



BI Norwegian Business School - campus Oslo

GRA 19703

Master Thesis

Thesis Master of Science

Towards a more balanced risk management - A Norwegian case study of Integrated Project Delivery

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Start: 15.01.2019 09.00

Finish: 01.07.2019 12.00

Master Thesis
by
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BI Norwegian Business School

Towards A More Balanced Risk Management
A Norwegian Case Study of Integrated Project Delivery

Date of submission:

29.06.2019

Programme:

Master of Science in Business Major Strategy

Supervisor:

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This thesis is a part of the MSc programme at BI Norwegian Business School. The school takes no responsibility for the methods used, results found and conclusions drawn.

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ACKNOWLEDGEMENT

First, we would like to direct a special thank you to our supervisor, Ragnhild Kvålshaugen. She has been guiding us throughout the whole process of writing our master thesis. Ragnhild was the one introducing us to Tønsbergprosjektet and invited us to come with her on our first project visit. We would like to thank Ragnhild for challenging us throughout this process, and for her valuable engagement, knowledge, and feedbacks. We are thankful for everything that Ragnhild has contributed with during this process.

Second, we would like to thank all of our eight informants in Tønsbergprosjektet. We are thankful for their willingness to share their valuable experiences with us. Moreover, we are thankful for their time and friendliness when we visited the construction site in Tønsberg for our data collection. Their contributions have been of significant value for our master thesis.

Last, we would also like to thank each other for a great teamwork. The process has been challenging and rewarding, and we have been motivating and helping each other to accomplish this final work that we are proud of.

We hope you will find our thesis interesting!

Oslo, June 29th 2019

Frida Klovning

A handwritten signature in blue ink, appearing to read 'Frida Klovning', written over a horizontal line.

Thea Fivel

A handwritten signature in blue ink, appearing to read 'Thea Fivel', written over a horizontal line.

ABSTRACT

The aim of this thesis is to explore how the IPD model can facilitate a more balanced risk management in construction projects. In order to address this, we will apply institutional theory as a theoretical lens in order to explore the transition from traditional risk management to shared risk management in construction projects. We conducted a qualitative research with a single case study of the first IPD project in Norway, and interviewed eight people from different units within the project organization. The findings are structured and presented after the methodology of Gioia, and the results lead to some interesting findings of practices that facilitate shared risk. Several of the IPD principles are associated with the practices identified as facilitators of shared risk in the project. Moreover, the study confirms the need for training and onboarding on both project and organizational level due to embedded routines and norms of traditional risk management. In addition, the results emphasize the theory of organizational learning, as the establishment of new practices for shared risk seem to rely on a dynamic process of organizational learning. Limitations can be found in relation to the research design in which a single case study is performed. There are also limitations associated with our case being a pilot project. However, the results from this study can be relevant to the construction industry, as IPD serves as an emergent model within the industry.

CHAPTER 1 – INTRODUCTION

The construction industry, like any other industry, is risky. Nevertheless, the industry is characterized as fragmented in which construction projects are perceived to have more inherent risk due to the involvement of several contracting parties (El-Sayegh, 2008). Risk management in construction is an utmost important factor in the life cycle of projects, as it relates to the compensation of the businesses involved. Criticism related to the use of adversarial contracting and the strong tendencies of individual company gain have been prevalent in the industry over the years. Moreover, delays, cost overruns, and quality reduction have been the results of such tendencies (Colledge, 2005), and one of the biggest challenges when it comes to spilling costs is inappropriate risk allocation within construction contracts (Zaghloul & Hartman, 2002). In order to overcome such spillovers the right choice of the project delivery model can be vital.

Furthermore, construction projects and the relationships formed between the contracting parties involved are temporary and unique in their nature. To regulate the relationships between the parties, the industry operates with different project delivery methods, also known as governance models (Lloyd-Walker & Walker, 2015). Traditional delivery models are often characterized as discrete transactions, and two of the most common models within this approach is design-bid-build (DBB) and design-build (DB). Tactics, conflicts of interests, and hidden information are some characteristics of today's traditional delivery models, which over the years have proved inadequate results for both project performance and the industry (Sakal, 2005; AIA, 2007; El-Adaway, Abotaleb & Eteifa, 2017). Integrated Project Delivery (IPD) has recently emerged as a response to the fragmented construction industry, and to the traditional delivery models' poor project performance (El-Adaway et al., 2017). For a project to be characterized as a full IPD project, three essential principles must be followed; early involvement of key participants, a multiparty-contract, and shared risk and reward (AIA, 2007). Moreover, these principles facilitate essential factors such as collaboration, openness, team integration, and a best-for project mindset (AIA, 2014). As the traditional delivery models have been seen as the standard models in the

construction industry today, transitioning to new delivery models proves to be challenging.

Interestingly, few case studies have been examining the IPD model's implications and effects on risk management. Some reasons might be in relation to the criteria of complexity in applying the model, as well as the model is considered as a novelty in the industry. Furthermore, risk management has been heavily addressed in the literature in general, however, in light of IPD, the phenomenon seems to be understudied. More specifically, few studies are addressing the IPD principles' effect on risk management in construction projects. In the field of strategic management, the theory of institutional change has been addressed in relation to embedded routines in the industry of construction. Existing literature address how the traditional approach tend to inhibit the establishment of new practices and delivery models in relation to the implementation of IPD (Ghassemi & Becerik-Gerber, 2011; Hartmann & Bresnen, 2011). Moreover, several studies are emphasizing challenges and opportunities of the implementation of IPD (Ghassemi & Becerik-Gerber, 2011; Bygballe & Swärd, 2019), however, a less amount are directly focusing on the management of risk. The goal of our thesis is to explore how the principles of IPD facilitate shared risk, as an understudied phenomenon in the literature. In addition, we seek to investigate the establishment of new practices for shared risk in the construction industry. On the basis of this, we aim to investigate the following research question:

Does the IPD model facilitate a more balanced risk management in construction projects, and if so, in what way?

Based on our main research question it is important to clarify and define the term risk, as risk is often used interchangeably with the term uncertainty in the context of the construction industry. Hillson (2002) defines uncertainty as an overarching term, whereas a risk is an uncertainty with negative effects, while an opportunity is an uncertainty with positive effects. In this study, we will apply the term risk as both positive and negative effects of uncertainty. However, the term of uncertainty will appear in some situations due to our informants' formulations.

The aim of this thesis is to contribute to existing literature and experiences in which we seek to develop new insight of risk management in IPD projects. Through the lenses of institutional theory, we seek to explore practices that facilitate shared risk. Moreover, we seek to examine both enabling and constraining elements of the transition from traditional risk management to shared risk management in construction. A qualitative case study of the first Norwegian IPD project, Tønsbergprosjektet (TP), is conducted. The main findings of this research are resulting in both theoretical and practical implications.

CHAPTER 2 – BACKGROUND

In this chapter, two different approaches of project delivery models will be addressed. The first section involves a general presentation of project delivery models in the construction industry, as well as a short introduction of risk management. Then, two of the most common delivery models within the traditional approach will be presented, before going further into the relational approach of IPD. The final section of this chapter will compare the two approaches and explain the main differences in relation to risk. The aim of this chapter is to introduce the context of our research and present relevant concepts within the industry of construction.

2.1 Project delivery models and uncertainty in construction projects

One of the first scholars to define the topic of project delivery models was Ireland (1985), who claims, “A useful contribution to modelling the building process may be to investigate the relationships between the use of particular managerial actions, or managerial approaches, and their effects on the achievement of goals or objectives.” (p. 61). More recent literature implies that a delivery model can contain different types of design, in terms of organizational, contractual, and governance structures to create and capture value (Davies, MacAulay & Brady, 2019). Lloyd-Walker and Walker (2015) address the need for a variation in the selection of project

delivery models due to differences in project size and complexity. They argue, “Project type has an impact on a series of strategic management factors, not least being procurement options” (p. 28). Accordingly, the selection of delivery model is an important part of overcoming the typical challenges of construction projects (Lichtig, 2006). Mesa, Molenaar, and Alarcón (2016) address two defining factors of a project delivery model. The first factor is about defining the structure of the project organization in which the level of project participants needs to be decided. The project organization often involves the perspectives of the owner, designer, and entrepreneur, which is their contribution in the different project phases, assigned authorities, and communication protocols. The second factor aims to define the contractual relationship between the project parties, whereas the procurement methods for selecting the project team, the compensation model, and the risk allocation between the contracting parties are defined. Both defining the project organization and the contractual relationship between the parties need to be decided in the development of a project (Mesa, et al., 2016).

The American Institute of Architects address that a project delivery model involves assigning responsibility for coordinating the design and construction process of a project (Cohen, 2010). What characterizes a project delivery model within the construction industry is a process organized to complete and deliver a project (Halpin, Lucko, & Senior, 2017). Moreover, recent literature distinguishes between a traditional and relational approach when addressing project delivery models in the industry (Zhang & Lie, 2014; Franz & Leicht, 2016). From the perspective of risk management, traditional delivery models are known for an individual management of risk, where the parties are operating with the allocation strategy of risk transfer to secure own gain (Sakal, 2005). In comparison, relational delivery models are characterized by shared risk and reward in which the goals of all project parties are aligned around project success (Cohen, 2010; Ghassemi & Becerik-Gerber, 2011). Accordingly, the two approaches are in contrast to each other due to the allocation of risk between the contracting parties. Thus, as the delivery model defines the relationship between the contracting parties, it is essential for the project owner to consider the aspect of risk allocation when deciding for what delivery model to use (Mesa et al., 2016).

2.1.1 Traditional delivery models

In existing literature, the classification of traditional delivery models is often used when referring to transactional based methods. Accordingly, traditional projects are often viewed as discrete transactions, whereas the behavioral elements are reduced and the contracting parties are all driven by individual gain (El-Adaway et al., 2017). One of the most common delivery models within the traditional approach is the DBB, which also serves as a dominant delivery model within the industry of construction. What characterizes the DBB is the contract structure, whereas the functions of design and delivery are separated into two different contracts. In a DBB project, the project owner and the designer first enter into one contract. When the design is developed on the basis of the owner's requirements, it is put out for bid. The contractor with the lowest bid wins a contract on a fixed price (AIA, 2007; Lloyd-Walker & Walker, 2015). One common disadvantage of the DBB model often refers to the amount of hidden costs in which the lowest bid rarely ends up being the cheapest price due to change orders (Lloyd-Walker & Walker, 2015). Mesa et al. (2016) explain that such disadvantages are often due to "greater risks of increased contingencies, more change orders, higher transaction costs in contract and claim management, and more frequent and severe disputes." (p. 1098-1099).

Another common delivery model within the traditional perspective is DB. Unlike the DBB, the DB model is characterized by an integration of project design and delivery. By integrating the two functions, the DB model facilitates closer collaboration between the two project parties (Lloyd-Walker & Walker, 2015). In addition, the involvement of the project owner is critical in defining the design criteria but tends to be limited as soon as the contractor starts on executing the project (AIA, 2007; El-Adaway et al., 2017). Both traditional delivery models are evaluating project performance on the basis of time and cost savings. In a DB model, this involves limited control for the owner in terms of project quality, whereas the project owner has few possibilities to make changes in the project design. To cope with this, the project owner has to be specific in the level of quality in its design criteria (AIA, 2007).

