselves. They need to empathize with their teams to understand that they need to involve their team members in certain decision making processes and share information. They need to take the perspective that some decisions affect a lot of people. And those people could be surprised by this and panic if they are not involved." *Quote 27: "And this should be facilitated and supported by the managers. If manager are not empathic it will also not reach the layers in the organization below. [...]. Exemplary behaviour should come from the top."*

Quote 28: "I think it really helps if everybody understands what is going on and that you truly understand why things happen. For example if a constructor needs to re-calculate something that has been changed. Then people can think: 'do I need to do this again!?' and feel annoyed. But if you know why that needs to be done, then you understand you need to do it for the project and with a reason."

Empathy between client and contractor

Quote 29: "And I also think that it can be improved that client and contractor better understand each other's interests and what the other means and needs. By being empathic that can also be improved."

Quote 30: "You really need to look together with the client at how are we going to collaborate. That's the first step towards trust. [...]. If you don't do this well and there's no empathy here, you start on wrong terms towards each other. I saw this for example at the project Zuidsasdok that this went wrong. It was about the wrong tone towards each other and not looking at the perspective of the other. "

Quote 31: "It is important to understand the request of the client. Of course we want to make a profit, but with the project we also want to add value towards the client and society. And we can only do that if we understand the request well. Because how to build it eventually, yes that we know."

Quote 32: "For us as the project board, we need to pick this up towards the client."

Quote 33: "In our project it really played a role by supporting that client and contractor were really able to show understanding to each other. We were able to act in an open and supportive manner. This resulted in a good connection for the collaboration between the two. This gave a positive result. [...]. It helped us that we understood how the public authority works and thinks. This helped to develop a certain attitude towards the client."

Quote 34: "Empathy is important to stay open and honest with each other. Even if you have a business conflict it is about realizing what kind of effect that conflict has on the other party, in this case the client. And that the client also goes through very complex procedures and show understanding for that and help if possible."

Quote 35: "Empathy is involved in that you try to envision; if I think take a certain action or I say something or I ask a question to my counterpart, that I try to envision how the other receives that. What does this mean for the other person? Can it have a different meaning than it has for me? If you are aware of this and you can ask yourself those questions, then you can think about how to ask questions or bring a message to start the right conversation with each other."

Quote 36: "The project manager is the first point of contact for the client, so he should be empathic and being able to empathize with the client and build a good relationship."

Quote 37: "Myself I also did a couple of projects in the past. Some failed and others were successful. And I think that was often related to the empathic relationship between client and contractor. For example in the MAVA project we were not so good in the empathic collaboration between client and contractor. But for example for the construction of a courthouse both parties were very empathic and things went very well. And for example for Zuidsasdok I think the client was not empathic." Quote 38: "I think it is very important that there's empathy towards your counterpart of the client. For example in my case I have a weekly, sometimes daily collaboration and communication line in which you are confronted with a lot of issues you need to solve together. Some things are clear, others unclear. Some touch time and money and then it gets often complicated. Then you need to be able to think further than this. And I think empathy here is important to be able to switch between different abstraction levels in terms of thinking and acting towards a certain solution. You need to be able to set primary interests aside and think in the bigger interest of the project and not my own interest."

Quote 39: "It is crucial for people that are in contact with the client. Then it is very important because the relationship you have can be negatively influenced on all levels. Those people in contact with the client come from stakeholder management, contract management, technique and in different layers of the organization."

Quote 40: "If you have no empathy for the way of writing, I'm talking about contract management, if you have no empathy and you just start writing very black-and-white. Yes that can reach the client in a very offensive way and in some cases the client can be very sensitive for that. This causes you can get into a conflict together very easily. The contract managers should not just write very juridically, they need to be more empathic how what they write reaches the client."

Quote 41: "Contract managers of both client and contractor should able to empathize with each other. If the discussion about time and money starts I think it is very important to empathize with each other's interests. To make sure together you can make new agreements with which both parties can live. Changes in de request often lead to contract mutations and disturbances that ask for contractual changes. Yes, then it is a bit giving and taking and being honest."

Quote 42: "Then it is important for technical management, because then we are going to execute the contract. The technical people are not always in contact with the client, but they do need the able to empathize with the client to understand what is stated in the contract. And people that are in contact with the client need to understand how to communicate with the client and how to convince the client if contractual changes are needed. [...]. This is mostly for the design managers."

Quote 43: "Project managers and technical managers also need to be empathic to understand the request of the client and feel the added value of the project.

Quote 44: "It is already important during the tender phase, because if you don't have it there, then you don't win. Because one of the most important things is that you are able to empathize with the client. Because you don't win your tender just on price, but on making a good total plan and for that you need your empathy. Because what wants the client? You need to understand the thinking behind the question. You must feel what the client wants you to score points on. [...]. This is important for the tender manager and the stakeholder manager because you also often also win based on stakeholder satisfaction."

Quote 45: "I think the tender manager should be empathic towards the client and sense the client with empathy. He needs to feel the client. And see how the client reacts to our story in the tender. He needs to read the client on how they react and pick up signals verbally and non-verbally from the client."

Quote 46: "You really need to get to know the client"

Quote 47: "We are a contractor, but we do need to act credible"

Quote 48: "Empathy starts at the beginning of the tender. I [client] start with telling the interested contractors what the contract or project is about. And I want them to focus and what I want to achieve is interaction. And that does not happen automatically. You need to have openness and trust for that. The client here must create that atmosphere. And if a contractor tells you a concerns you need to listen to that. And I think you need to be empathic for this."

Empathy towards stakeholders

Quote 49: "This is important for the tender manager and the stakeholder manager because you also often also win based on stakeholder satisfaction. So you need to understand what the environment thinks is annoying. You need to have some feeling for that."

Quote 50: "Stakeholder managers also fulfil an important role in this phase. Because the stakeholder analysis is also part of it. Then you need to understand how to involve these people. The stakeholder managers need to be able to sense the environment."

Quote 51: "Because in the tender you already make an analysis of your stakeholders and their wishes and requirements. But often you are not allowed yet in this phase to talk to the stakeholders."

Quote 52: "Stakeholder management is just one big piece of empathy. You even choose people based on their competences for this. You choose people who are very good at listening and showing understanding. This is really needed towards all stakeholders. They need to be able to explain everything to people at their homes. You need to bring that in a certain manner. [...]. They also need to talk to people that issue permits and they also need to be able to bring that in a good manner with empathy. If you are not empathic, that person is less likely to provide you the permit. [...]. You really need to be able to delve into why stakeholders think a certain way. If you understand what stakeholders think or why they give certain resistance to the project you can make better suitable solutions that can save a lot money or effort."

Quote 53: "That there's understanding for the baker that still needs to deliver his bread, the farmer that still needs to be accessible, and that it also affects them. That if you need to close the road that in advance you start talking to the farmer and you take into account different seasons when certain plants or animals need to be protected. So a certain sensitivity. And that for what we are building the environment has become much more important and that you handle them with respect."

Quote 54: "You need to realise that certain stakeholders will be affected by the project. That asks communication and understanding those people. You need to empathize with these people to understand how to act towards these stakeholders. If you don't do this you get a lot of resistance against the project. And in the end you will experience that when requesting permits there are a lot of constraints, negative stories will reach the newspaper. Eventually you will not make progress, because that resistance will block your processes. If you are bit empathic here, maybe with a small twist of the project plan a clash and a lot of constrains can be taken away."

Quote 55: "Yes I think it is very important, especially for stakeholder managers. They need to search for the interests of the others. Of course you always need to verify if these interests are also the best for the project, but sometimes you can really make a win-win situation out of it. And what we try to do is localise these wishes or by all means acknowledge them. What some people want we just cannot implement in the project. But I also understand those people and I think empathizing is important here. You need to respect their views. I worked in the past on a project that got a lot of resistance from local residents, but for them the most important thing was just being acknowledged in their opposite view. That was often enough to start the conversation. Because those people understood that they were not going to stop the construction of the whole road. But we could have a

conversation in which we were not trying to convince them of the success of the project, but in which we showed we understood they thought the project was not a success. We asked if they wanted to talk to us about finding a way in which the project would be tolerable for them. Eventually for the success of the project this caused we could get a decision on the infrastructure planning act (nl: tracébesluit) that had the support of the majority of the stakeholders."

Quote 56: "And after the tender you need to further work out your stakeholder analysis in detail. You need to collect information from the stakeholders, about their vision towards the project. But you also need to communicate information to them about the project and understand how this can be done best."

Quote 57: "In my opinion you should not close your eyes for what's happening in the environment. Because if you are not open to that, then it goes wrong. Because you can ignore those interests, but then you only push people away. And then people just get angry because they are because away and there's no acknowledgement towards them."

Quote 58: "The designers need to cope with the stakeholder requirements in the design. So there empathy coming from design is also important. It is about interpretation of the requirements."

Quote 59: "During the stakeholder analysis you really need to be empathic understand why requirements are there. I think that should mainly come from stakeholder management and technique, so design managers. Because they need to create support for what will be designed and trust amongst stakeholders. If there's no support from the environment then you could get into trouble when requesting permits. That delays the project unnecessary. Or people could seek media attention which could cause that people within the ministry will disapprove the project."

Statements related to where empathy is most important

Quote 60: "If you look at all budget exceedances, they started internally. So internally you need to make sure everything is organised. But also that people with the right empathic ability talk to the client if there are things that need to be solved. Because you can make sure you fixed everything internally, but if you are in a conflict with the client it will still not be a successful project."

Quote 61: "Because it think that in the internal alignment you can lose more compared to alignment between others. Because alignment between client and contractor can also be arranged contractually, that only takes longer and more effort. But if design leaders are not doing it well, then you have a design that is just too expensive to execute outside what could have been done more efficiently. So I think with internal alignment you can save most money."

Quote 62: "Empathy is most important during the tender phase. There you need to lay the foundation. When the contract is awarded and preparation starts; that goes so fast with a fast growing organization. If you don't have the right vibe there with each other, yes then you will not find it later too. You really need to lay the foundation of this in the tender. And if you don't do this for example a contractor can feel put under pressure in the tender resulting in for example a not realistic price of the bid. Yes then from the start of the project you have financial struggles. The same goes for the planning. It are the big parameters where it then goes quickly wrong."