Similar for both the DBB and DB model is the encouragement of individual interest, whereas projects participants pursue minimum effort for maximum return (AIA, 2007). Moreover, both models are operating with individual risk management, meaning that all parties identify and assess risk in isolation. Thus, the management of risk in traditional delivery models can be characterized by risk avoidance, whereas each party attempts to allocate risk over to the other contracting parties to reduce own risk (Walker & Lloyd-Walker, 2016). For instance, in a DB model, the owner often transfer risk and coordination effort over to the entity of the design and delivery functions in order to ensure higher coordination (AIA, 2007). However, the focus on individual gain serves to be disadvantageous for project performance in which contractors tend to reduce quality standards in order to maximize own profit (Fahmy & Jergeas, 2004). This means that even if project performance is low, contracting parties can turn out as winners based on their individual gain in profit (Mesa et al., 2016).

2.1.2 Integrated project delivery

With roots from the principles of Lean and relational behavior in the US and Australia, IPD is described as a collaborative framework that ties people, operational processes, business practices, and organizational systems together (Forbes & Ahmed, 2010; Ahmad, Azhar & Chowdhury, 2018). Unlike traditional delivery models, IPD focuses on commitment to the project outcome, and a central goal of organizing the delivery of a project is within the objectives of time, quality, and cost (El-Adaway et al., 2017). The American Institute of Architecture (2007) was first to set the foundations for IPD and introduced the concept of IPD to the industry by publishing a standardized contractual document. They describe IPD as:

Integrated Project Delivery (IPD) is a project delivery method that integrates people, systems, business structures, and practices into a process that collaboratively harnesses the talents and insights of all participants to reduce waste and optimize efficiency through all phases of design, fabrication and construction (AIA, 2014:4).

IPD separates itself from other delivery models on the grounds of some main characteristics (Cohen, 2010). First, the multi-party contract involves the use of one single contract creating a temporarily virtual or formal organization to execute the project. The contract contains descriptions of all project participants and their specific roles, liabilities, rights, and individually obligations. Moreover, the contract facilitates close collaboration and teamwork, and ties individual success to project success. Kent and Becerik-Gerber (2010) state that the multi-party contracts are “the vehicle that allows these goals to be reached successfully without being complicated by separate contracts that create opposing motives.” (p. 816). One typical part of a multi-party contract is the creation of integrated teams, involving an equal representation of owners, architects, and builders, who together manage the project from start to finish (Cohen, 2010). The American Institute of Architects (2007) address that the key to a successful IPD is related to the establishment of a project team who is committed to a collaborative working environment. The integrated team needs to be identified early as well as their roles and responsibilities need to be organized within a flexible structure. In addition, provisions of risk allocation and obligations should be defined in which it encourages close collaboration and open communication between the project parties (AIA, 2007).

An IPD model is further based on an early involvement of key participants, more specifically known as the project owner, designer, and entrepreneur. The early involvement aims to facilitate an efficient decision-making process due to the participants’ variation in expertise and knowledge. Accordingly, early involvement proves to increase the diversity of perspectives in an early phase as well as it tends to reduce rework due to the principle of transparency and open book (AIA, 2014). The principle of transparency is related to open communication and active information sharing between the contracting parties. Information sharing is often encouraged by modern technology and building information modeling (BIM), whereas it ensures coordination across project participants and reduce potential misunderstandings (El-Adaway et al., 2017).

Collaborative decision-making and control serves as another essential part of an IPD contract in which collective decision-making encourages commitment as the

overall ownership of the project increases (AIA, 2014). The collective decision-making in an IPD project is done by project participants in selected teams, rather than just the owners and project managers (Azhar, Kang & Ahmad, 2014). Based on Keith Sawyer's (2007) research on collaborative decision-making, Menches and Chen (2012) point out that decisions are done more efficiently when the group that make them consist of a variety of skills, knowledge, and perspectives. Shared knowledge, open and collaborative culture, well-defined goals, autonomy, fairness, and equal participation are further addressed as factors that are crucial in order to enhance the decision-making process (Menches & Chen, 2012:1044). Walker and Lloyd-Walker (2016) address that effective collaboration between the project parties has proven to enhance the management of risk in construction projects due to the improvement of "dynamic capabilities of project participants." (p. 2). Moreover, close collaboration enables decisions to be made when they need to be made (Cohen, 2010). However, when the project parties' relationship is defined by risk allocation, protective behavior can impede an open information sharing between the parties, and thus serves as a barrier of collaboration (Menches & Chen, 2012).

Furthermore, the IPD model is characterized by shared risk and reward. Shared risk and reward serves as one of the key principles of IPD in terms of motivating collaboration as a compensation model (Zhang & Lie, 2014). The principle refers to a collective risk management, whereas risk is appropriately shared between the project parties (AIA, 2007). Additionally, the compensation model aligns with the essential principle of optimizing the project as a whole, whereas both cost and benefits are related to project outcome rather than the contribution of the individual firms (AIA, 2014). In line with Cohen (2010), Ghassemi and Becerik-Gerber (2011) argue, "By aligning the goals of parties around collective project success and making each party accountable for the behavior of others, project teams gain more control of the overall process and better mitigate the overall risk." (p. 35). Moreover, cooperation is crucial for project participants to maximize individual and project return (Zhang & Lie, 2014). Several methods of risk and reward sharing is present in the literature on IPD. Thomsen, Darrington, Dunne and Lichtig (2009) address three different approaches of risk sharing practices. The first method involves sharing both risk and benefits in terms of cost overruns and cost savings.

The second method is characterized by a profit pool for risk related to cost overruns, and the final method is about sharing any remaining amount of contingency when the project is finalized (Thomsen et al., 2009; Zhang & Li, 2014). Despite the variations in risk sharing methods, the overall compensation system of IPD deals with common challenges related to the assessment of risk in the earlier phase of a project (Zhang & Li, 2014).

2.2 Traditional delivery models versus IPD

In traditional projects, quality is subject to the objectives of time and cost, and the contractor's performance is mainly evaluated based on schedule and budget, as long as the work is within reasonable quality (El-Adaway et al., 2017). While the traditional delivery models evaluate project performance based on time and cost constraints, the IPD models assess performance in project progress and success. Thus, what drives project success in IPD projects is often related to the incentive mechanisms in which these are mechanisms that facilitate better reflections of performance for all parties involved (El-adaway et al., 2017:4). Closely related to what drives project performance is the conflict of interest. Traditionally, the interests of the owner and the contractor are in conflict. While the project owner's interest is to increase earnings and minimize costs and time for completion, the contractor's interest is to earn greatest profit. Thus, the interests are not motivated by project success, rather it is driven by individual gain. The model of IPD tends to reduce these conflicts due to the alignment of interests of the contracting parties, whereas all project participants are evaluated on performance relative to project progress and success (El-Adaway et al., 2017). Mesa et al. (2016) identify drivers of project delivery performance by comparing traditional and relational delivery models. The study recognizes five characteristics of IPD as the most influential drivers of performance. These are; open communication, alignment of interest, trust, team working, and gain and pain sharing. Additionally, El Asmar, Hanna, and Loh (2013) prove that IPD projects have superior performance in similar areas such as quality, communication, and change performance. While quality serves as the most important performance objective in this study, faster processing and delivery

times, and a reduction in change orders are also significant performance results (El Asmar et al., 2013).

Moreover, the aspect of trust and its role in the economic exchange differs between traditional delivery models and IPD. Trust can be defined by “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other part.” (Mayer, Davis & Schoorman, 1995:712). What sets traditional delivery models apart from IPD is the dependency of trust between the parties, whereas the establishment trust is the single most important principle of IPD (AIA, 2007; Ghassemi & Becerik-Gerber, 2011:34). Mayer et al. (1995) address the role of trust in relation to risk taking, and explain an increasing need for trust in the organizational context. As collaborative operations also exist without the element of trust, substitutes such as contracts are often used to regulate cooperation activities where trust is absent. Moreover, the formal contract can be viewed as a protection against a disruption of the partnership (Loraine, 1996; Roe, 1996; Bresnen & Marshall, 2000). However, in relation to the construction industry, Swärd and Lunnan (2011) argue that contractual trust enables a smoother project execution. They further state “Contractual trust is triggered by positive reciprocal actions and expected behavior and is founded on a known contract and industry norms.” (p. 65). This can be seen in relation to the different project delivery models, where traditional delivery models use contracts to regulate the cooperation. On the contrary, IPD is dependent on the establishment of trust to achieve the collaboration that is necessary for an integrated project (Briscoe & Dainty, 2005; Ghassemi & Becerik-Gerber, 2011).

Kent and Becerik-Gerber (2010) claim that the principles of early involvement and close collaboration address the challenges of fragmentation in the industry, whereas fragmentation is referred to as “inefficient work practices and costly changes late in the construction phase” (Kent & Becerik-Gerber, 2010:816). Even though the DB model facilitates a more integrated approach compared to the DBB model, traditional delivery models tend to promote hierarchical levels of contracting and fragmentation. Thus, the two models are addressed as inappropriate for today’s complex and dynamic construction projects (El-Adaway et al., 2017:1).

Accordingly, Walker and Lloyd-Walker (2016) address IPD as a response to traditional delivery models, in which the principles of collaboration and shared risk are to challenge the fragmentation of the traditional approach. Additionally, Ghassemi and Becerik-Gerber (2011) describe one challenge facing traditional models as the lack of integration of key participants, whereas late integration often results in change orders and slow decision-making processes. This is often due to poor communication and limited information sharing, in which parties often fear that information will be used against them at a later stage (El-Adaway et al., 2017).

While traditional delivery models have to face the challenges of fragmentation, the IPD model facilitates an efficient decision-making as the overall knowledge base increases due to the principle of early involvement of key participants (AIA, 2014). Moreover, practices related to open communication and transparency ensure access to the other participant's schedules, costs, and productivity data, which again enhances the ability to make effective decisions (Kent & Becerik-Gerber, 2010; Ghassemi & Becerik-Gerber, 2011; Menches & Chen, 2012). Close collaboration, sharing of information, and an open-book policy also tend to enable project parties to experiment and test new solutions (Loosemore & Richard, 2015). Accordingly, IPD is known for facilitating a safe environment with a culture that is more open for innovation and change (Rowlinson & Walker, in press). Rowlinson and Walker (in press) further stress that the construction industry is ready for innovation, which again will facilitate the use of IPD and enhance the industry's capabilities and opportunities for the future. However, the industry is described by having a strong sense of systematic inertia with regards to overcoming barriers of innovation (Rowlinson & Walker, in press).