Statements related to where empathy is not important Quote 63: "In the basis I think it is important if everyone has empathic ability"

Quote 64: "I think empathy is required in all roles, but of course not in very role it has direct influence to the main objectives of the project. But if people are not able to empathize with each other (in all processes) this has no direct

effect on the project itself, but disturbances will occur. An if there are too many disturbances, then it can indeed affect the project success."

Quote 65: "I recognize empathy in everything here" about the visual of the preconstruction phase

Quote 66: "I think for people in the project control team empathy is less important. You don't need to be very empathic in prescribing how to register disturbances, how to prove requirements, to make the planning, to monitor costs and to fill in risks registers."

Quote 67: "For project control, yes of course those people need to be a bit empathic, but in the end they just need to build a system to control the project. Yes compared to other processes empathy here is absolutely less important."

Quote 68: "For people in the design team when translating all requirements to a design. Then those people just need to focus on their own work and it is less needed to empathize with others. And that also goes for execution. If they just make calculations or something like that."

Quote 69: "For a specialist that just needs to execute a task and who is able to just do that alone. Someone who is very good in his work. That person doesn't have to be very empathic to my opinion, if he is just able to execute his tasks."

Quote 70: "The importance decreases towards the end of the preconstruction phase."

Quote 71: "You really need to make an analysis of the participation level per stakeholder. For important stakeholders it is crucial you collaborate with them and really involve them. But there are also stakeholders that agree with everything, you just need to inform them.

Clustering statements

Table 11 shows for each statement about the relevance of empathy how many interviewees mentioned (something similar to) this this. Next to this it shows who then needs to be empathic towards whom and what the goal is of the empathy. In the final column it is indicated for each case if the cognitive (C) or also the affective (A) component of empathy is present here. This is based on how the researcher interpreted the relevance of the cognitive or affective component. In some situations activation of the cognitive side (i.e. understanding someone else's feelings) would be enough to fulfil the goal, where in other situations it is also needed the affective side is present (i.e. feeling an emotion as a reaction to someone else's emotion). If there's interaction between people, feeling and showing an emotion too would be favourable (affective). If there's no direct interaction between people, but empathy is just needed to understand for example how to write a contract it is assumed the cognitive side of empathy would be enough.

Statement about empathy	Mentioned by # interviewees (total = 11)	Empathy by who to whom?	Goal of empathic competence?	C/A*
1. Empathy between different processes				
People from the design team and execution team should be empathic towards each other	7	People in the design team and execution team towards each other; mainly	To understand how to communicate with each other; to understand each other; to think along with the other; to	C+A

^{*} C = cognitive component of empathy; A = affective component of empathy

		managers, design leaders and head of execution	understand the other's personality	
Empathy towards other people in the project organization is important	5	Everyone in the project organization towards each other	For job satisfaction; for mutual respect; for trust; to understand the personality of the other; to understand how to communicate to the other; to create solidarity	C+A
Empathy between people from different disciplines in general is important	7	People from different disciplines towards each other (mainly managers)	To understand how to communicate things to each other; to understand which questions to ask	C+A
It is important the project manager/project director/project board is empathic towards people in the project organization	2	The project director/project manager/project board towards people in the project organization	To understand how to communicate the interests of the project; to show exemplary behaviour	C+A
Different parties in a consortium need to be empathic towards each other	5	Managers of the different parties in the consortium towards each other	To understand the interests of other parties and not act on behalf of their own sake; to understand how the others companies work/their processes	C+A
2. Empathy within proces	sses			
Empathy is important within teams	7	Team members towards each other (supported by their managers)	For job satisfaction; for mutual respect; for trust; to understand the personality of the other; to understand how to communicate to the other; to create solidarity	C+A
Empathy of team members towards managers	2	Team members towards their managers	To understand why certain things are needed; to understand why they need to do certain things; to understand why decisions are made	C+A
Managers should be empathic towards their team members	5	Managers towards team members	To understand how to involve team members; to understand how to communicate plans/interests; to understand peoples personalities; to feel how to activate team members	C+A
3. Empathy with people of	outside of the proj	ect organization		
Empathy is needed towards external stakeholders during the preparation after the contract has been awarded	11	Stakeholder managers towards stakeholders	To align with stakeholders; to understand how to involve them; to make them feel heard; to appear credible towards stakeholders; to understand how to communicate; to understand what solutions fit best for them; to understand their concerns/objections:	C+A

Empathy towards stakeholders during the design process	3	Technical design managers towards stakeholders	To understand how to cope with stakeholder wishes and requirements in the design	С
Empathy to understand what is stated in the contract	4	Project managers and technical managers towards the contract managers of the client	To understand the reasoning behind what is stated in the contract	С
Client and contractor should be empathic towards each other	11	The management team/board of the contractor and the management team/ board of the client towards each other	To understand each other's interests; to understand what the other party needs; to understand how to communicate; for mutual trust; to create good terms for collaboration	C+A
Empathy towards counterparts of the client	8	All people that are in contact with people from the client	To understand each other's interests; to understand what the other party needs; to understand how to communicate; for mutual trust; to create good terms for collaboration	C+A
Contract management should be empathic towards the client	4	People from the contract management team towards the client/contract managers of the client	To understand how to communicate contractual issues; to understand what language to use in the contract	С
Technical management should be empathic towards the client	5	People from the technical management team that are in contact with the client, towards the client	To understand what the client needs; to understand how to communicate with the client	C+A
During the tender phase towards the client	9	Tender managers towards the client	To understand what the client wants and needs; to understand the reasoning behind the MEAT criteria; to understand how to communicate; to understand what the client feels; to create good terms for collaboration	C+A
During the tender phase towards stakeholders	8	Stakeholder managers towards stakeholders	To understand how to involve the stakeholders and keep them satisfied, because you score points on this in the tender	С

Table 11: Clustering statements about the role of empathy during the preconstruction phase

Appendix G: Part II interview data analysis – secondary information

The interviews of Part II of the research also revealed other interesting information that is not directly related to answering one of the (sub-)research questions. This information is however still valuable, interesting and worth taking into consideration when making recommendations for the research. This appendix therefore gives an overview of this other relevant, secondary information retrieved from the data analysis of Part II.

A situation conducive to empathy

As explained in section 2.5, for an individual to be empathic someone's empathic ability is relevant and someone must also be willing to be empathic. However it seems for someone to be able to fully utilize this empathic ability if he or she wants to, the situation must also allow for this. This research has been executed during the COVID-19 pandemic where working from home was the standard. 6 out of 11 interviewees mentioned during the interview that they noticed empathizing with team members or someone from another team became much harder whilst working from home. The interviewees mentioned it is harder to empathize with someone and understand what someone else feels, needs or thinks when you don't see that person in real life and not as often as you would normally do. Online you only speak to each other in a meeting environment via a screen, however in real life you also speak to each other more informally which helps to sense and feel what someone else feels. This should be kept in mind when drawing up recommendations on how via empathy the project performance can be improved; a situation that is conducive to empathy supports people in being empathic.

Empathy supported by experience

Several interviewees highlighted the importance of empathy to better understand someone from a different discipline or process. 5 out of 11 interviewees mentioned with this that to what extent someone is able to empathize with someone from another discipline is also supported by one's experience. Someone in the design team for example that in the past worked in the execution preparation team can more easily empathize with someone from the execution team and put himself in the shoes of this person. This seems related to someone's willingness to be empathic as explained by Kouprie & Sleeswijk Visser (2009). When someone has experience in the field of the other person, this person has a personal connection with this other person causing a greater willingness to be empathic. This shows that someone's experience in different roles and processes in a construction project also plays a role in being empathic.

"Yes having a look inside of the kitchen of the other, to understand that the other person is not doing that to bully you, but that he also does that with his best intentions. But yes, because you don't know how it's organized there, you think it's not done in the right way."

"Yes a look inside of the kitchen of the other, I think that should happen within the disciplines of the organization. And yes within the organization of the client to have a broader look between the disciplines."

Empathy and two-phase contracts

Two of the interviewees mentioned at the end of the interview that with the newer two-phase contracts and building team procurement forms, empathy between the client and contractor could be of even greater importance during the early phases of the project. This is because here the client and contractor together as a team need to cooperate closely. As this research focusses on the role of empathy in integrated construction projects, this information is not relevant for answering the research questions, but it is still interesting to keep this statement in mind as two-phase contracts are getting more popular and thus empathy could become even more

important. It could be interesting for future research to further investigate the exact role of empathy in two-phase contracts.

Wishes and expectations

During the interviews, in response to the questions what could go better or what is not going well in construction projects, the interviewees mentioned several things that were not directly related to empathy. However when further examining these statements, it seems they are all wishes or ideas from the client or contractor about how collaboration could be improved. For example one interviewee working on the contractor side mentioned it would be helpful if the client would be present during more meetings of the project team. This is not directly related to being empathic, but it is related to understanding the wishes, expectations and needs of the other party between client and contractor.

Empathy for sustainability

One interviewee mentioned empathy is also important to reach sustainability goals. For people to feel the urge to be sustainable, they must be able to empathize with (future) society and/or stakeholders. They must put their own preferences aside and feel that it is important to become more sustainable. Here especially the affective component of empathy is important for feeling the awareness.

Empathy and project complexity

Four interviewees mentioned that they think there's a relationship between the importance of empathy and the complexity of a construction project. They explained they think empathy is more important for projects with a high complexity and less important for projects with a lower complexity.

"Well, I think **it can also be done without empathy if you don't have a very complex task**. So if you only need to roll as piece of asphalt somewhere, then it will go well. But when it gets very complex, big, a lot of money is involved, the environment is involved a lot. Yes then you can't go without it, because you cannot steer on a small piece and forget the rest. That will just not work, because everything is related and you will also notice this when disturbances occur, because then there's a quick risk of some sort of domino effect."

"If you have an easy task, in which all conditions and permits are arranged and there are no big risky aspects, just asphalting, yes then it's less important. Then there are **not a lot of risks that can catch you**."

Selecting people on empathic competence

Also some interviewees mentioned they think it is a good intervention to select people in the organization based on their competences. This is interesting, because this could be a possible intervention to improve project performance via empathy by selecting people in key roles that that need to be empathic based on their empathic competence.

"You need to look at what type of people you have within your organization on key positions. Spend time on that."

Stimulating empathy earlier in the project

Finally it was mentioned by interviewees that they think it is more important for people to be empathic as early as possible in the project. This is also interesting to keep in mind when thinking about interventions that could improve project performance via empathy. This gives the expectation that it would be more effective to project performance to stimulate empathy earlier in the project.

"I think as early as possible in the project it is important for the involved people to be empathic. Because in your preliminary design you draw the boundaries and you main structure. And if you do that by taking each other into account

and you **empathize a bit broader with what's going on in the other disciplines**, in their interests, for the other parties. Yes then you can make a good plan. Because yes if for your final design you start with thinking about how to involve other people, then your structure and boundaries from your preliminary design are already made and you need to go two steps back into the process to make changes."

Appendix H: Test to measure empathy of people working in the construction sector

This appendix contains the test with which the empathic ability of people working in the construction sector has been measured. The test is the Dutch version of the Interpersonal Reactivity Index (IRI) test as presented by De Corte, et al. (2007). The test is based on the original English IRI test from Davis (1980).

The questionnaire starts with eleven questions related to personal information of the respondent. These questions are not standard included in the test to measure empathy but they are added for the data analysis of this research. Then questions 12 - 39 are the questions corresponding with the items to measure empathy of the IRI test. The order of these questions is copied from the original test. For each of these questions it is indicated for which IRI category it measures empathy. The questionnaire ends with an open question to give the respondent to possibility to leave any further remarks.

Question		Answer options	IRI category*
Pers	sonal questions		
1	Geslacht	Man; Vrouw	-
2	Leeftijd	Schaal <20 – 65+ jaar	-
3	Voor wie werkt u?	Opdrachtgever; Opdrachtnemer; Anders	-
4	Heeft u in het verleden altijd vanuit deze kant aan bouwprojecten gewerkt?	Ja/Nee	-
5	Zo nee, waar heeft u hiervoor gewerkt?	Opdrachtgever; Opdrachtnemer; Anders	-
6	Uw werkgever?	Selectie veld met werkgevers	-
7	Uw vakgebied	Project Management; Project Beheersing – Financieel Management; Project Beheersing – Proces Management; Contract Management, Omgevingsmanagement; Technisch Management – Ontwerp; Technisch Management – Werkvoorbereiding; Technisch Management – Werkuitvoering; Technisch Management – Onderhoud; Anders	-
8	Heeft u een leidinggevende functie?	Ja; Nee	-
9	Hoeveel mensen heeft u onder u werken in de project organisatie?	Schaal 0 – 250+ mensen	-

^{*} The asterisk sign (*) indicates reversed items. PT = Perspective Taking; FS = Fantasy; EC = Empathic Concern; PD = Personal Distress

10	Uw functie	Open antwoord	-
11	Hoeveel jaar werkervaring heeft u in de	Schaal 0 – 35+ jaar	-
	constructie sector?		
Iten	ns IRI test		
12	Ik dagdroom en fantaseer, met enige	Schaal 1 – 5; 1 = Omschrijft mij totaal	FS
	regelmaat, over dingen die zouden kunnen	niet; 5 = Omschrijft mij heel goed	
	gebeuren met mij		
13	Ik heb vaak tedere, bezorgde gevoelens voor	Schaal 1 – 5; 1 = Omschrijft mij totaal	EC
	mensen die minder gelukkig zijn dan ik	niet; 5 = Omschrijft mij heel goed	
14	Ik vind het soms moeilijk om dingen te zien	Schaal 1 – 5; 1 = Omschrijft mij totaal	PI*
4.5	Vanuit andermans gezichtspunt	niet; 5 = Omschrijft mij neel goed	FC*
15	Soms neb ik niet veel medelijden met andere	Schaal $1 - 5$; $1 = Omschrijft mij totaal$	EC≛
10	mensen wanneer ze problemen nebben	niet; 5 = Omschrijft mij neel goed	FC
10	de nersenages uit een reman	Schaal $1 - 5$; $1 = Omschnijtt mij totaal$	F5
17	le personages uit een roman	School 1 E: 1 = Omschrijft mij heel goed	
1/	on mijn gemak	5 $ -$	PD
10	lk ben meestal objectief wanneer ik naar een	School 1 $-$ 5: 1 $-$ Omschrijft mij tetaal	EC*
10	film of tongelstuk kijk on go er njet vook	5 $ -$	ГJ
	volledig in on	met, 5 – Omsennjit mij neer goed	
19	lk probeer paar jeders kant van een	Schaal 1 – 5: 1 = Omschrijft mij totaal	PT
15	meningsverschil te kijken alvorens ik een	niet: 5 = Omschrijft mij heel goed	
	beslissing neem		
20	Wanneer ik iemand zie waarvan wordt	Schaal 1 – 5; 1 = Omschrijft mij totaal	EC
	geprofiteerd, voel ik me nogal beschermend	niet; 5 = Omschrijft mij heel goed	
	tegenover hen		
21	Ik voel me soms hulpeloos wanneer ik in het	Schaal 1 – 5; 1 = Omschrijft mij totaal	PD
	midden van een zeer emotionele situatie zit	niet; 5 = Omschrijft mij heel goed	
22	Ik probeer mijn vrienden soms beter te	Schaal 1 – 5; 1 = Omschrijft mij totaal	PT
	begrijpen door me in te beelden hoe de	niet; 5 = Omschrijft mij heel goed	
	dingen eruit zien vanuit hun perspectief		
23	Uitermate betrokken raken in een goed boek	Schaal 1 – 5; 1 = Omschrijft mij totaal	FS*
	of film is eerder zeldzaam voor mij	niet; 5 = Omschrijft mij heel goed	
24	Wanneer ik zie dat iemand zich bezeert, ben ik	Schaal 1 – 5; 1 = Omschrijft mij totaal	PD*
	geneigd kalm te blijven	niet; 5 = Omschrijft mij heel goed	
25	Andermans ongelukken verstoren me meestal	Schaal 1 – 5; 1 = Omschrijft mij totaal	EC*
	niet veel	niet; 5 = Omschrijft mij heel goed	
26	Als ik zeker ben dat ik over iets gelijk heb,	Schaal 1 – 5; 1 = Omschrijft mij totaal	PT*
	verspil ik niet veel tijd aan het luisteren naar	niet; 5 = Omschrijft mij heel goed	
27	andermans argumenten	Cohool 1	FC
21	njuens net zien van een toneelstuk of film,	Schaal $1 - 5$; $1 = Omschrijft mij totaal$	۲S
20	voer ik mij disor ik een van de karakters ben	$\operatorname{Hiet}_{\mathcal{S}} = \operatorname{Omschrijt}_{\operatorname{HI}} \operatorname{HI}_{\operatorname{HI}} \operatorname{heel}_{\operatorname{Soball}} $	
۷Ŏ	schrikt me af	- $ -$	۲U
20	Wanneer ik zie dat iemand unfair wordt	Schaal 1 $-$ 5: 1 $-$ Omschrijft mij totaal	FC*
23	behandeld, voel ik soms weinig medeliiden	niet: $5 = 0$ mschriift mii heel goed	
	met hen		

30	Ik ben meestal behoorlijk effectief in het	Schaal 1 – 5; 1 = Omschrijft mij totaal	PD*
	omgaan met noodsituaties	niet; 5 = Omschrijft mij neel goed	
31	Ik ben vaak nogal geraakt door dingen die ik	Schaal 1 – 5; 1 = Omschrijft mij totaal	EC
	zie gebeuren	niet; 5 = Omschrijft mij heel goed	
32	Ik geloof dat er twee zijden zijn aan elke vraag	Schaal 1 – 5; 1 = Omschrijft mij totaal	PT
	en probeer te kijken naar beide	niet; 5 = Omschrijft mij heel goed	
33	Ik zou mezelf beschrijven als een vrij teder	Schaal 1 – 5; 1 = Omschrijft mij totaal	EC
	persoon	niet; 5 = Omschrijft mij heel goed	
34	Wanneer ik naar een goede film kijk, kan ik	Schaal 1 – 5; 1 = Omschrijft mij totaal	FS
	mezelf zeer gemakkelijk in de plaats stellen	niet: 5 = Omschriift mii heel goed	
	van het hoofdpersonage	, <u>, , , , , , , , , , , , , , , , , , </u>	
35	Ik neig ertoe controle te verliezen tijdens	Schaal 1 – 5; 1 = Omschrijft mij totaal	PD
	noodsituaties	niet: 5 = Omschriift mii heel goed	
36	Wanneer ik overstuur ben door iemand.	Schaal $1 - 5$: $1 = Omschrijft mij totaal$	PT
	probeer ik mijzelf meestal voor een tijdie 'in	niet: 5 = Omschrijft mij heel goed	
	zijn schoenen' te vernlaatsen		
27	Wannoar ik oon interessant verhaal of roman	School 1 E: 1 – Omschrüft mit totaal	EC
57	an het lezen hen heeld ik me in hee ik me	niet: E – Omschrijft mij bool good	ГJ
	adi net lezen ben, beeld ik me in noe ik me	niet; 5 = Omschrijft mij heel goed	
	zou voeien indien de gebeurtenissen in net		
	verhaal mij zouden overkomen		
38	Wanneer ik iemand zie die zeer hard hulp	Schaal 1 – 5; 1 = Omschrijft mij totaal	PD
	nodig heeft in een noodsituatie, ga ik kapot	niet; 5 = Omschrijft mij heel goed	
39	Alvorens iemand te bekritiseren, probeer ik	Schaal 1 – 5; 1 = Omschrijft mij totaal	PT
	mij voor te stellen hoe ik mij zou voelen mocht	niet; 5 = Omschrijft mij heel goed	
	ik in hun plaats staan		
Clos	sing question		
40	Zijn er verder nog dingen die u met ons zou	Open antwoord	-
	willen delen met betrekking tot het onderzoek		
	/ deze vragenlijst?		
	, acto magenijoti		

Table 12: Questionnaire to measure empathy of people working in the Dutch construction sector based on De Corte, et al. (2007)

Appendix I: Part III questionnaire data analysis

This appendix contains the extensive data analysis results of the questionnaire of Part III. All analyses have been done using SPSS statistical analysis software. The score on empathy is here the dependent variable, the other variables like gender/age/etc. are the independent variables. To test the significance of the data sample to the population of people working in the construction sector, independent samples t-tests and ANOVA F-tests have been done (depending on the amount of categories for an independent variable). To test the significance a significance level of α =0,05 has been followed.