In relation to the risk management in construction, the industry is known for being risk averse. Thus, the strategy of risk transfer serves as a common method for allocating risk in traditional projects in which each party tries to avoid responsibility for risk (El-Adaway et al., 2017). Moreover, the identification and assessment of project risk is often the contractor's responsibility and they develop their own standardized control strategies for dealing with risk. In contrast, the principle of shared risk and reward of IPD promotes a strategy where all contracting parties work together in managing project risk. Thus, all parties are responsible for

identifying and assessing project risk (El-Adaway et al., 2017). Compared to traditional risk management, IPD facilitates a more fair risk approach as the management of risk depends on the project outcome (Ghassemi & Becerik-Gerber, 2011; Zhang & Li, 2014). Accordingly, the open and collaborative environment of IPD facilitates effective mechanisms to cope with risk, uncertainty, and ambiguity in construction projects (Walker & Lloyd-Walker, 2016). As such, shared responsibility leads to active input for risk identification and innovation in how to deal with project risk (El-Adaway et al., 2017:4).

2.2.1 Barriers of IPD

From the above discussion, the IPD model appears to be a response to traditional delivery models' poor project performance, as it encourages the traditional boundaries into a more collaborative and dynamic process (Cohen, 2010; Mesa et al., 2016). However, due to its recent origins, several barriers are identified in relation to its use in practice. Ghassemi and Becerik-Gerber (2011) address four of the most common barriers of implementing the IPD model in the industry of construction. First, they examine the cultural barriers stating that these are due to the industry's unwillingness to change from the traditional models. The challenges that need to be dealt with are the ones that involve "overcoming the inertia and changing the mindset built on the traditional hierarchy." (Ghassemi & Becerik-Gerber, 2011:40). In relation to overcoming cultural barriers, Ashcraft (2012) addresses the importance of knowing when past experiences and practices are useful, and when they should be neglected. Moreover, the individuals must be willing to collaborate. Osman, Nawi, Zulhumadi, Shafie, and Ibrahim (2017) examine the readiness of construction stakeholders to implement IPD and address that the attitude must be reflected in the individual readiness to implement a new approach of project delivery.

Ghassemi and Becerik-Gerber (2011) address integration of project personnel, IPD training, and trust-building as solutions to overcome cultural barriers. In relation to the integration of personnel, early involvement of all project parties served to be an important way of overcoming barriers related to project team integration. In

addition, IPD training, both at organizational and project level, has proven to reduce the cultural barriers. At the organizational level, IPD training facilitates an identification of collaborative people within the organization. At the project level, teams and project participants are trained throughout the project in order to ensure common project goals and expectations (Ghassemi & Becerik-Gerber, 2011). Additionally, contracting parties are overcoming cultural barriers by the establishment of mutual trust and respect. The establishment of trust is vital for the principles of IPD, and is a result of an open, transparent, and collaborative environment (Cohen, 2010; Perlberg, 2009). Several trust-based activities are described in the literature, whereas transparency, shared team confidence, and open communication are the most common factors (Ghassemi & Becerik-Gerber, 2011).

Second, financial barriers are associated with the implementation of IPD, whereas one barrier refers to the choice of compensation structure. Ghassemi and Becerik-Gerber (2011) address the challenge where “traditional contract structures tend to inhibit collaboration by only providing incentives for each individual firm.” (p. 43). Other financial barriers relate to the principle of shared risk and reward. The challenges refers to the different approaches in the accounting of cost and profit between the project participants (Roy, Malsane & Samantha, 2018). Third, barriers in relation to the legal aspect refers to issues of liability and insurance. Kent & Becerik-Gerber (2010) address the issues of insurance and risk allocation as two of the greatest barriers of IPD adaptation in the industry, whereas the insurance industry does not have coverage for the IPD model. Thus, contracts are selected on the basis of traditional insurance products (Ghassemi & Becerik-Gerber, 2011; Roy et al., 2018). Fourth, technological barriers are identified due to the integrated use of technology in IPD projects. Roy et al. (2018) address three issues identified in existing literature, as critical in terms of integration. Firstly, as IPD requires an early definition of target cost, time, and quality, project stakeholders tend to have trouble in defining these goals due to the design not being completed. Secondly, due to lacking information and knowledge management systems, collaborative decision-making process arise as an issue. Lastly, issues regarding unclear BIM standards refer to the different levels of competence in using BIM (Kent & Becerik-Gerber, 2010; Ghassemi & Becerik-Gerber, 2011).

CHAPTER 3 - LITERATURE REVIEW

In this chapter, we seek to address relevant literature regarding our research question: *Does the IPD model facilitate a more balanced risk management in construction projects, and if so, in what way?* In order to address this, we will apply institutional theory as a theoretical lens in order to explore the transition from traditional risk management to shared risk management in construction projects. In the first section, four concepts within institutional theory will be addressed. First, the two concepts of institutional change and collaboration will be discussed in relation to the emergence of IPD as a new delivery model within the industry. Institutional change is a relevant concept in which it involves the appearance of new practices and norms. Thus, the emergence of new practices delivery models within the industry can be viewed as an institutional change. The concept of collaboration is tied to institutional change, as the transition to collaborative models can be associated with the dynamics of change. Second, the concept of embedded agency aims to reflect upon the role of project participants and their ability to act outside the boundaries of the embedded practices of traditional risk management. Third, the last concept derived from institutional theory is routines. This concept aims to identify the role of routines in relation to the management of risk in construction, whereas the embeddedness of traditional routines seems to challenge the implementation of practices for shared risk in practice. In the last section of this chapter, three sub-questions will be developed on the basis of the theory discussed. These sub-questions will guide our analysis and help us answering our main research question.

3.1 Institutional theory

The economist Douglas North (1990) distinguishes institutions based on their degree of formality. His approach describes formal institutions as laws, regulations, and rules, and informal institutions as norms, cultures, and ethics. Complementary to North's (1990) dimension, Scott (2014) addresses three supportive pillars of

institutionalism: regulative, normative, and cultural-cognitive. The three pillars constitute as providers of institutional structure in terms of legal, moral, and cultural boundaries. These boundaries are enabling behavior through guidelines and directions for action (Scott, 2014). Firstly, the regulative pillar is included in the formal dimension of institutions, and explains how institutions constrain and regularize behavior. Secondly, the normative pillar is defined by its focus on norms and values, aligning with North's (1990) dimension of informal institutions. Norms are described by "how things should be done" (Scott, 2001), and values involve "conceptions of the preferred or the desirable together with the constructions of standards to which existing structures or behaviors can be compared and assessed." (p. 64). The last pillar emphasizes the cultural-cognitive element of institutions. The essence of this informal dimension is both related to the aspect of compliance as well as the understanding of social roles. For instance, as routines are followed because they are taken for granted, and that social roles often arise due to a common understanding of what particular actions are associated with certain actors (Berger & Luckmann, 1967; Scott, 2001).

Moreover, institutional theory explains why the strategic choices of organizations often occur as a result of taken-for-granted processes within the institutional environment. Thus, the pressures and constraints from the external environment are indicative for the structure of the organization (Oliver, 1991). Organizational change is closely linked to institutionalization as organizations need to be responsive to external conditions in order to survive (Meyer & Rowan, 1977; Pfeffer & Salancik, 1978; Oliver, 1991). Oliver (1991) examines the strategic response to institutional processes emphasizing the context of organizational behavior as "conforming to collective norms and beliefs." (p. 147). In addition to the context as one explanatory factor of strategic response, several authors suggest that the motives of organizational behavior are in compliance with the organization's aim of obtaining stability and legitimacy (DiMaggio & Powell, 1983; Oliver 1991), and that organizations are driven by interest, which is institutionally defined. The motive of stability emphasizes the organizational institution as resistance to change over time in terms of being restricted by conformity of the institutional environment. DiMaggio and Powell (1983), Zucker (1977), and Oliver (1991) examines stability as a reproduction of organizational

structures, activities, norms, and routines. Oliver (1991) addresses habits as a typical response in relation to the motive of stability. He argues that, “organizations reproduce actions and practices of the institutional environment that have become historically repeated, customary, conventional, or taken-for-granted” (p.152). The aim of legitimacy refers to functions of social worthiness, where the role of conformity appears as useful for organizations in terms of their likelihood of survival (Oliver, 1991).

3.1.1 Institutional change and collaboration

In addition to the behavior of organizations addressed in institutional theory, the aspect of deinstitutionalism highlights the phenomenon of institutional change. Scott (2001) describes deinstitutionalism as a process where established practices and beliefs are weakened, or disappear. Moreover, deinstitutionalism can be associated with the appearance of new practices and norms (Scott, 2001). Three forces are explaining different pressures that institutions can be facing; functional pressure, political pressure, and social pressure (Oliver, 1997). First, the functional pressure refers to challenges in performance and is often related to environmental changes such as competition for resources and market acquisitions. Second, political pressures refer to changes in legitimacy of existing institutional arrangements supported by power distributing sectors. Third, institutional change as a result of social pressure often involves the role of changing social expectations and conflicting beliefs (Oliver, 1992; Dacin, Goodstein & Scott, 2002).

Within the construction industry, organizational change can be seen in relation to the emergence of new delivery models, such as IPD. Hartmann and Bresnen (2011) argue that established routines and activities tends to inhibit the development of new practices and delivery forms in the construction industry. Thus, even though IPD appears to be a response to traditional delivery models’ poor project performance, the embeddedness of routines and procedures within the traditional model seem to challenge the implementation of IPD (Ghassemi & Becerik-Gerber, 2011). On the contrary, Lichtig (2006) addresses the incentive mechanisms of IPD as drivers for institutional change. He states; “financial incentives provides added

motivation for individuals and organizations to stretch beyond their current levels of performance or ways of doing business and may help overcome inertia and resignation that often exists on projects.” (p.32).

Furthermore, in the context of organizations and their response to institutions, Lawrence, Hardy and Phillips (2002) address the role of collaboration and how interorganizational relationships can influence institutional change in terms of producing new institutions. Collaboration can be defined as, “a cooperative, interorganizational relationship that is negotiated in an ongoing communicative process and that relies on neither market nor hierarchical mechanisms of control.” (Lawrence et al., 2002:282). Within the definition of collaboration there are several interorganizational arrangements that are included, for instance strategic alliances, joint ventures, buyer-supplier arrangements, and networks (Parmigiani & Riviera-Santos, 2011). Lawrence’s et al. (2002) study show that collaboration contributes to the creation of new institutions, where both high level of involvement and embeddedness are generating institutional change. Moreover, organizations must reflect on their relationship with the collaborating organization as well as the embeddedness of the institutional system of the collaboration (Lawrence et al., 2002).

Bresnen and Marshall (2000) address the collaborative aspect of institutional change by examining the role of project partnering in the construction industry. They argue that the institutional perspective can “throw important light upon the dynamics of change associated with the attempted transition to collaborative contracting in project environments.” (p. 5). Accordingly, project performance can be significantly improved if project participants adapt to more collaborative approaches of working. However, Bresnen and Marshall (2000) also argue that the establishment of a collaborative environment require more than “project team building, a set of appropriate tools and techniques and a strong commitment from top management.” (p. 12). Such changes may also require factors that reinforce current work practices as well as an understanding of how the changes will impact the participants’ interests and motivation (Bresnen & Marshall, 2000).