Data sample characteristics and representativeness

The data sample consists of N=219 responses of people working in the project team of the case project. The questionnaire started with some personal questions. Table 4 shows the distribution of answers the respondents gave to these personal questions. Representativeness of the data sample to the population can be analysed with a Chi-square test. Data about the population characteristics is needed for this. Unfortunately, no recent and exact data about the population characteristics could be found for this research. It seems no data exact data about the composition of the Dutch construction sector is available on the internet (only information about the men/women ratio in 2016 was found). Therefore it has been decided to compare the sample distribution to the population by interpretation of the researcher and not with a statistical Chi-square test.

It first of all can be concluded the data sample is characterized by a much higher percentage of male respondents than female respondents. This matches the population of construction professionals where more males are employed (91% male in 2016 (Roelvink, 2019)). Overall, most respondents came from the contractor side. This was expected as the project team on the contractor side is much bigger. Finally, the distributions of age, contact with the client, work experience and managing positions seem quite evenly distributed as expected. Concerning the distribution of responses coming from different disciplines it stands out that a lot of respondents came from the Technical Management - Design team, but this is also not unexpected as the design phase is a big part of the preconstruction phase. Furthermore people coming from the disciplines Contract Management and Technical Management – Maintenance are low represented in the data sample. A low representation of maintenance is however not unexpected during the preconstruction phase where maintenance is not very active yet.

Test of Normality

A Test of Normality has been done to test if the scores on (total) empathy are normally distributed in the data sample. To do so the Kolmogorov-Smirnov test and the Shapiro-Wilk test have been executed in SPSS. The value of the Shapiro-Wilk test will be used to determine the normality of the sample because it is said this test is better for smaller samples and more powerful. The data is normally distributed if the Sig. value of the Shapiro-Wilk is greater than 0,05. As can be seen from Figure 31 the data sample is normally distributed because 0,335 > 0,05. Figure 32 shows the histogram of the empathy scores in the data sample.

Tests of Normality						
Kolmogorov-Smirnov ^a Shapiro-Wilk						
	Statistic	df	Sig.	Statistic	df	Sig.
Totaalempathie	,062	219	,042	,993	219	,335
a. Lilliefors Significance Correction						



Figure 32: Histogram of the empathy scores

Average distribution of empathy

The descriptive statistics of total empathy in the data sample can be found in Figure 33. It can be concluded the average score on empathy for all respondents is 57,19. The scores vary from 29 to 89 and are normally distributed as can be concluded from the normality test.

Descriptives					
			Statistic	Std. Error	
Totaalempathie	Mean		57,19	,775	
	95% Confidence Interval	Lower Bound	55,66		
	for Mean	Upper Bound	58,72		
	5% Trimmed Mean	57,02			
	Median	57,00			
	Variance		131,569		
	Std. Deviation	11,470			
	Minimum	29			
	Maximum	89			
	Range	60			
	Interquartile Range		17		
	Skewness		,206	,164	
	Kurtosis		-,187	,327	

Figure 33: Descriptive Statistics of the total score on empathy in the data sample

In literature of De Corte, et al. (2007) people scored on average 63,85 on the total empathy score and the following scores on the subscales: FS = 16,48; PT = 17,29; EC = 18,05; PD = 11,92. In research of Davis (1980) people scored

on average 65,97 on the total empathy scores and the following scores on the subscales: FS = 17,20; PT = 17,35; EC = 20,31; PD = 10,83. Table 13 shows the distribution of empathy for the total data sample compared to literature averages.

	Ν	Minimum	Maximum	Mean	Std. Deviation
Total empathy score (literature mean: 64-66)	219	29	89	57,19	11,470
Total FS score (literature mean: 16-17)	219	1	26	12,79	4,964
Total PT score (literature mean: 17)	219	6	27	18,22	3,807
Total PD score (literature mean: 11-12)	219	1	25	9,52	4,408
Total EC score (literature mean: 18-20)	219	8	26	16,66	3,705

Table 13: Scores on empathy for the complete data sample

The average scores on empathy have been analysed per group characteristic too. The following sections contain the results of the average scores on empathy per characteristic.

Empathy per gender

In literature of De Corte, et al. (2007) men scored on average 57,69 on total empathy and women on average 69,09 on the Dutch version of the IRI test. In Davis (1980) his research men scored on average 61,01 and women on average 70,66. To compare the average scores on empathy per gender, an independent samples t-test has been executed. Figure 34 shows the results of the t-test. Based on the independent samples t-test it can be concluded the averages scores on empathy per gender (except for the scores to Perspective Taking (PT)) are significant and can be generalised to the rest of the construction sector.

		Levene's Test fo Variand	r Equality of ces	t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Differ Lower	e Interval of the ence Upper
Totaalempathie	Equal variances assumed	4,657	,032	-4,994	190	,000,	-11,150	2,233	-15,554	-6,745
	Equal variances not assumed			-3,853	28,930	,001	-11,150	2,893	-17,068	-5,231
TotaalFS	Equal variances assumed	,027	,870	-4,696	190	,000	-4,628	,985	-6,572	-2,684
	Equal variances not assumed			-4,484	32,286	,000	-4,628	1,032	-6,729	-2,526
TotaaIPT	Equal variances assumed	1,404	,238	-1,130	190	,260	-,900	,797	-2,473	,672
	Equal variances not assumed			-1,004	30,936	,323	-,900	,897	-2,729	,929
TotaalPD	Equal variances assumed	5,088	,025	-3,592	190	,000	-3,119	,868,	-4,832	-1,406
	Equal variances not assumed			-2,725	28,736	,011	-3,119	1,145	-5,461	-,777
TotaalEC	Equal variances assumed	1,645	,201	-3,334	190	,001	-2,502	,751	-3,983	-1,022
	Equal variances not assumed			-2,868	30,399	,007	-2,502	,873	-4,283	-,721

Figure 34: Independent Samples T-Test for average score on empathy per gender

The average scores on empathy per gender in the data sample can be found in Table 14. The average scores on the subscales found in previous research of De Corte, et al. (2007) and Davis (1980) are also included.

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Total empathy score	Male				
	(literature mean: 58-61)	185	55,53	10,365	0,762
	Female				
	(literature mean: 69-71)	34	66,24	13,055	2,239
FS empathy score	Male				
	(literature mean: 16)	185	12,05	4,661	0,343
	Female				
	(literature mean: 18-19)	34	16,82	4,674	0,802
PT empathy score	Male				
	(literature mean: 14-17)	185	18,08	3,643	0,268
	Female				
	(literature mean: 18)	34	19	4,586	0,786
PD empathy score	Male				
	(literature mean: 9-10)	185	9,17	3,963	0,291
	Female				
	(literature mean: 12-13)	34	11,38	6,045	1,037
EC empathy score	Male				
	(literature mean: 17-19)	185	16,23	3,505	0,258
	Female				
	(literature mean: 20-22)	34	19,03	3,92	0,672

Table 14: Group statistics empathy per gender

The scores on empathy per gender have also been compared per IPM discipline. Table 15 shows this distribution.

	Average score on empathy						
	Fe	males	Males				
	(literature l	mean = 69-71)	(literature n	nean = 58-61)			
Contract Management	N = 2	71,0	N = 4	61,8			
Stakeholder Management	N = 7	67,1	N = 10	56,2			
Project Management	N = 3	58,7	N = 20	53,3			
Project Control - Process Management	N = 7	69,6	N = 18	51,8			
Project Control - Financial Management	N = 1	31,0	N = 10	50,0			
Technical Management - General	N = 0	-	N = 2	67,5			
Technical Management - Design	N = 2	76,5	N = 76	57,6			
Technical Management - Execution Preparation	N = 3	70,7	N = 31	53,7			
Technical Management - Maintenance	N = 2	61,5	N = 3	57,7			
Else	N = 7	65,4	N = 11	56,2			

Table 15: Average score on empathy per gender per IPM process

Empathy per age category

To compare the average scores on empathy per age category, an ANOVA test has been executed. Figure 35 shows the results of the ANOVA test. These results show for the total score on empathy no significant differences have been found in average scores on empathy that are generalisable to the population. This means no conclusions can be drawn with certainty based on the statistical significance. The data sample only reveals expectations about possible differences. Table 16 shows the average scores on empathy per age category.

	ANOVA									
		Sum of Squares	df	Mean Square	F	Sig.				
Totaalempathie	Between Groups	2133,552	10	213,355	1,672	,089				
	Within Groups	26548,393	208	127,637						
	Total	28681,945	218							
TotaalFS	Between Groups	350,013	10	35,001	1,450	,161				
	Within Groups	5022,325	208	24,146						
	Total	5372,338	218							
TotaalPT	Between Groups	166,160	10	16,616	1,154	,324				
	Within Groups	2993,876	208	14,394						
	Total	3160,037	218							
TotaalPD	Between Groups	292,480	10	29,248	1,542	,126				
	Within Groups	3944,214	208	18,963						
	Total	4236,694	218							
TotaalEC	Between Groups	179,112	10	17,911	1,324	,219				
	Within Groups	2813,884	208	13,528						
	Total	2992,995	218							

Figure 35: ANOVA test result empathy score per age category

	Age	Ν	Mean	Std. Deviation	Std. Error Mean
Total empathy	<20 year	1	47	-	-
score	21 – 25 year	12	53,33	5,087	1,469
(literature mean: 64-66)	26 – 30 year	37	59,86	12,641	2,078
	31 – 35 year	22	58,64	13,538	2,886
	36 – 40 year	38	58,05	12,608	2,045
	41 – 45 year	34	60,44	9,475	1,625
	46 – 50 year	25	51,68	10,415	2,083
	51 – 55 year	26	55,69	8,385	1,644
	56 – 60 year	14	55,5	13,119	3,506
	61 – 65 year	9	57,22	12,347	4,116
	65+	1	40	-	-
Total FS score	<20 year	1	10	-	-
	21 – 25 year	12	11,58	3,175	0,917
	26 – 30 year	37	13,76	5,356	0,881
	31 – 35 year	22	14,41	5,861	1,25
	36 – 40 year	38	12,87	5,126	0,832
	41 – 45 year	34	14	3,806	0,653
	46 – 50 year	25	10,68	4,88	0,976
	51 – 55 year	26	11,92	4,604	0,903

	56 – 60 year	14	12,43	5,019	1,341
	61 – 65 year	9	11,44	5,897	1,966
	65+	1	7	-	-
Total PT score	<20 year	1	16	-	-
	21 – 25 year	12	17,75	2,417	0,698
	26 – 30 year	37	18,86	4,504	0,74
	31 – 35 year	22	19	4,059	0,865
	36 – 40 year	38	16,95	3,77	0,612
	41 – 45 year	34	19,12	3,043	0,522
	46 – 50 year	25	17,72	4,704	0,941
	51 – 55 year	26	18,77	3,433	0,673
	56 – 60 year	14	17	3,397	0,908
	61 – 65 year	9	18,56	2,404	0,801
	65+	1	16	-	-
Total PD score	<20 year	1	7	-	-
	21 – 25 year	12	9,25	3,361	0,97
	26 – 30 year	37	10,49	4,312	0,709
	31 – 35 year	22	8,36	4,457	0,95
	36 – 40 year	38	10,74	4,769	0,774
	41 – 45 year	34	9,56	4,062	0,697
	46 – 50 year	25	7,76	4,39	0,878
	51 – 55 year	26	8,46	4,718	0,925
	56 – 60 year	14	10,29	4,232	1,131
	61 – 65 year	9	11	3,464	1,155
	65+	1	4	-	-
Total EC score	<20 year	1	14	-	-
	21 – 25 year	12	14,75	2,05	0,592
	26 – 30 year	37	16,76	3,562	0,586
	31 – 35 year	22	16,86	3,771	0,804
	36 – 40 year	38	17,5	4,151	0,673
	41 – 45 year	34	17,76	3,542	0,608
	46 – 50 year	25	15,52	3,63	0,726
	51 – 55 year	26	16,54	3,501	0,687
	56 – 60 year	14	15,79	4,264	1,14
	61 – 65 year	9	16,22	3,563	1,188
	65+	1	13	-	-

Table 16: Group statistics empathy per age category

Empathy on the contractor side and client side

To compare the average scores on empathy for people working on the side of the contractor and the side of the client, an independent samples t-test has been executed. Figure 36 shows the results of the t-test. Based on this test it can be concluded significant differences in the total empathy score, the FS score and the EC score have been found. For PT and PD no significant differences could be found. Table 17 shows the distribution of empathy for people working on the contractor side and client side.

		Levene's Test f Variar	or Equality of nces	t-test for Equality of Means						
							Mean	Std. Error	95% Confidence Differ	e Interval of the ence
		F	Sig.	t	df	Sig. (2-tailed)	Difference	Difference	Lower	Upper
Totaalempathie	Equal variances assumed	,817	,367	-3,803	217	,000	-8,995	2,365	-13,657	-4,333
	Equal variances not assumed			-4,071	31,849	,000	-8,995	2,210	-13,497	-4,493
TotaalFS	Equal variances assumed	,797	,373	-3,019	217	,003	-3,127	1,036	-5,168	-1,086
	Equal variances not assumed			-3,195	31,606	,003	-3,127	,979	-5,122	-1,132
TotaaIPT	Equal variances assumed	,094	,760	-1,818	217	,070	-1,463	,805	-3,050	,123
	Equal variances not assumed			-1,761	29,983	,088	-1,463	,831	-3,160	,234
TotaalPD	Equal variances assumed	5,603	,019	-1,699	217	,091	-1,585	,933	-3,423	,253
	Equal variances not assumed			-1,409	27,929	,170	-1,585	1,125	-3,890	,720
TotaalEC	Equal variances assumed	1,456	,229	-3,683	217	,000	-2,820	,766	-4,329	-1,311
	Equal variances not assumed			-4,197	33,327	,000	-2,820	,672	-4,186	-1,453

Figure 36: Independent samples t-test results for empathy on the side of the contractor and client

	Contractor/client	N	Mean	Std. Deviation	Std. Error Mean
Total empathy score	Contractor	194	56,16	11,233	0,806
(literature mean: 64-66)	Client	25	65,16	10,286	2,057
Total FS score	Contractor	194	12,43	4,911	0,353
(literature mean: 16-17)	Client	25	15,56	4,565	0,913
Total PT score	Contractor	194	18,06	3,77	0,271
(literature mean: 17)	Client	25	19,52	3,928	0,786
Total PD score	Contractor	194	9,34	4,245	0,305
(literature mean: 11-12)	Client	25	10,92	5,415	1,083
Total EC score	Contractor	194	16,34	3,662	0,263
(literature mean: 18-20)	Client	25	19,16	3,091	0,618

Table 17: Group statistics empathy for people working on the contractor side and client side

Empathy and contact with the client

The people that worked on the contractor side in the project organization were asked how often they are in contact with the client. To compare the average scores on empathy to how often people are in contact with the client, an ANOVA test has been executed. The results of the ANOVA test can be found in Figure 37. The ANOVA test showed no significant differences have been found. Table 18 shows the average scores on empathy and how often people are in contact with the client.

		ANOV	A			
		Sum of Squares	df	Mean Square	F	Sig.
Totaalempathie	Between Groups	420,032	4	105,008	,829	,508
	Within Groups	23930,690	189	126,617		
	Total	24350,722	193			
TotaalFS	Between Groups	99,445	4	24,861	1,031	,392
	Within Groups	4556,184	189	24,107		
	Total	4655,629	193			
TotaalPT	Between Groups	91,018	4	22,755	1,622	,170
	Within Groups	2651,358	189	14,028		
	Total	2742,376	193			
TotaalPD	Between Groups	77,281	4	19,320	1,074	,371
	Within Groups	3399,941	189	17,989		
	Total	3477,222	193			
TotaalEC	Between Groups	97,113	4	24,278	1,842	,122
	Within Groups	2490,433	189	13,177		
	Total	2587,546	193			

Figure 37: ANOVA test results empathy and contact with the client

	Contact with the client	Ν	Mean	Std. Deviation	Std. Error
Total empathy score	Never	80	55,65	11,293	1,263
(literature mean: 64-	Almost never	43	54,44	9,003	1,373
66)	Sometimes	31	57,03	11,368	2,042
	Regularly	21	57,29	14,674	3,202
	Often	19	59,58	11,227	2,576
Total FS score	Never	80	12,18	4,98	0,557
(literature mean: 16-	Almost never	43	11,53	4,102	0,626
17)	Sometimes	31	13,19	4,983	0,895
	Regularly	21	12,86	5,379	1,174
	Often	19	13,84	5,61	1,287
Total PT score (literature mean: 17)	Never	80	17,46	3,871	0,433
	Almost never	43	18,07	4,171	0,636
	Sometimes	31	18,1	2,879	0,517
	Regularly	21	18,71	4,002	0,873
	Often	19	19,74	3,052	0,7
Total PD score	Never	80	9,83	4,483	0,501
(literature mean: 11-	Almost never	43	9,12	3,311	0,505
12)	Sometimes	31	9,48	3,999	0,718
	Regularly	21	9,24	5,366	1,171
	Often	19	7,63	4,058	0,931
Total EC score	Never	80	16,19	3,379	0,378
(literature mean: 18-	Almost never	43	15,72	3,165	0,483
20)	Sometimes	31	16,26	4,058	0,729
	Regularly	21	16,48	4,589	1,001
	Often	19	18,37	3,745	0,859

Table 18: Group statistics empathy and how often people are in contact with the client

Empathy and work experience in the construction sector

To compare the average scores on empathy and the amount of work experience people have in the construction sector, an ANOVA test has been executed. Figure 38 shows the results of the ANOVA test. With the ANOVA test significant results have been found for the average total score on empathy and the scores on the scales FS, PT and PD. Table 19 shows the average distribution of empathy per amount of work experience in the construction sector.

	ANOVA										
		Sum of Squares	df	Mean Square	F	Sig.					
Totaalempathie	Between Groups	2708,355	7	386,908	3,143	,004					
	Within Groups	25973,590	211	123,098							
	Total	28681,945	218								
TotaalFS	Between Groups	443,698	7	63,385	2,714	,010					
	Within Groups	4928,640	211	23,358							
	Total	5372,338	218								
TotaalPT	Between Groups	270,329	7	38,618	2,820	,008					
	Within Groups	2889,707	211	13,695							
	Total	3160,037	218								
TotaalPD	Between Groups	277,274	7	39,611	2,111	,044					
	Within Groups	3959,420	211	18,765							
	Total	4236,694	218								
TotaalEC	Between Groups	143,301	7	20,472	1,516	,163					
	Within Groups	2849,694	211	13,506							
	Total	2992,995	218								

Figure 38: ANOVA test results empathy and work experience in the construction sector

	Years of experience	Ν	Mean	Std. Deviation	Std. Error
Total empathy	0 – 5	60	61,58	12,148	1,568
score	5 – 10	27	54,81	10,713	2,062
(literature	10 - 15	50	57,62	11,674	1,651
mean: 64-66)	15 – 20	22	58,73	10,133	2,16
	20 – 25	29	53,24	8,206	1,524
	25 – 30	15	49,73	9,779	2,525
	30 – 35	11	55,64	12,94	3,902
	35+	5	55	11,726	5,244
Total FS score	0 – 5	60	14,12	5,253	0,678
(literature	5 – 10	27	12,22	4,902	0,943
mean: 16-17)	10 - 15	50	13,38	4,977	0,704
	15 – 20	22	13,68	4,466	0,952
	20 – 25	29	11,76	4,085	0,759
	25 – 30	15	9	4,018	1,037
	30 – 35	11	11,45	5,279	1,592
	35+	5	10,4	4,219	1,887
Total PT score	0-5	60	19,72	3,84	0,496
	5 – 10	27	18,07	3,961	0,762