3.1.2 Embedded agency

In relation to the collaborative aspect of institutional change, Lawrence et al. (2002) address the role of organizational collaboration as “an important form of institutional entrepreneurship.” (p. 289). The concept of institutional entrepreneurship refers to the creation of organizational institutions shaped by empowered agents and their interests (DiMaggio, 1986). Several authors refer to these agents as organizational members of change with an important impact on the implementation of new institutional practices (Townley, 2002; Zilber, 2002; Dacin et al., 2002). Additionally, Zilber (2002) addresses the interplay between actions, meanings, and actors as drivers of institutions. The interplay within an organization, where social actors perceive, enact, and reinforce their behavior, is described as the mechanisms behind institutional processes (Zilber, 2002). The study shows that the deinstitutional pressures of functional, political, and social factors are influenced by organizational members’ subjective interpretations, meanings, and responses. Thus, institutional change is not only characterized by external pressures but also internal conditions of individual interpretations of the pressure. Internal conditions in relation to institutional change are also referring to the influence of organizational members as carriers of change (Townley, 2002).

Moreover, Seo and Creed (2002) emphasize the perspective of institutional change in relation to agency and embeddedness. In the article, institutional change is viewed as “an outcome of the dynamic interactions between two institutional by-products: institutional contradictions and human praxis” (p. 222). They argue that agents are functioning as “the mediating mechanism” that links together the embeddedness of institutions with contradictions and change (Seo & Creed, 2002:240). Seo and Creed’s (2002) study identifies the changing role of the agents. While some authors address social actors as passive receivers of institutional structures, others experience the role of agents as different. Accordingly, newer literature within the field of institutionalism perceives actors as active and willing to change if it adds to their individual interests (Seo & Creed, 2002). In addition, Garud, Hardy, and Maguire (2007) elaborate on the paradox of embedded agency,

which encompasses the mechanisms of institutional embeddedness of organizational members. Embedded agency refers to the regulative, normative, and cognitive processes, which members of an organization are experiencing. As these processes are known for defining the actors' cognitions, interests, and identities (Clemens & Cook, 1999; Garud et al., 2007:961), to what extent are organizational members able to adapt to new practices and beliefs? This question underlines the role of actors and their ability to reflect and act outside the boundaries of established and taken-for-granted practices within the organization (Garud et al., 2007).

3.1.3 Routines

Feldman and Pentland (2003) clarify the term organizational routines as a repetitive, recognizable pattern of actors who are interdependent on each other and often in the means of other actors. They further address the origin of organizational routines, whereas routines are viewed as a result based on "the need for cognitive efficiency and the reduction of complexity." (Feldman & Pentland, 2003:97). Organizational routines can, for instance, be a product of organizational learning, or a response to external pressure. Furthermore, routines have been viewed as a natural product of action (Orlikowski, 2000; Feldman & Pentland, 2003). This perspective describes organizational activities' likelihood in terms of feasibility, where some activities are easier to perform than others are. Therefore, actors tend to choose the easier activities over the hard ones, which justifies the repetitive patterns of some activities (Feldman & Pentland, 2003). Additionally, routines are developed when individuals or organizations apply a specific logic to an action. More specifically, when this logic is repeated as a set of formal rules and procedures, it becomes a routine (Feldman & Pentland, 2003).

Traditionally, routines have been reflecting organizational stability and inertia. However, through a more dynamic approach, scholars are discovering organizational routines in the context of change. The ostensive and performative perspectives address the variation, selection, and retention of organizational routines. The ostensive perspective is defined by "the abstract, generalized idea of the routine, or the routine in principle" (p. 101), while the performative aspect

involves the routine in practice, consisting of specific people, time, and place (Latour, 1986; Feldman & Pentland, 2003). Both perspectives serve as necessities for an organizational routine to exist, and the interplay between them can be understood as a source of change (Latour, 1986; Feldman & Pentland, 2003; Bresnen, Goussevskaia, & Swan, 2005). Moreover, routines arise through actors' enactment and are dependent on people's choice to follow, or change them. In addition, routines can be compared with habits, whereas habits are performed automatically (Feldman & Pentland, 2003).

In relation to construction, practices of risk management can be viewed as routines in which the individual organizations possess own standardized strategies and practices for identifying and assessing project risk. While traditional delivery models encourage individual practices of risk management, the principle of shared risk and reward in IPD requires transparent and collaborative practices for risk management (El-Adaway et al., 2017). Additionally, Bygballe and Swärd (2019) examine routines and their relevance for understanding collaboration in construction projects. In the context of organizational cooperation and relationship quality, the willingness to create common routines is significantly related to a high-quality relationship. Further, the authors argue that if the partners align their interpretations and perception of the different roles and routines, it creates a common understanding to further enable collaboration. This continuous process facilitate an open space where participants are able to adjust and refine their interest and motivation, to better cope with its partners and their routines (Bygballe & Swärd, 2019).

Furthermore, Bresnen et al., (2005) draw attention to the importance of understanding how the introduction and adaptation to new routines can disturb old knowledge embedded in the organization. Moreover, they express that the understanding of the relationship between changes in routines is related to the complex management practices (Bresnen et al., 2005). Implementing changes in a project-based organization requires "practical embedding in systematic routines and working practices and its enculturing in shared understandings, norms and values", and not only translation of new knowledge (Clark & Staunton, 1989; Blackler, 1995; Bresnen et al., 2005:30). A change often involves replacing old

cultural assumptions with new ones, which might introduce some implications in relation to both distributing power and influence different actors. Furthermore, Bresnen et al., (2005) view organizational routines as a form of learning in project-based organizations. Individual learning enhances organizational learning in that sense that the members of the organization absorb new knowledge and transfer it to the entire organization. Nonetheless, the lack of knowledge in an organization can be a source of slow adaptation towards new routines (Kim, 1998). Slow adaptation can be seen in relation to a resistance to change in which project-based environment can be characterized by highly embedded knowledge, practices, and routines in the individuals' core (Bresnen et al., 2005).

3.2 Discussion of literature

In the background of our study, we have identified several barriers and opportunities related to the use of IPD in practice. The comparison of IPD with the traditional delivery models forms the basis for our choice of literature. In the literature review, we have looked further into the theory of institutions, whereas the concept of institutional change is emphasized. This serves as a relevant perspective of our research as established literature already address challenges in which the model of IPD brings in new principles and practices into the industry. On the basis of this, we have identified relevant topics for our research question: *Does the IPD model facilitate a more balanced risk management in construction projects, and if so, in what way?* In order for us to answer this, we have established three sub-questions to direct and guide our research and to help us answer our main research question. In the following section, the three sub-questions will be explained in opposition to the literature.

Within the industry of construction, different approaches of risk management are applied and there are significant differences between the methods within the various contractual formats. Two contradicting strategies of risk management was recurring in the literature. Traditionally, we see that risk is individually managed and that risk avoidance is highly emphasized through the allocation of project risk. In comparison, IPD operates with the key principle of shared risk and reward, whereas

the contracting parties share the responsibility for project risk (Sakal, 2005; Zhang & Li, 2014). Furthermore, the IPD model emphasizes certain incentive mechanisms that create the foundation of shared risk and reward, through a compensation system (AIA, 2014). In the comparison of traditional delivery models and IPD present in the background, we identified significant differences between the two approaches, both in terms of contractual structures and performance. In the literature, open communication, efficient decision-making, information sharing, and creating integrated teams are addressed as beneficial practices of IPD (Ghassemi & Becerik-Gerber, 2011; AIA, 2014; Zhang & Li, 2014). On the basis of this, we seek to identify specific characteristics of practices for shared risk management. Moreover, we seek to discover what factors that prove to enable a more balanced risk management. Thus, we have developed the following sub-question:

(1) What characterizes the practices of risk management in IPD?

The theory further states that there are several barriers related to the implementation of IPD. Ghassemi and Becerik-Gerber (2011) address four barriers in relation to cultural, financial, legal, and technological aspects. When addressing the cultural barriers, they emphasize the challenges related to changing the mindset that is built on traditional norms and routines in the industry. Additionally, Hartmann and Bresnen (2011) state that the established routines and practices serves as inhibiting factors of the development of new practices and delivery models in the industry. Accordingly, institutional theory address this in relation to organizational behavior, whereas an organization's aim of obtaining stability refers to the reproduction of its structures, activities, and routines (DiMaggio & Powell, 1983; Oliver, 1991). Moreover, organizational conformity seems to restrict the organizational institution to change over time (DiMaggio & Powell, 1983; Oliver, 1991). Based on this, we aim to identify barriers related to organizational change in which traditional routines and practices seems to inhibit the realization of shared risk and reward in IPD projects. The second sub-question is as follows:

(2) What are the barriers for realizing the ambitions of shared risk and reward in IPD projects?

Furthermore, traditional delivery models and IPD are emphasized in the literature as two quite different delivery models when addressing risk. Therefore, an important part of our main research question is the transitioning from the traditional approach of risk transfer towards shared risk in IPD. More specifically, our research aims to examine how the principles of IPD facilitate the management of risk in construction projects. As our second sub-question seeks to identify barriers that affect the realization of the IPD model, our third sub-question aims to discover if there are other elements that might either enable or constrain the adaptation of shared risk practices. In the literature, Ghassemi and Becerik-Gerber (2011) address several factors that need to be considered when implementing IPD, and emphasize integration of project personnel, IPD training, and trust-building activities and tools as efficient for overcoming barriers related to the implementation of IPD. Similarly, our research aims to identify factors that facilitate the establishment of new practices regarding the management of risk in construction projects. That being said, we seek to examine what elements that contributes to the transition towards practices for shared risk in construction projects. The third sub-question is as follows:

(3) Which factors enable and constrain the transition from traditional risk management to shared risk management?

By investigating these three sub-questions, we aim to collect considerable knowledge to further answer our main research question. More specifically, by examining the opportunities and barriers of IPD in relation to risk management, we aim to discover what elements of the IPD model facilitate a more balanced management of risk.

CHAPTER 4 – RESEARCH METHODOLOGY

4.1 Research design

The choice of research strategy is consistent with the purpose of our study, which is to investigate IPD as a recently established delivery model in the Norwegian construction industry. Our study is limited towards investigating how the IPD model influences risk management in construction projects. We decided for a qualitative research approach, as our aim is to identify what practices of IPD facilitate a more balanced risk management. The qualitative research method is characterized by an unstructured way of collecting data, with the function of acquiring in-depth knowledge and the underlying motivation of a smaller sample base (Bryman & Bell, 2015). Langley and Abdallah (2011:202) address, “qualitative data have particular strengths for understanding processes because of their capacity to capture temporally evolving phenomena in rich detail.” In contrast to the quantitative method, the qualitative method is based on meanings expressed through words rather than numbers (Saunders, Lewis & Thornhill, 2009). Moreover, the qualitative research is therefore addressed as the most appropriate method for investigating insufficiently understood phenomena (Marshall & Rossman, 1995). On the basis of this, the qualitative approach serves us the ability to explore and understand the IPD model and its impact in a greater detail.