(literature	10 - 15	50	16,78	3,781	0,535
mean: 17)	15 – 20	22	18,55	3,306	0,705
	20 – 25	29	18,24	3,925	0,729
	25 – 30	15	17,2	3,385	0,874
	30 – 35	11	18,45	2,77	0,835
	35+	5	16,6	1,817	0,812
Total PD score	0 – 5	60	10,43	4,781	0,617
(literature	5 – 10	27	8,3	3,881	0,747
mean: 11-12)	10 - 15	50	10,22	4,82	0,682
	15 – 20	22	9,27	3,453	0,736
	20 – 25	29	7,59	3,311	0,615
	25 – 30	15	8,33	3,848	0,994
	30 – 35	11	10,64	4,632	1,397
	35+	5	11,4	5,03	2,249
Total EC score	0 – 5	60	17,32	3,568	0,461
(literature	5 – 10	27	16,22	3,598	0,693
mean: 18-20)	10 - 15	50	17,24	3,941	0,557
	15 – 20	22	17,23	3,585	0,764
	20 – 25	29	15,66	3,384	0,628
	25 – 30	15	15,2	3,668	0,947
	30 – 35	11	15,09	4,482	1,351
	35+	5	16,6	2,302	1,03

Table 19: Group statistics empathy per amount of work experience in the construction sector

Empathy of managers and non-managers

To compare the average scores on empathy for managers and non-managers, an independent samples t-test has been executed. The results of the t-test are shown in Figure 39. Based on the t-test it can be concluded the differences found for managers and non-managers in the sample are significant for the total score on empathy and the score on the PD scale. Table 20 contains the average scores on empathy for people that have a managing role in the project organization and non-managers.

		Levene's Test f Variar	or Equality of Ices				t-test for Equality	ofMeans		
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Differ Lower	e Interval of the ence Upper
Totaalempathie	Equal variances assumed	6,006	,015	-2,758	217	,006	-4,453	1,614	-7,635	-1,271
	Equal variances not assumed			-2,946	175,646	,004	-4,453	1,512	-7,437	-1,470
TotaalFS	Equal variances assumed	1,117	,292	-1,924	217	,056	-1,356	,705	-2,746	,033
	Equal variances not assumed			-1,978	158,560	,050	-1,356	,686	-2,711	-,002
TotaalPT	Equal variances assumed	,166	,684	-1,641	217	,102	-,889	,542	-1,957	,179
	Equal variances not assumed			-1,665	153,203	,098	-,889	,534	-1,944	,166
TotaalPD	Equal variances assumed	1,998	,159	-2,297	217	,023	-1,432	,624	-2,662	-,203
	Equal variances not assumed			-2,365	159,328	,019	-1,432	,606,	-2,629	-,236
TotaalEC	Equal variances assumed	,581	,447	-1,469	217	,143	-,775	,528	-1,816	,265
	Equal variances not assumed			-1,493	153,829	,137	-,775	,519	-1,801	,251

Figure 39: Independent samples t-test results for empathy for managers and non-managers

	Manager	Ν	Mean	Std. Deviation	Std. Error Mean
Total empathy score	Yes	74	54,24	9,781	1,137
(literature mean: 64-66)	No	145	58,7	11,997	0,996
Total FS score	Yes	74	11,89	4,657	0,541
(literature mean: 16-17)	No	145	13,25	5,068	0,421
Total PT score	Yes	74	17,64	3,677	0,427
(literature mean: 17)	No	145	18,52	3,85	0,32
Total PD score	Yes	74	8,57	4,105	0,477
(literature mean: 11-12)	No	145	10	4,492	0,373
Total EC score	Yes	74	16,15	3,572	0,415
(literature mean: 18-20)	No	145	16,92	3,757	0,312

Table 20: Group statistics empathy for managers and non-managers

In the questionnaire, managers were also asked how many people they had below them in the project organization. This information was asked to determine where in the hierarchical organizational structure someone is employed. Table 21 shows the distribution on the total empathy score compared to the amount of people the respondent had below him or her in the project organization. Table 22 shows the distribution of empathy for managers and non-managers per IPM process.

	# people below them in the project organization	N	Mean	Std. Deviation	Std. Error Mean
Total empathy score	0	149	58,4	11,999	0,983
(literature mean: 64-66)	1-6	36	55 <i>,</i> 94	9,85	1,642
	6-10	12	53,33	7,291	2,105
	11-20	6	56	10,602	4,328
	21-50	9	53,89	10,671	3,557

	>50	7	49,71	15,373	8,876
Total FS score	0	149	13,26	5,007	0,41
(literature mean: 16-17)	1-6	36	11,89	4,683	0,78
	6-10	12	10,5	3,943	1,138
	11-20	6	14,5	4,637	1,893
	21-50	9	11,78	5,263	1,754
	>50	7	11,28	3,606	2,082
Total PT score	0	149	18,4	3,944	0,323
(literature mean: 17)	1-6	36	17,86	3,49	0,582
	6-10	12	17,58	3,26	0,941
	11-20	6	16,5	3,782	1,544
	21-50	9	19,11	4,343	1,448
	>50	7	17,86	3,512	2,028
Total PD score	0	149	9,9	4,494	0,368
(literature mean: 11-12)	1-6	36	9,28	3,976	0,663
	6-10	12	8,92	5,282	1,525
	11-20	6	9,33	4,274	1,745
	21-50	9	7	3,162	1,054
	>50	7	7	5,508	3,18
Total EC score	0	149	16,85	3,759	0,308
(literature mean: 18-20)	1-6	36	16,92	3,62	0,603
	6-10	12	16,33	3,2	0,924
	11-20	6	15,67	2,338	0,955
	21-50	9	16	4,153	1,384
	>50	7	13,57	4	2,309

 Table 21: Group statistics empathy compared to the hierarchical place of the manager

	Average score on empathy (literature mean: 64-66)						
	Non-managers Manager			nagers			
Contract Management	N = 5	66,2	N = 1	58,0			
Project Control - Process Management	N = 20	57,9	N = 5	52,6			
Project Control - Financial Management	N = 10	48,3	N = 1	48,0			
Project Management	N = 4	64,0	N = 19	51,8			
Stakeholder Management	N = 12	64,3	N = 5	52,0			
Technical Management - General	N = 1	59,0	N = 1	76,0			
Technical Management - Design	N = 59	57,8	N = 19	58,9			
Technical Management - Execution Preparation	N = 16	58,2	N = 18	52,5			
Technical Management - Maintenance	N = 3	64,7	N = 2	51,0			
Else	N = 15	61,2	N = 3	52,7			

Table 22: Average score on empathy for managers and non-managers per IPM process

Distribution of empathy per process

To compare the average scores on empathy per IPM process, an ANOVA test has been executed. Figure 40 shows the results of the ANOVA test. Significant differences in the data sample have been found for the total score on empathy and the PD score.

	ANOVA							
		Sum of Squares	df	Mean Square	F	Sig.		
Totaalempathie	Between Groups	2580,543	11	234,595	1,860	,046		
	Within Groups	26101,402	207	126,094				
	Total	28681,945	218					
TotaalFS	Between Groups	458,408	11	41,673	1,756	,064		
	Within Groups	4913,930	207	23,739				
	Total	5372,338	218					
TotaalPT	Between Groups	174,467	11	15,861	1,100	,363		
	Within Groups	2985,569	207	14,423				
	Total	3160,037	218					
TotaalPD	Between Groups	384,132	11	34,921	1,876	,044		
	Within Groups	3852,562	207	18,611				
	Total	4236,694	218					
TotaalEC	Between Groups	226,633	11	20,603	1,542	,119		
	Within Groups	2766,363	207	13,364				
	Total	2992,995	218					

Figure 40: ANOVA test results empathy per IPM process

For this research it is most interesting to compare how empathy is distributed amongst people of the different IPM processes. This distribution can be found in Table 23.

	Process	N	Mean	Std. Deviation	Std. Error Mean
Total empathy	Contract Management	6	64,83	7,468	3,049
score	Stakeholder Management	17	60,71	12,414	3,011
(literature mean: 64-66)	Project Control - Financial Management	11	48,27	7,901	2,382
	Project Control - Process Management	25	56,80	13,621	2,78
	Project Management	23	53,96	9,398	1,96
	Tech. Management - Maintenance	5	59,2	9,985	4,465
	Tech. Management - Design	78	58,06	11,917	1,349
	Tech. Management - Execution	13	51,77	9,859	2,734
	Tech. Management - Preparation	20	56,65	10,584	2,367
	Tech. Management	2	67,5	12,021	8,5
	Else	19	60,32	9,86	2,262
Total FS score	Contract Management	6	14,33	2,658	1,085
(literature	Stakeholder Management	17	14,29	5,034	1,221
mean: 16-17)	Project Control - Financial Management	11	7,82	4,191	1,264
	Project Control - Process Management	25	11,71	6,107	1,247

	Project Management	23	11,78	4,954	1,033
	Tech. Management - Maintenance	5	14,4	3,647	1,631
	Tech. Management - Design	78	12,95	4,715	0,534
	Tech. Management - Execution	13	11,77	4,729	1,311
	Tech. Management - Preparation	20	13,25	4,767	1,066
	Tech. Management	2	16	8,485	6
	Else	19	14,42	4,488	1,03
Total PT score	Contract Management	6	18	4,517	1,844
(literature	Stakeholder Management	17	18,47	3,826	0,928
mean: 17)	Project Control - Financial Management	11	18,18	3,459	1,043
	Project Control - Process Management	25	17,19	3,965	0,809
	Project Management	23	17,43	3,342	0,697
	Tech. Management - Maintenance	5	18,6	0,894	0,4
	Tech. Management - Design	78	18,12	4,071	0,461
	Tech. Management - Execution	13	16,69	4,498	1,247
	Tech. Management - Preparation	20	17,3	2,638	0,59
	Tech. Management	2	18,5	0,707	0,5
	Else	19	20,11	3,857	0,885
Total PD score	Contract Management	6	12,83	3,764	1,537
(literature	Stakeholder Management	17	10	5,268	1,278
mean: 11-12))	Project Control - Financial Management	11	7,27	3,663	1,104
	Project Control - Process Management	25	7,69	5,037	1,028
	Project Management	23	9,22	3,204	0,668
	Tech. Management - Maintenance	5	8,4	3,847	1,72
	Tech. Management - Design	78	10,46	4,223	0,478
	Tech. Management - Execution	13	7,31	2,81	0,779
	Tech. Management - Preparation	20	9,35	4,749	1,062
	Tech. Management	2	14	4,243	3
	Else	19	7,68	4,831	1,108
Total EC score	Contract Management	6	19,67	2,944	1,202
(literature	Stakeholder Management	17	17,94	3,436	0,833
mean: 18-20)	Project Control - Financial Management	11	15	3,578	1,079
	Project Control - Process Management	25	17,44	4,025	0,822
	Project Management	23	15,52	3,117	0,65
	Tech. Management - Maintenance	5	17,8	3,962	1,772
	Tech. Management - Design	78	16,54	3,97	0,449
	Tech. Management - Execution	13	16	3,873	1,074
	Tech. Management - Preparation	20	16,75	3,041	0,68
	Tech. Management	2	19	0	0
	Else	19	18,11	3,23	0,741

Table 23: Group statistics empathy per process

The distributions of empathy per IPM process have also been analysed for the client team and contractor team separately. The following sections will elaborate on these results.

Empathy per IPM process - contractor team

Table 24 shows the distribution of empathy per IPM process on the side of the contractor.

	Process	N	Mean	Std. Deviation	Std. Error Mean
Total empathy	Contract Management	2	69,5	13,435	9,5
score	Stakeholder Management	14	59,64	12,598	3,367
(literature	Project Control - Financial				
mean: 64-66)	Management	11	48,27	7,901	2,382
	Project Control - Process Management	21	53,025	12,331	2,757
	Project Management	22	53,86	9,608	2,048
	Tech. Management - Maintenance	5	59,2	9,985	4,465
	Tech. Management - Design	72	57,21	11,716	1,381
	Tech. Management - Execution				
	Preparation	33	54,21	10,2215	2,5505
	Else	14	59,5	10,006	2,674

Table 24: Average scores on empathy per IPM process for the contractor team

Empathy per IPM process - client team

Table 25 shows the distribution of empathy per IPM process on the side of the client.

	Process	Ν	Mean	Std. Deviation	Std. Error Mean
Total empathy	Contract Management	4	62,5	3,317	1,658
score	Stakeholder Management	3	65 <i>,</i> 67	12,503	7,219
(literature	Project Control - Process Management	4	67	17,34	8,67
mean: 64-66)	Project Management	1	56	-	-
	Tech. Management - Design	6	68,33	10,033	4,096
	Tech. Management	2	67,5	12,021	8,5
	Else	5	62,6	10,164	4,545

Table 25: Average scores on empathy per IPM process for the client team

Reactions to the open question

The questionnaire ended with an open question if respondents had anything else to share. It should be noted that 15 respondents left the comment that they found the questions in the questionnaire rather hard to understand and answer. They didn't understand the type of questions or how to answer the questions. For a next research it is recommended to keep this in mind as apparently not all construction professionals understood the type of questions of the IRI test.

Appendix J: Interview set-up Part IV

This appendix will cover the interview set-up for the expert session held during part IV of the research. An interview scheme has been made to structure the session. This is based on the guidelines for interviews from Baarda (2017). The drawn up interview scheme can be found in Table 26. The interviews followed this scheme with topics and questions to discuss.

Introduction	 Agreement of participants that the session will be recorded
	 Introduction round
	Are there any questions about the document received on forehand or the expert session?
Starter question	A good project performance means to me: [open question]
Questions	A bad project performance is often caused because:
	[select all causes of a bad project performance]
	 Stakeholders are not being involved enough in the project
	 Client and contractor don't understand enough what each other's interests are
	 There's no sufficient integration between design and execution
	 There's not enough team spirit/solidarity within the project team
	 There's not enough openness between client and contractor
	 Managers do not know how to involve the people lower in the organization enough in the project (contractor side)
	 The design is not enough tailored to the wishes of the client and/or
	stakeholders
	 Contract managers (contractor side) do not understand well enough how to communicate contractual issues towards the client
	 People in the project team of the contractor don't enjoy going to work
	 The management team of the contractor is not empathizing enough with the client
	 Different disciplines work too much on 'islands' and don't integrate well enough with each other
	 De different parties in a construction consortium don't collaborate well enough
	 In the tender a contract has been made that serves the individual interest
	more than the interest of the project
	 None of the above factors is causing a poorer project performance
	For the cases listed below: how effective would this intervention be for the
	success of the project?
	[1 = totally not effective, 2 = little effective, 3 = neutral, 4 = effective, 5 = very effective]
	 Make sure managers are more empathic (contractor side)
	 In the tender phase select the contractor, among other things, based on
	empathic competence
	 Stimulate that team members are more empathic with each other (contractor side)
 Stimulate or train that client and contractor learn to empathize more w 	th
--	------
each other's interests	
 Select people on key positions based on empathic competence 	
 Make sure that there's more empathy towards stakeholders and their 	
wishes and requirements	
 Stimulate that design and execution learn to empathize more in how th should collaborate 	эу
 Stimulate more openness between client and contractor 	
 Stimulate that contract managers of the contractor learn to empathize 	nore
with how they can communicate contractual issues best to the client	
 Stimulate that the different disciplines learn to empathize more with ea other 	ch
 Stimulate that different parties in a consortium empathize more with ea other's interests and work processes 	ich
 Stimulate that designers learn to empathize more with the wishes and 	
requirements of the client and stakeholders when making the design	
requirements of the ellent and stakeholders when making the design	
The earlier in a project empathy is being stimulated in these places, the bigger effect on the final project outcome [agree/disagree]	the
For a project with low complexity it is less effective to stimulate the empathic thinking of project participants for the final project performance [agree/disagree]	
It is mostly effective to stimulate empathy in terms of:	
[Understanding each other better / Showing more emotions and openness towa	ards
each other / both are in all cases relevant / it differs per situation what is releva	nt]
People are more likely to empathize with another person if they experienced	
working in that side of the project	
[agree/disagree]	
Closing Introduce that we came to the end of the interview	
Ask if the interviewees missed anything in the interview or if they still would like	e to
add something	

Table 26: Interview Scheme Part IV - English

As the interviewees and the interviewer are both native Dutch speakers, the interviews have been held in Dutch. This is done to support the interviewees in not feeling limited by a language barrier in their answers. The translated Dutch interview scheme that has been followed can be found in Table 27.

Introduction	 Akkoord van de deelnemers dat de sessie wordt opgenomen Introductie ronde Zijn er nog vragen over het document dat vooraf is ontvangen?
Starter question	Voor mij betekent een goede project prestatie: [open antwoord]

Topics	Een slechte project prestatie wordt vaak veroorzaakt doordat:
	[selecteer alle oorzaken van een slechte project prestatie]
	 Stakeholders niet genoeg worden meegenomen in het project
	 Opdrachtgever en opdrachtnemer elkaars belangen niet genoeg inzien
	 Er geen goede integratie tussen ontwerp en uitvoering plaatsvindt
	 Er niet genoeg team spirit/saamhorigheid is binnen het project team
	 Er niet genoeg openheid is tussen opdrachtgever en opdrachtnemer
	 Managers de mensen lager in de organisatie niet genoeg bij het project weten te betrekken (ON zijde)
	 Het ontwerp niet goed genoeg is afgestemd op de eisen van de klant en/of stakeholders
	 Contractmanagers ON niet goed genoeg inzien hoe zij het beste
	contractuele issues kunnen communiceren richting OG
	 Mensen in het ON project team niet met plezier naar hun werk gaan
	 Het ON management team zich niet genoeg inleeft in de OG
	 Verschillende disciplines te veel op 'eilandjes' werken en niet goed integreren met elkaar
	 De verschillende partijen in een constructie consortium niet goed samenwerken
	 Er in de tender een contract is opgesteld wat meer het eigenbelang dient, dan het helang van het project
	Coon van hevenstaande sonstateringen vereerzaakt een slechte prejest
	prestatie
	In onderstaande gevallen: hoe effectief zou deze interventie zijn voor het succes van een project?
	[Rating van 1 = totaal niet effectief, 2 = weinig effectief, 3 = neutraal, 4 = effectief, 5
	- Teel eig effectier]
	 Zorgen voor meer empathische managers (ON team) In de tender de endrachtnemer e.a. selecteren en empathische competentie.
	 Stimuleren dat teamleden empathischer zijn richting elkaar (ON team) Stimuleren /trainen dat ondrachtgever en ondrachtnemer zich meer leren
	inleven in elkaars belangen
	 Mensen op key posities selecteren op basis van empathische competentie
	 Ervoor zorgen dat er meer inlevingsvermogen is richting de eisen en wensen van stakeholders
	 Stimuleren dat ontwerp en uitvoering zich meer inleven in hoe met elkaar samen te werken
	Meer openheid stimuleren tussen opdrachtgever en opdrachtnemer
	 Stimuleren dat contractmanager ON zich meer inleven in hoe zij het beste contractuele zaken kunnen communiceren richting OG
	 Stimuleren dat de verschillende discinlines zich meer inleven in elkaar
	 Stimuleren dat verschillende partijen in een consortium zich meer inleven in elkaars belangen en werkprocessen
	 Stimuleren dat ontwerners zich meer inleven in de eisen van de klant en
	stakeholders tijdens het maken van het ontwerp

	Hoe eerder in het project empathie wordt gestimuleerd op deze plekken/rollen, hoe groter het effect op de project uitkomst [Eens/oneens]
	Bij een project met lage complexiteit heeft het stimuleren van het empathisch denken van project teamleden weinig effect op de uiteindelijke project uitkomst [Eens/oneens]
	Het heeft vooral zin om empathie te stimuleren in het kader van: [Elkaar beter begrijpen / meer emoties en openheid tonen richting elkaar / beide zijn in alle gevallen relevant / het verschilt per situatie wat relevant is]
	Mensen zullen zich sneller inleven in iemand anders als zij een keer aan die persoons zijde hebben gestaan in het project [Eens/oneens]
Closing	Introduceer dat we aan het einde van het interview zijn aangekomen. Vraag of de geïnterviewden nog iets misten of iets zouden willen toevoegen. Bedankt de geïnterviewden

Table 27: Interview Scheme Part IV - Dutch

Appendix K: Part IV expert session data analysis

This appendix contains the extensive data analysis of Part IV of the research and an overview of quotes of what the experts during the expert session of Part IV shared as substantiation about their answers. They are categorized per question.