Furthermore, we have chosen a single case study for our research. A single case study design involves one basic case on a single location, providing a more detailed and intensive examination of the setting (Bryman & Bell, 2015). Moreover, case studies are seen as beneficial in term of providing rich empirical descriptions of recent events, as they often give access to unusual research of a significant phenomenon (Yin, 1994; Eisenhardt & Graebner, 2007). Thus, our choice of a single case research is justified by its richness in data and its ability to describe the existence of a specific phenomenon (Siggelkow, 2007; Langley & Abdallah; 2011). Additionally, single case studies often have the potential of being revelatory in terms of developing new insight into an understudied phenomenon (Yin, 1994;

Langley & Abdallah, 2011). Based on this, a single case study served to be an appropriate design for our research as it provide us the ability to extract a deeper understanding of the IPD model in relation to risk within one single project. However, there are also some challenges associated with a single case study design. Eisenhardt and Graebner (2007) address the issue of generalizability, and are questioning whether findings from one single case can be representative for other cases in general (Bryman & Bell, 2015). Our reflections about this issue regarding single case design and generalizability is discussed in the section about our reflections of strengths and weaknesses, where we consider the transferability of our research.

4.2 Theoretical sampling and presentation of case

For the theoretical sampling of our single case study, we used the logic of selecting a revelatory case with the potential for developing new insight of an unusual or rare phenomenon (Yin, 1994; Langley & Abdallah, 2011). The project case was selected for two main reasons. First, as we were primarily interested in practices of risk management within IPD projects, the case had to apply the model of IPD. TP serves as the first and only project in Norway that applies a classic IPD contract. Thus, by selecting this particular case, we were able to extract knowledge about our research phenomena in a new context. Moreover, this single case provides opportunities for unusual research access (Yin, 2014; Eisenhardt & Graebner, 2007). Second, the case needed to be an ongoing construction project due to the value of data collected. As TP started its initial phase in 2016, the project participants already acquired a significant amount of information about the process so far. This enabled us to collect up-to-date knowledge and interpretations through interviews and observations from the ongoing project. More specifically, an in-depth analysis can extract individual experiences and interpretations about the situation they are currently involved in (Eisenhardt & Graebner, 2007). Accordingly, looking more into questions asking “how” and “why”, one can extract the uniqueness of a particular case (Yin, 1994).

4.2.1 Tønsbergprosjektet

TP is an ongoing construction project of a hospital in Norway with an aim of completion in the middle of 2021. The contracting parties of the project are Sykehuset i Vestfold as the project owner, Skanska as the main contractor, and Cura as the designers and civil engineers. The latter is a joint venture that consists of five organizations with different specialties within the scope of architecture and consultancy. These five organizations are Multiconsult ASA, Hjøllnes Consult AS, Erichsen & Horgen, LINK Arkitektur AS, Henning Larsen Architects og Bølgeblikk Arkitekter. A classical IPD contract was decided in 2017 and it involves all project participants. The foundation for IPD in TP is characterized by close collaboration and aligned financial interests with rapid clarifications, all in line with the values of the project. The project integration involves several methods, tools and platforms that aim to meet the project ambitions. Some of these are building information modeling (BIM), virtual design construction (VDC), integrated concurrent engineering and Big Room. In addition, the project is also in close collaboration with professionals from the hospital (Tønsbergprosjektet.no).

The incentive model of TP is based on a common responsibility for the project progress, quality, and economy. The profit will be allocated in accordance with the degree of success and is related to the volume that each project party contributes with. Moreover, the profit is a fixed amount that can either be increased or decreased in percentage, depending on whether the project falls below or above the exit price. Depending on the project success, participants may lose their profits but will receive expenses so that they do not suffer from direct losses. In addition, the TP operates with Target Value Design, whereas the focus lies on value instead of costs when solutions are being developed. Through a risk and reward system, the design and engineering team and contractor are encouraged to reduce project costs and find the ultimate target for cost and time. Accordingly, risk is placed with those who have the greatest opportunity to handle them but the agreement is based on the fact that the parties' strong common interests will make provisions on risk distribution unnecessary (Tønsbergprosjektet.no).

Furthermore, the TP has been a demonstration project in the national initiative for better efficiency and sustainability in the construction industry. Being a pilot project in one of Norway's largest industries, the project is fully committed to further develop standardized solutions related to the classical IPD principles. Moreover, the project is characterized with high ambitions, whereas three main goals are defined by; (1) 10% lower costs, (2) 50% faster construction time, and (3) extensive use of BIM, as the technological tool for modeling. In relation to the last goal, TP already shows significant results in innovation. In 2017, the project received an international award in the category of "Design Using Open Technology" for their use of BuildingSMART tools in the design phase (Tønsbergprosjektet.no).

4.3 Data collection

A case study design is often accompanied by a collection of multiple sources of data. This technique is referred to as triangulation (Yin, 2014; Bryman & Bell, 2015). Saunders et al. (2009:146) are defining triangulation as "The use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you." Moreover, the use of triangulation can provide a more thorough understanding of the relevant circumstances. In addition, using a triangular strategy can increase the validity of the data in terms of its property of cross-checking the data collected through multiple sources (Yin, 2014). For our qualitative data collection, we applied the techniques of interviews, observations, and project documents. We relied on the interviews as the main source of data, where data from observations and project documents served as our sources of triangulation. The three techniques will be described in the following sections.

4.3.1 Interviews

Our primary source of evidence for this study is semi-structured interviews, a method that serves as the most significant technique for data collection within a case study designed research (Yin, 2014). Moreover, with the purpose of an

explanatory study, we aim to understand the relationships between different variables - an approach facilitated through semi-structured interviews (Saunders et al., 2009). This technique promotes a flexible interaction between the interviewer and interviewee (Bryman & Bell, 2015). Our purpose of collecting data through semi-structured interviews was to get in-depth knowledge about relevant topics within this unique case. The semi-structured interviews facilitated this in-depth perspective, as we experienced the responses to be detailed descriptions and explanations of the various phenomena.

For the sampling of respondents, we did not want a random sample. Our sample was dependent on our research question and sub-questions, and more precisely, “what do you need to find out, what will be useful, what will have credibility, and what can be done within your available resources.” (Patton, 2002; Saunders et al., 2009). Saunders et al. (2009:233) address non-probability sampling as an approach consisting of several selection techniques for subjective judgments. One technique described within this approach is purposive sampling, which we decided to apply for our research. This technique enabled us to select respondents based on their ability to provide us with the most appropriate material related to our research question (Saunders et al., 2009). Within purposive sampling, we went for a technique called snowball sampling. Snowball sampling involves using the network of a person in order to get in contact with more people (Bryman & Bell, 2015). Based on this, we reached out to one of the persons we had been in touch with during the project visit in February. In the process of identifying the interview objectives, we provided our contact person with information about what data we wanted to collect. More specifically, we wanted to interview people from the three contracting parties as well as we were interested in people’s experiences within the industry. In addition, we wanted the interviewees to have some experiences either with the IPD model or risk management within the project. After a short description of the information we were interested in, our contact person gave us a list of potential respondents to contact for our interviews. In addition, our supervisor provided us with one of the respondents contact information.

Our research question has guided our data collection, both in terms of the development of the interview guide with questions, and the sampling of informants.

An interview guide is characterized as a list of specific topics, in which the list aims to ensure consistency in a semi-structured interview (Bryman & Bell, 2015). Our interview guide consisted of topics related to our two main themes, namely IPD and risk management. Based on this, nine questions were developed and categorized into four sections; introduction, IPD, risk management, and closure (see Appendix 1). The interviews involved questions about the informants' experiences with the IPD model in the project. More specifically, what they think have been beneficial and challenging, practices of uncertainty management, and the role of IPD in relation to the management of risk in the project. In order to extract as much information from the interviews as possible, we emphasized an open formulation of the questions, as well as we allowed for new and upcoming questions when additional information occurred.

Eight interviews were conducted in total. Seven of them were performed face-to-face, while one was conducted through Skype due to geographical location. Each respondent was individually deciding his or her preferred time and location for the interview to be held. The majority of the face-to-face interviews were held in Tønsberg at the project office, while the rest were held in Oslo. All eight interviews were conducted within March 2019. The duration of each interview varied from approximately thirty minutes to over an hour. Despite variations in duration, we experienced accurate and relevant reflections from every interviewee. We were both present as researchers in all eight interviews but switched on having two different roles of either asking the interview questions or observing and ensuring that all topics were covered. By recording all interviews, we were able to develop accurate reviews of every interviewee. Moreover, we prevented potential misunderstandings when we were of different interpretations in the process of analyzing the data, as the recording enabled us to go back and review the interviews, as many times we needed. In addition, all interviews were transcribed consecutively as they were completed. The transcribed interviews were further identified by numbers to ensure anonymity, and then transferred into the computer-aided qualitative data analysis software (CAQDA), Nvivo, and prepared for the data analysis.

4.3.2 Observations

In the early stage of our research process, we were invited together with our supervisor to visit the project. The day consisted of multiple presentations from different project participants, each with different responsibilities in the project. We were able to observe the different tools, methods, and practices applied in the project, such as BigRoom, VR technology, and BIM stations. In addition, we were taken for a guided tour on the construction facilities, where we had insightful conversations with different project participants along the way. The observation day was not designed for our research purposes, however, it provided us with valuable data in terms of understanding the complexity of the project. From the observation day, we collected information through presentations, conversations, and impressions in general. We took active notes to ensure that what we observed was preserved for later use. Our aim to take part in one of their weekly project meetings was set aside due to its limited relevance for our study. On the basis of this, our observations can be referred to as micro-ethnography in terms of the limited time spent on observations (Bryman & Bell, 2015).

4.3.3 Project documents

In addition to interviews and observations, a complementary source of information was project documents (see Appendix 2). These documents were given to us on the observation day and further provided us with valuable information about the project. The project documents involve overall descriptions of the TP with regards to project ambitions, internal processes and the organization. In addition, we were provided documents containing information about project management and their experiences with digital tools. However, it is essential to be critical in assessing the credibility in such organizational documents, mainly due to the potential bias from the presenters (Bryman & Bell, 2015). Moreover, the project documents gathered from the TP has been evaluated according to their credibility, authenticity, meaning and representativeness for our study (Scott, 2014). In addition to these documents,

IPD reports used for guidelines in the early phases of TP were distributed to us as an additional source of information.

4.4 Data analysis

The data we have collected are based on interviews, observations, and additional documents from the case we have been studying. We decided to apply the methodology of Gioia, an interpretive method where qualitatively collected data forms the development of new theoretical concepts (Gioia, Corley & Hamilton, 2012). In addition, we followed an abductive approach. Dubois and Gadde (2002:559) explains this approach as “fruitful if the researcher’s objective is to discover new things — other variables and other relationships.” Moreover, the abductive approach focuses on building research from existing theory, and involves back-and-forth engagement with the collected data “as a source for theoretical ideas” (Bryman & Bell, 2015:27; Dubois & Gadde, 2002). Thus, as our research aims to extend established theories through identifications of new concepts, we found the approach of abduction as the most appropriate research logic for our study. The qualitative approach allowed us to categorize our data, before identifying relationships between the identified concepts (Saunders et al., 2009). In order to manage a large amount of collected data, we applied the program Nvivo.

Our decision of applying an abductive approach enabled us to be less concerned with supporting existing theories, but rather focus on extending them by discovering new concepts and patterns. Moreover, a systematic combining, like the abductive approach, refers to the identification of new concepts as well as developing new theoretical models. Two activities are common in an abductive process, namely matching and direction/redirection (Dubois & Gadde, 2002). The process of direction and redirection refers to the use of multiple data sources in which it allows us to double check our findings but also increase the potential of revealing unknown aspects (Dubois & Gadde, 2002). Moreover, these activities enabled us to redirect our research when we, through the analysis, revealed obscure aspects. In addition to the activities of directing and redirecting, we went back and forth between theory, data, and analysis to match theory with reality. Thus, we

ensured that our concepts were developed from our data and not forced into pre-existing categories derived from established literature (Glaser 1978; Dubois & Gadde, 2002).

Before we started to analyze our data, we looked into the existing literature on the concepts of IPD and risk management within the construction industry. Through this process, we identified themes and perspectives that gave us an understanding of what existing theories and studies examined and addressed. Moreover, by reviewing relevant theory, we drew out an overview of aspects related to the concepts of IPD and risk management, as well as we located opportunities of discovering new expanding concepts. After a comprehensive literature investigation, we developed three sub-questions in addition to the research question. These sub-questions were developed to direct the process of data analysis, as well as facilitate the structure of our findings. Moreover, the three sub-questions aim to facilitate the discussion that is going to answer our main research question. The next step before we started on the data analysis involved collecting data through the eight interviews.

After transcribing all interviews, we started to analyze the data. For this process, we applied the methodology of Gioia. This method enabled us to capture the informant's meanings and search for their understanding of organizational events (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Langley & Abdallah, 2011). In the first phase of the analysis, we started to read thoroughly through the transcribed interviews. Thus, we became more familiar with the data we had collected, as well as it prepared us for the coding process. Throughout this process, we also discovered that our sub-questions were, to some extent, inconsistent with our data collection. Therefore, we went back and improved our sub-questions, which the abductive approach allows us to do (Dubois & Gadde, 2002). We continued with the systematic identification of themes and concepts for our data structure. The identification of concepts was guided by the purpose of your research question (Saunders et al., 2009). In the process of organizing our data according to the method of Gioia, three elements were emphasized; first-order concepts, second-order themes, and aggregated dimensions (Gioia et al., 2012). The first-order concepts served as the first step in the development of our data structure. These

concepts are informant categories derived from representative extracts of the data collection (Gioia et al., 2012). When all first-order concepts were identified, the second step involved connecting the concepts with established theory (Gioia et al., 2012). The themes we derived from this process serve as the second-order themes in our data structure. In the final step of developing a complete data structure, we established the aggregated dimensions on the basis of our first-order concepts and second-order themes. These dimensions are the overarching concepts of our research and are to ensure consistency between the different variables derived from our data collection (Gioia et al., 2012). The complete data structure (see Figure 1) will be presented in chapter of findings.

In addition to our manual drawings of the concepts and its relations, we used Nvivo to create a mind map of the data structure (see Appendix 3). The mind map is also characterized by the Gioia method, consisting of the three elements of first-order concepts, second-order themes, and aggregated dimensions (Gioia et al., 2012). Within the structure of Gioia, we divided our concepts into two central nodes, where each sub-question were taken into account. By dividing the mind map into these sections, we aimed for a more precise structure of the analysis, as well as it ensured consistency with our main research question. The mind map promotes a detailed overview of all concepts and their relations, which enabled us to compare and contrasts all elements we had identified from the data collection. In the process of comparing and contrasting, we had great use of the mind map in terms of identifying patterns between all concepts. After coding the data from the eight interviews, we went through the additional data of our observations and project documents to make sure that all relevant concepts were identified.

4.5 Reflection on strengths and weaknesses

Essential to all qualitative studies is the consideration of scientific quality. Instead of the concepts of reliability and validity, the Gioia method is known for a set of criteria that is used to assess the quality of the research (Langley & Abdallah, 2011). Lincoln and Guba (1994) distinguish between trustworthiness and authenticity when addressing quality criterias in qualitative research.

Lincoln and Guba (1994) separate the criteria of trustworthiness into four parts; credibility, transferability, dependability, and confirmability. The criteria of credibility involves paralleling internal validity, which means that we as researchers must secure an accurate and truthful study. The quality of *credibility* has been examined through triangulation. By using three different sources of data (interviews, observations, and project documents), we were able to cross check the data material. Thus, we secured that the data were telling us what we thought the informants were telling us (Saunders et al. 2009:146). For instance, we experienced the observations as valuable in terms of assessing the data we collected from the interviews, as we also observed several of the same informants that we interviewed. Additionally, Shenton (2004) state that credibility also can be secured by “the development of an early familiarity with the culture of participating organization before the first data collection dialogues take place” (p. 65). The observation day provided us with an understanding of the project environment, which was valuable to us when selecting our sample and preparing for the interviews.

The criteria of *transferability* involves the study’s ability to be applicable to other construction projects (Shenton, 2004). Our research do not aim to achieve generalizable outcomes as it is based on one specific project with a small sample of informants. However, we emphasized the aspect of theoretical sampling in terms of the generalizability of our findings. As Eisenhardt and Graebner (2007) address, single case studies enable the opportunity of exploring a specific or unusual phenomenon. Moreover, the case is chosen for the reason that it will offer insight of the specific phenomenon, as well as it has the potential to replicate, eliminating or expanding findings concerning the phenomenon (Eisenhardt & Graebner, 2007). *Dependability* or paralleling reliability are mentioned as the third criteria to secure trustworthiness (Lincoln & Guba, 1994). This criteria involves the researchers ability to show that if the method used in this study were to be repeated in the same context and with the same participants, the outcome would be the same (Shenton, 2004). Based on our chapter of research design and data collection we aimed to explain our method in great detail. In addition, our data gathering is described on an operational level. Additionally, we have had a close collaboration with our thesis supervisor, which has guided us in the right direction for our research design and

auditing our findings. Because all our informants are Norwegian, our recordings and transcribed material were done in Norwegian. As this might pose a limitation for research adaptation, we translated all transcribed interviews to English in order to ensure that the quotes are places in the right context and reflect the correct meaning. Lastly, the criteria of *confirmability* is defined by “the qualitative investigator’s comparable concern to objectivity” (Shenton, 2004). To ensure this criteria, we developed an interview guide to extract the informants experiences and ideas without the interference of our own interpretations or views. Additionally, we aimed to secure that research bias were not affecting statements from the participants to fit certain narratives in our analysis.

In addition to the criteria of trustworthiness, authenticity is also a criteria applied when evaluating the quality of qualitative research (Lincoln & Guba, 1994). In the light of institutional change, our research aims to provide an understanding of risk management in IPD projects. Moreover, the intention of our research is to provide the industry with knowledge about how IPD benefits the management of risk. More specifically, how IPD can facilitate a more balanced risk management in construction projects. Additionally, our research emphasizes both benefits and barriers in relation to the transition from traditional delivery standards to IPD. In order to secure for fairness, we have aimed to be objective in our engagement with the different project participants who are present as research objects and informants in our study.

4.6 Ethical considerations

In the process of conducting data, it is vital to preserve the ethics of business research. Based on Diener and Crandall (1978) views, Bryman and Bell (2015) elaborate on four ethical principles that needs to be considered when conducting research. These are; risk of harm, informed consent, invasion of privacy, and deception. Risk of harm relates to our responsibility as researchers to carefully assess the possibilities of harm to the participants. Moreover, this ethical principle also relates to the importance of keeping the confidentiality of records and anonymity of the participants (Bryman & Bell, 2015).

Through Data Protection Official for Research in Norway we developed a contract of consent involving information regarding the purpose of our study, as well as the rights for our interview objects. This contract was signed by all eight interviewees, and thus, aimed to protect the participants of any harm. This further aligns with the principle of informed consent, as the participants have the right to a get detailed understanding of the research purpose and process before participating (Bryman & Bell, 2015). We informed the participants of the use of recordings, duration, and their rights in the beginning of each interview. In addition, we arranged identification numbers on each participant to anonymize the data for further use. This was to ensure that the data was completely unidentified, and that it was impossible to recognize any personal information.

The application of confidentiality and anonymity is also justified by the presentation of the data. As the principle of invasion of privacy entails participants right to withdraw or not answer specific questions (Bryman & Bell, 2015). Therefore, we treated each case individually, and avoided personal questions that might invade their privacy. In addition, the research objectives were volunteering, and their contributions were based upon their willingness to engage in our study. Lastly, the principle of deception is referring to researchers presentation of their findings as something different then what it was stated from the interview (Bryman & Bell, 2015). We ensured this principle by directly translate the interview materials to English, and thus, achieved an accurate presentation of the participant's views and statements.

CHAPTER 5 - EMPIRICAL FINDINGS

The three sub-questions presented in the discussion of literature have been guiding the process of our data analysis as well as they have been directing the structure of our empirical findings. Moreover, the sub-questions have helped us to identify relevant data so that we were able to answer our main research question: *Does the IPD model facilitate a more balanced risk management in construction projects, and if so, in what way?* As our research question concerns how the IPD model

facilitates risk management in construction, we aim to identify both benefits and barriers related to the model. The first sub-question aims to identify characteristics of practices that are associated with the management of risk in IPD, whereas the principles of IPD seem to involve contradicting elements in relation to traditional delivery models. The purpose of our second sub-question is to discover barriers related to the execution of risk management in IPD projects in which traditional norms and routines tend to inhibit the establishment of new practices in the industry. The third sub-question aims to discover elements that can have influence on the transition from traditional delivery models to IPD in the industry of construction. The three sub-questions are phrased as follows:

1. *What characterizes the practices of risk management in IPD projects?*
2. *What are the barriers for realizing the ambitions of shared risk and reward in IPD projects?*
3. *Which factors enable and constrain the transition from traditional risk management to shared risk management?*

Furthermore, our findings will be presented on the basis of our data structure, which act in accordance with the methodology of Gioia. The data structure consists of three parts; first-order concepts, second-order themes, and aggregated dimensions (see Figure 1). All first-order concepts within each second-order theme are presented as mutually exclusive, however, some of them are also complementing each other. The textual narratives are supported by specific quotations in the text as well as additional quotations for each theme are displayed in a table (see Appendix 4). In addition, the two aggregated dimensions of our data structure are forming the core of the contribution.