Definition of project performance

During the expert session, the participants were first asked what a good project performance means to them. This has been done to validate if their definition of project performance matches with the definition of project performance used in this research (= to what extent the project scores on its success criteria or KPI's, where the objectives of the project define the success criteria or KPI's). The four experts shared the following definitions of project performance:

"Safely reach the end product of the project within the available time and budget" "Reach the objectives of the project within the boundaries of time, money and quality" "Enjoying your work" "A project realised with a good collaboration within time, with good quality and within budget"

It can be concluded these definitions match with the definition of project performance used in this research as they all described project performance in terms of reaching success criteria. Three experts named success criteria based on the factors of the iron triangle (time, quality, budget). Other success criteria according to these experts are apparently safety, work satisfaction, and good collaboration. This means that to these experts, improving project performance means a better result on the factors of the iron triangle and safety, a higher work satisfaction of project team members and a better collaboration between project participants. It is the question by which means empathy is able to facilitate this.

Validation of the framework

To validate the framework, the experts were first asked to indicate causes of a poorer project performance. After this they were asked rate the effectiveness of the interventions of the framework to solve these causes. Finally their opinion was asked about the expected boundary conditions or specifications of the framework. The following sections will discuss the results of this.

Causes of a poorer project performance

The experts were asked to indicate all causes of a poorer project performance from the list of possible causes as presented in Table 6. The outcome of this rating is presented in Figure 41. It first of all can be concluded that all possible causes were recognized as causes of a poorer project performance. However, factors related to external empathy between contractor/client and stakeholders are more often rated as causes of a poorer performance compared to factors related to internal empathy. This validates the focus of the framework on external empathy. When asking the experts if they could substantiate their choices they explained the following:

"They are all causes of a poorer project performance because **they are all factors related to how people work together**. It is about **collaborative performance**. So you need **to be able to take the perspective of the interests of the other**. And I recognize this in all these causes. It is not about content, but about **how to deal with each other** and **how to involve each other**, also the other way around. And about **how to get teamwork done** and **enjoy your work**. The same goes for stakeholders; if you don't take **the perspective of stakeholders**, disturbances will occur and things will go wrong. You need continuous attention for that."

"I think all causes are relevant, but I tried to prioritise certain factors over others. Because looking from the perspective of stakeholder management, if you don't do that right things will go very wrong."

"What I think is relevant to highlight is that there is a certain prioritizing of to what extent each cause contributes to a poorer performance. Some of us have seen a lot of projects in the past and there you do see one common denominator of what is causing most disturbances in projects. For example **stakeholder management is extremely important**. With that you create the boundaries of the project that needs to be realised. If you don't do this well, you think you can start the project, but immediately at the start you will notice obstacles in the execution. That is typically what went wrong on the North-South line project. City districts were not involved enough in the plans and that resulted in a lot of resistance against the project which caused a lot of obstacles in the progress. [...]. And I also think a good collaboration between client and contractor is more important, especially when things go a bit rough in the project. And have the required openness and transparency in that and to think about each other's interests."

"I also think all causes are relevant, but also tried to **prioritise causes**. The things that are to my opinion to a lesser extent causing a poorer project performance I didn't select. That's what you also see in the scores."



Figure 41: Responses of the experts about what causes a poorer project performance

Effectiveness of interventions to improve project performance

Next the experts were asked to rate the effectiveness of possible interventions to solve the causes of a poorer project performance to validate if the interventions in the framework could improve project performance. For each intervention they were asked to rate the effectiveness from 1 to 5 where: 1 = totally not effective, 2 = little effective, 3 = neutral, 4 = effective, 5 = very effective. Figure 42 shows the outcome of the average rating per intervention. First of all it can be concluded that overall all interventions were rated as effective considering the

project outcome. Although, looking at which interventions where rated as most effective, it can be concluded these are the interventions tackling a lack of external empathy. This is a logical outcome following the answers to the question about causes of a poorer project performance where it was also indicated factors related to external empathy are more likely to cause a poorer performance. The quotes below show some substantiation of the experts about their choices. Based on the explanations from the experts it can be concluded that all interventions would support a better project performance, but that the biggest improvement in performance can be reached by stimulating the external empathy between client and contractor or with stakeholders.

"Again I tried to rank differences in effectives for the different factors. But I think for the success of the project that we can reach the biggest improvement, and of course it is important that within a team you are on good terms with each other, but asking about **the biggest improvement I think that is more to be found in other factors than within a team**. That's why I rated this one [about empathy within teams] lower."

"I think all interventions lay very close to each other, but **that especially stimulating that client and contractor learn to empathize more with each other's interests would be very effective**. But I want to add to this that of course you need to be empathic, but you also shouldn't be overly kind to each other. There should also stay a certain business relationship. So I also distinguished scores in this. You do need to have an eye for each other and help each other and enjoy your work, but I think when it comes to the effectiveness to project performance seeing each other's interests weighs heavier in the end."

"I want to say something about empathy inside the organization of the contractor, because I also see a lower priority there when it comes to project success. I think it is between client and contractor much more important, especially when it comes to **seeing each other's interests** and **having an empathic attitude towards each other**. Of course it plays a role how the teams of the contractor or the teams of the client function individually, but that is a bit of secondary importance to project success. Because when you look at failures in projects, that is much more **related to the relationship between client and contractor or the relationship with stakeholders**. And not much related to how the teams works together. That is of course of importance, but not primarily in causes of failures in big projects."

"I don't completely agree with that, because I also saw projects in the past where the parties in the consortium were really in conflict with each other. But it is about prioritizing, because there the collaboration with the client went wrong in the first place which caused that internally people also started getting into conflicts. Because big losses occurred and they searched someone to blame for that. So **the effectiveness of your solution is first getting the collaboration with the client right and then within the consortium things will also go better**. But of course also there profits can be gained."

"What is my vision to these scores is that they are all important, but that the internal organization of the contractor scores the lowest when it comes to reaching a successful project. And I think **the most effective for a successful project is the relationship between involved parties, so client and contractor or stakeholders**."

"I recognize this, but because for example if design and execution don't communicate well with each other and things go wrong there, well that leads to re-work and that leads potentially to a reduction in the profit of the project. But for the client the project can still be successfully delivered within time. So overall it can be a successful project, but for the contractor there's a financial loss. And I want to add to this, that when it comes to contract management, **it is of course important that contract managers are able to take each other's perspective, but a certain business attitude towards the contract prevails there. I think empathy plays a smaller role here**. Not that it's not important, but just

less."

"I don't totally agree to that, because I do think for contract management a certain empathy is needed to get to that business attitude and how to do that. For example how to give a certain substation, especially when there's political sensitivity."



Figure 42: Rating of the effectiveness per intervention to project performance

Boundary conditions and specifications of the interventions

Finally the experts were presented four questions to validate the boundary conditions and specifications of the framework. Their answers to these four questions will be discussed in the following sections per boundary condition or specification.

Stimulating empathy earlier in the preconstruction phase

It can be concluded that all interviewees agreed that stimulating empathy earlier in the project has a higher impact on the project performance (Figure 43). Interviewees substantiated their choices by the following statements:

"Yes, **the earlier the better**. What you do in the beginning of the project is much more determining the project outcome compared to when the project further proceeds. **If your project is almost finished, there is not a lot of performance to reach anymore.** Then it is very hard to go back or make changes in case a wrong decision has been made. So the effect is the highest if you start with it from the beginning of the project. For the relationship between client and contractor this means starting in the tender phase."

"It is important that from the beginning of the project the right people are in the right places with the right empathic competences. Because if you need to switch people later in the project that is very hard and could be harmful to the project I think. Because you need to transfer knowledge and get a culture change. It is hard to get a culture change in the organization when the project already started."



Figure 43: Answers to the question about stimulating empathy earlier in the project

Empathy and project complexity

All four experts disagreed to the statement that for projects with a low complexity it would be less effective to stimulate the empathic thinking of project participants (Figure 44). They explained the following:

"I think it is always important, even for projects that are not that complex you need a certain level of empathy. Maybe a little bit less, but it is always needed I think."

"I think when the relations are disbalanced, also in non-complex projects, it will still go wrong."

"What popped into my head **is a very small infrastructure project** where a contractor needs to deliver a small piece of asphalt in an outer area, but **forgets to involve the stakeholders and the stakeholders start to revolt** because of the road blockage. Well this is a very non-complex little project, but it can still go very wrong in this way."



Stimulating affective or cognitive empathy

To the question whether it would be more effective to stimulate cognitive empathy (understanding each other better) or affective empathy (showing more emotions and openness to each other), two experts answers both are important to stimulate. The other two experts indicated that it differs per situation what is most effective. This is shown in Figure 45. This was substantiated by one of the two experts as:

"I chose it differs per situation and with that I tried to say; they are both of importance but what is the most important differs per situation. There are situations in which the emotions and openness, well **openness is to my opinion always of importance**, but **showing emotions in a certain situation or discussion is not always relevant**. But it think **understanding is always important**."

The other expert that chose 'it differs per situation what is relevant' agreed to this. Asking in what kind of situations showing emotions would not be important one of these two experts responded the following:

"I find that a hard question. Look, there are situations to think of in projects in which you affect a big team of people in which emotions can start to arise. Not that much for the actors who need to discuss things to each other, but **it is important to realize that decisions that are made can provoke certain emotions within teams**. And I think that is important to keep in mind."

"It is about when a decision is made, **empathizing with what kind of effect that has** or what that does for another team."



Figure 45: Answers to the question about cognitive and affective empathy

Empathy supported by experience

Finally three people agreed that it is more likely that people will empathize with another if they have experience on the side of the other person (Figure 46). The expert that selected disagree explained:

"I think **it is not per se necessary that to understand another, that you also need to have fulfilled that role** of the other. I think that is also impossible to walk along with everyone. Than you need to do that many times. But I think being open to what drives another or what happens for another or in what way your actions influence the work of the other, well to my opinion that doesn't have to be facilitated or increased by fulfilling that role of the other."





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MASTER THESIS

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