The first aggregated dimension is ‘Direct and indirect practices of risk: Facilitation of shared risk in IPD’. This dimension indicates the relationship between the different variables identified as direct or indirect practices of risk management in the case of TP. Three second-order themes are representing this dimension: ‘Early involvement’, ‘Collective risk management’, and ‘Trust-building practices’. In

terms of the classical principles of IPD, shared risk and reward serves as a principle with direct connection to risk management, while other principles such as early involvement tend to involve practices with an indirect effect on the management of risk. Thus, we aim to identify what characterizes the practices that facilitate risk management in IPD projects. Due to the complexity of the IPD model, we have broken down relevant elements to ensure a complete understanding of what may influence the realization of practices related to the management of risk. Moreover, we aimed to discover benefits and barriers that may have an influence on the facilitation of a more balanced risk management in IPD. On the basis of this, the findings within this dimension aim to reflect and answer the first and second sub-question of our research.

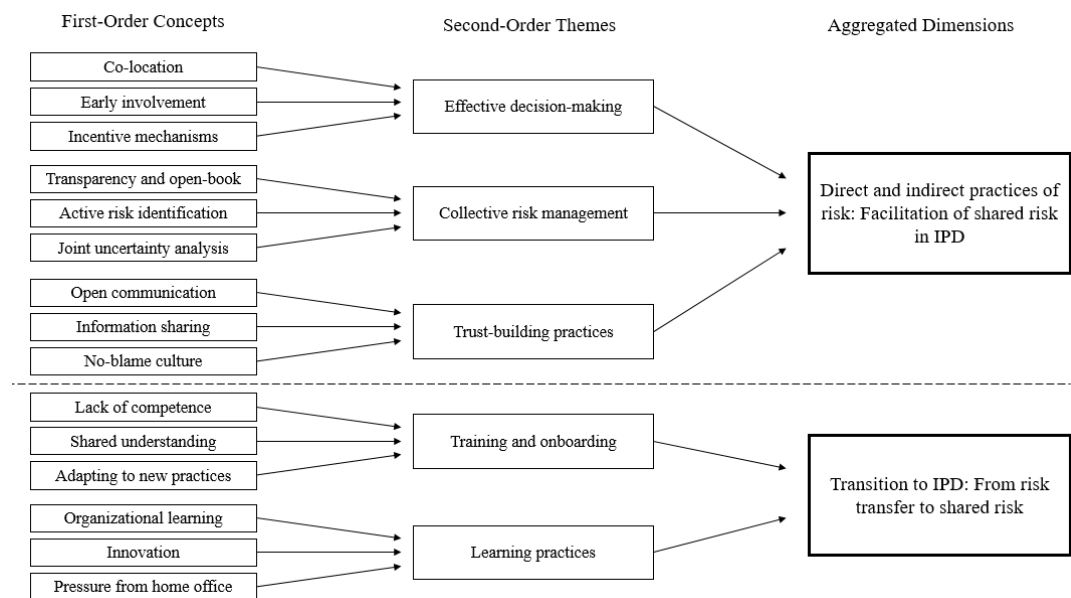


Figure 1: Data Structure

The second dimension of our data structure is ‘Transition to IPD: From risk transfer to shared risk’. Within this dimension, our conceptual findings are separated into the themes of ‘Training and onboarding’ and ‘Learning practices’. The theme of training and onboarding addresses three concepts that have been identified as limiting factors of the IPD in the TP. By limiting factors, we mean factors that seemed to inhibit the realization of IPD as the delivery model. During our research, we experienced a significant connection between new practices resulting from IPD and the project participants’ ability to adapt to these practices. Reflections considering the second sub-question are also addressed in this dimension as we

have identified barriers related to the new practices of risk management. Additionally, our third sub-question aims to discover both enabling and constraining elements related to the transition from traditional delivery models to IPD. On the basis of this, we will be able to decide on what elements that facilitate the establishment of new practices that have the potential to promote a more balanced risk management in construction.

5.1 Practices facilitating shared risk in IPD projects

5.1.1 Effective decision-making

Effective decision-making appeared as an important factor for risk management in the TP, and the assessment and management of risk seemed to be more efficient due to the concepts of ‘Co-location’, ‘Early involvement’ and ‘Incentive mechanisms’. More specifically, through teamwork, integration, and aligned interests, project risk seemed to be more effectively identified and planned for at an earlier stage in the project. While co-location and incentive mechanisms seemed to ensure close collaboration in the processes of decision-making regarding risk, early involvement seemed to facilitate an early identification of risk. The first concept we derived from our data collection was co-location. It became clear from the interviews that co-location was an important element from the early stages of the project, as an indirect practice of risk management. A shared office was established next to the construction site, facilitating a collaborative environment where the parties were better able to discuss solutions directly across the different units. Open rooms and weekly meetings seemed to enable a more efficient decision-making process in which all project parties were gathered to decide for quick clarifications. It appeared from the interviews that the co-location also had an influence on the project culture in which all parties got to know one another at a more personal level in addition to being colleagues. Other benefits such as time efficiency and less travel expenses were also addressed in relation to co-location.

The number one benefit of IPD is that you sit together with all project parties. Co-location makes it easier to solve things and address challenges that may arise. One does not have to

end up in a battle field as one often do in other delivery contracts, where things escalate at the end of the project. (TP employee 2).

In relation to the benefits of co-location, some of the informants addressed opportunities that were not taken full advantage of. For instance, it was stated that the daily management of risk could be better in terms of utilizing more of the opportunities that the co-location enables.

There have been some opportunities that we may not have utilized completely. We have been co-located and we have been an open organization. At the same time, we could probably be better in dealing with uncertainty on a daily basis. (TP employee 7).

Furthermore, challenges related to the location of the shared office were brought up. Having employees travel from Oslo to Tønsberg every day turned out to be costly and inefficient, and it was questioned whether the location of the shared office was appropriate or not. Based on this, an office in Oslo was established in addition to the original office in Tønsberg. Splitting up the project office led to a less co-localized office as first intended, whereas all designers and civil engineers moved to Oslo. In relation to the relocation of the office, it was stated that they had been experiencing less effective and value creating decision-making processes as well as an increase in the use of tools for digital communication, such as e-mail.

After splitting the offices, we experienced a significant increase in the use of e-mail. I also think that it has led to slightly less value-creating discussions, in some situations. I think this proves the importance of co-location. (TP employee 7).

Another category that emerged as a concept in our data collection was the early involvement of project participants. The TP have been fully committed to the principle of early involvement, whereas all contracting parties seemed to be brought into the project in an early phase. The early involvement seemed to facilitate a better overview of potential risk, and thus a more efficient risk management. Moreover the early involvement also seemed to be beneficial for risk identification, whereas the integration of key participants enabled more diversity in the assessment of project risk.

Due to early involvement, we have been able to test out the feasibility of several solutions earlier than in a project with a traditional contract. (TP employee 2).

It was important to have the entrepreneur involved as early as possible so they could clarify with the designers and engineers on what to deliver. We do often see that the designers and engineers go too far in terms of what they are used to, instead of asking the entrepreneur what they actually need. (TP employee 5).

In addition to the benefits addressed, there were also some challenges related to the principle of early involvement. It appeared that the intentions of having participants involved at an earlier stage lacked an accurate outlining. Key participants from all parties were involved at an early stage but without any clear roles or responsibilities. The absence of roles and responsibilities seemed to be challenging, whereas a high degree of responsibility disclaim were addressed. Moreover, the challenges seemed to be related to the flat organizational structure in the early project phase. Due to a flat organizational structure without clear roles and responsibilities, decisions tended to be passed on to higher levels in the project organization. This challenged the aim of a more efficient decision-making process in the lower organizational levels. In response, the project established an interface management plan to ensure clear responsibilities between the parties.

Our organization is characterized with a flat structure, and therefore, more people need to be included in order to make decisions. This made it sometimes difficult to get good decision-making processes. It boils down to the fact that you need to structure the organization with clear boundaries on who is making what decisions on what level. We wanted decisions to be made at the right level, because then they are followed through. (TP employee 6).

The interface is always a risk, and managing the interface - who is responsible for the different things, is really important. (...) We have put extra emphasis on the interfaces in order to have control over this early, and then prevent surprises at a later stage. So we made an interface management plan to make sure that we could better manage the interface. (TP employee 4).

The last concept within the theme of effective decision making is the incentive mechanisms. All of the informants seemed to agree on the benefits of the incentives facilitated by the IPD model. Teamwork, best-for-project mindset, and mutual

positive interests were terms brought up when talking about the economic model of IPD. Moreover, the incentive mechanisms seemed to have certain characteristics which directly affected the management of risk in the project. For instance, it appeared that the project participants were focusing on solving issues together as a team. Thus, when facing challenges and important decisions that needed to be made, the project parties work together in order to develop a best-for-project solution rather than disclaiming responsibility through risk transfer.

Tings do not stop because we are working towards a common goal, and the incentives is all about solving problems or challenges to the best for the project. We are teaming up with the ones that knows how to deal with the specific challenges, and tries to solve the problems for the project's best. (TP employee 1).

In addition to the associated benefits related to risk management, it appeared that the incentive mechanisms facilitate a best-for-project mindset in the project culture. Reflections about aligned interests were brought up in several of the interviews and it was further stated that such a mindset facilitated a more efficient decision-making processes between the contracting parties. All parties seemed to be working towards a common goal, which facilitated an effective distribution of project risk between the contracting parties. Additionally, risk were also emphasized in relation to the client in terms of quality requirements and value for the final users.

There is a distribution key on remaining profits. If you do not know how it goes with the other parties of the project, you do not know how it goes with yourself. (TP employee 2).

We are all in the same boat, and we have to think of the totality. Here, we look at the overall consequences of every risk, and how it can affect the different parties, including the final users – what has this to say for the hospital? We need to think about the functionalities of what we deliver. (TP employee 4).

In sum, co-location, early involvement, and incentive mechanisms are all individual concepts derived from the data collection. They have all in common that they are either practices, or leads to practices, that facilitate an effective decision-making process in the TP. In terms of co-location, the contracting parties were better able to discuss solutions across units, and also engage in more informal interactions, which served to be positive for the project culture. Additionally, the principle of

early involvement seemed to benefit the decision-making processes in terms of having all parties involved at an early stage. However, there have been some challenges related to the intentions of this principle, whereas too many people seemed to be involved in the project at an early stage without any clear roles or responsibilities. The incentive mechanisms appeared as a concept in relation to the alignment of interests and the best-for-project mindset stated by the informants. These mechanisms served to be beneficial in terms of the establishment of a collaborative environment for the decision-making processes. On the basis of this, the facilitation of a more effective decision-making process seems to benefit the management of risk in terms of addressing risk more efficiently.

5.1.2 Collective risk management

Within the theme of collective risk management, three concepts are representing different practices related to the management of risk in the TP. The concepts of ‘Transparency and open-book’, ‘Active risk identification’, and ‘Joint risk analysis’ involve practices that are facilitating a collective risk management. The concept of transparency and open-book seemed to be related to the establishment of a collaborative environment, while practices of active risk identification and joint risk analysis proved to be specific procedures of risk management in the project. The principles of transparency and open-book appeared as two recurring elements in our data collection. Some informants was referring to transparency mainly as a contractual formality, while others emphasized the cultural aspect of it. Both contractual and behavioral practices were addressed as results of openness and transparency. In terms of open-book being a contractual formality, practices related to the management of risk appeared in several aspects. For instance, as the principle of open-book tends to facilitate closer collaboration and mutual trust, new common practices of risk management seemed to emerge throughout the project. The principle of open-book proved to have positive effects on the collaborative environment. Moreover, as openness served to promote closer collaboration, practices of risk management also tend to become more collaborative. Thus, it appeared from our research that the open and transparent environment facilitated practices for common risk management.

Along the way, one has gained an increased awareness of what transparency and open book mean - that all data should be available for everyone. Therefore, the internal uncertainty analysis in Skanska was set aside. Now, all risk analysis are done jointly. (TP employee 3).

The fact that we have achieved openness between all parties gives effect to risk management. One feel confident with bringing up uncertainties that not necessarily is a risk, but can become one if we ignore it. Traditionally, we would watch our own issues individually, until the risk became evident for all parties. I do not want to say that this has worked well enough, but at least it has been facilitated. (TP employee 4).

In addition, the aspect of trust was often brought up in relation to transparency. It was stated that their experiences with transparency in the TP often was coherent with the level of trust between the parties. Moreover, it took time to establish trust between the contracting parties and the level of transparency seemed to be challenged in some situations.

Transparency comes as one trusts one another. One have to prove that one is trustworthy, and you have to show it in the everyday life. For example, if someone face a challenge, then it is a common problem and we have to solve it together. (TP employee 3).

Creating trust and transparency between everyone involved in the construction project, it is absolutely crucial for success and we could probably have done a better job and mobilized it in a better way. (TP employee 8).

Although changes and adjustments of routines and processes in relation to risk were made due to the principle of open-book, some parties also experienced challenges related to the requirement of transparency. In the case of TP, challenges related to different interpretations of what lies in the principle of openness was stated. Even though the policy of open-book was perceived as a contractual formality within the collaboration, challenges seemed to emerge from an inconsistency in the levels of openness. Thus, it appeared that there were different levels of the requirement for openness, which seemed to make the formality of the open-book policy more complex in reality.

The process of understanding the requirement for openness and the requirement for collaboration has taken a long time, and we are still not there. (TP employee 2).

Another emerging concept within in the theme of collective risk management is active risk identification. This concept was identified due to the development of new procedures and routines for risk identification in the TP. Several procedures and routines were recognized as direct practices of risk management, however, there was different interpretations of their use and effects. Some of the informants were also questioning whether the opportunities of active risk identification were fully taken advantage of in terms of daily risk management.

We could be better in the daily monitoring of risk, and make issues visual as soon as we discover them. There are lots of different tools out there. (TP employee 7).

An issue management system appeared as one of the new practices related to risk identification in the TP. The system was established to get a clear overview over issues identified in the project, and enabled cross-team interaction between the different parties and facilitated the management of risk in terms of being transparent and open. There seemed to be consensus when talking about the benefits of the issue management system. Yet, several of the informants addressed that due to limited implementation, many of the project participants were not familiar with how to apply the system, or they did not see the value of its use.

We have developed an issue management system, which is a processing module where issues can be registered. It is an open and transparent tool where everyone can see what others are doing. I do not know of anyone that have tried to hide any risk. The focus is more about making risk visible for everyone, as fast as possible. (TP employee 4).

The issue database is beneficial in terms of getting an overview, for those that are using the system, notably. There are participants who think that it is too much work with this database, which is unfortunate. This is a system that is all about risk management – how you describe the issue and its consequences. However, when only two thirds in the project uses it, you will get some surprises along the way. (TP employee 5).

Furthermore, several of the informants described the system as beneficial in terms of being an open platform where everyone could get an overview over identified risk in the project. However, there seemed to be consensus about the challenges of its use in which the different organizations were operating with individual

procedures for risk management in the early project phase. Thus, the individual routines of assessing project risk seemed to be challenging the aim of a collective risk management in the project. Moreover, the implementation of the issue database was limited, and it was further stated that this was grounding in lack of capacity for maintaining the system as well as establishing common routines for using it.

We used to apply own routines for reporting risk in terms of their consequence and probability. (...) we have not been able to develop a good system for reporting risk across the contracting parties. I believe it is because of the different traditions, as for instance, the entrepreneur has its own rigid systems for risk management in which they report internally. (TP employee 2).

When I started on this project, I was missing a risk register. Eventually, we tried to develop a system for it but it did not turned out as it was supposed to. This was because we were lacking the capacity to establish good routines in using it. (TP employee 2).

In addition to practices for risk identification, procedures for more thorough risk analyses were also performed in the TP. These procedures serve as categories for the final concept within the theme of collective risk management, namely joint risk analysis. One main characteristic of these procedures was that they were performed jointly, involving all parties of the project. Similar to practices of active risk identification, we categorized the joint risk analysis as direct practices due to its explicit connection to the general procedures of risk management in the project. Even though procedures of risk analysis are common as internal practices for all organizations of any construction project, the joint analysis within the TP were developed in order to adapt to the principle of shared risk and reward.

In the beginning, we worked internally with risk, and we had our own routines for performing the uncertainty analysis. Eventually, we moved away from this, and started to do the analyses all parties together. I think this is an example of how we matured during the project. (TP employee 2).

We are dealing with uncertainties in an open forum where all parties are involved. Traditionally, we would be doing this internally and not include any of the other contractors in our calculations. (TP employee 6).

Some of the employees addressed several benefits of performing these joint risk analysis, and compared them to traditional procedures of risk management. It appeared from the informants that the parties did relate to risk differently compared to previous construction projects. We were told that the different organizations used to observe and identify uncertainties individually, while in the TP all parties were discovering risk together, eventually. Several of the informants stated that this practice contributed to an earlier identification of potential risk, whereas they also were able to assess the totality of them, and thus tolerate a lower risk provision compared to what they were used to from previous projects. It was further stated that the joint risk analysis were performed in relation to the budget revisions, which was two times a year. The number of joint risk analysis was stated as higher compared to their prior experiences from traditional projects. The analysis were described as quite similar to the analysis performed in traditional delivery models, however some procedures were adjusted in order to become more appropriate in relation to the calculations of shared profit.

We can tolerate a lower risk provision because we have a much better overview of the totality. (TP employee 4).

When it comes to the uncertainty analysis, we have been adapting them to provide good forecasts for profit and earnings. We do not do this adjustment in traditional contracts, as we look isolated on our own organization and do all calculations internally. (TP employee 2).

The three aforementioned concepts are based on our findings from the data collection, and appeared in relation to conversations about procedures and practices of risk management applied in the TP. We have characterized all three concepts as direct practices of risk management, as they all contribute to a collective way of dealing with project risk. It appeared that the project parties were better at identifying potential risk, and thus more able to take action at an earlier stage. Moreover, transparency proved to be a foundational concept for the collective risk management, as it facilitates an open management of risk across the contracting parties. In terms of active risk identification, the TP seemed to have accomplished a common system that enables all participants to share information regarding project risk. However, it appeared that the system was not thoroughly implemented

and that some of the project participants did not see the value of its use. In relation to the joint uncertainty analysis. The project parties were adjusting established routines and procedures to make them fit new standards for risk management, whereas one of the most significant changes seemed to be the collective calculations and analysis of risk in the project organization.

5.1.3 Trust-building practices

Another finding that appeared from our interviews is related to the establishment of trust in the project, and we identified three factors that seemed to be vital in relation to the management of risk. The concepts of ‘Open communication’, ‘Information sharing’, and ‘No-blame culture’ are the basis of the third theme. The aspect of trust has already been reflected in the concept of transparency and open-book. However, it appeared from the interviews that there were other practices that explicitly facilitated the establishment of trust between the parties. Thus, these practices were further developed into concepts in which they characterizes the establishment of trust within the TP. In the process of identifying practices of risk management, open communication proved to be a recurring concept that indirectly affected the management of risk. It emerged from our data collection that there were certain procedures promoting an open communication in the TP. The ICE meetings were brought up as one practice in relation to open communication, whereas all project parties were gathered to discuss specific issues present in the project. Although the ICE meetings proved to facilitate an open communication across the parties, we were told that the meetings became more infrequent during the project, whereas people seemed to have different perceptions of the meeting’s efficiency.

In the ICE meetings, all project parties are brought together in Big Room where we are working together retrieving all necessary information about a certain topic or issue. We are all together in making the final decision regarding the issue. All the right people are represented in these meetings – people from the hospital, the entrepreneur, and the designers and engineers. (TP employee 5).

We saw that the meetings were taking a lot of time and that relevant information often was discussed in prior meetings. It does not happen that much in the project from week to week, that involves all parties. (TP employee 6).

In relation to risk management, open communication was also emphasized in terms of the assessment and planning of project risk. One stated that the assessment of potential risk was more efficient due to a close communication between the parties. However, it also appeared that there could have been done more related to building up a project culture that facilitated an even better communication between the contracting parties.

Project uncertainties will always be evident in a construction project but through open communication, we can plan for them more easily. (TP employee 6).

What I see is that it could have been done much more on the culture building side in order to get better communication and flow across the various companies. (TP employee 2).

Closely related to open communication is the concept of information sharing. In terms of facilitating the establishment of trust, there seemed to be several practices of information sharing performed in the project. It appeared from the interviews that information sharing was a direct practice of risk management in which practices were mainly described in relation to the use of technical systems and meetings for sharing information about risk. For instance, open BIM was mentioned as a precondition for the project in which it enabled information sharing across all project participants. More specifically, open BIM was to ensure transparency in design, progression, and costs.

We have an own sharepoint solution where all project participants have access to all kinds of information. (TP employee 2).

BIM is a precondition for information sharing as it makes information available to all parties in the project. (TP employee 5).

In addition, it appears from some of our informants that there have been some changes in practices related to information sharing during the project. These changes also relates to the previous concept of open communication, where the practice of ICE meetings was presented. Practices related to the ICE meetings seemed to be adjusted based on experiences acquired during the project. Thus, it

seemed that some of the new practices of information sharing went from being fully implemented in the early phase, to become less emphasized during the project.

We went from having meetings once a week to have it too rarely, so we should have ended up with something in between. However, these changes was mainly based on having information spread out to all parties, where we experienced that it was not necessary to have meetings every week because people were already updated. (...) People were frustrated because they felt that the meetings stole too much time, and that it disabled them to do the actual job they were supposed to do. (TP employee 6).

The last concept within the theme of trust-building practices is no-blame culture. It appeared from several of the informants that the project culture was characterized as a community in many ways, and that the collaborative environment were facilitating the management of project risk. Some of the informants seemed to agree upon that challenges were solved together rather than blaming each other, and that the parties were focusing on making solutions that were to the best for the project. Moreover, it was stated that the parties experienced a project culture without the typical tactics as often appear in traditional projects where risk is managed individually and most often transferred to reduce own risk. Additionally, some informants were questioning the accomplishment of a culture based on trust in which too much trust could reduce the focus on formal routines of risk management.

The advantage is that you can create a positive climate where everyone work towards common goals, and you don't blame each other anymore. (TP employee 1).

In this project, we focus on making solutions as an entity. We use our energy to figure out how to solve problems rather than blaming each other - more like a community compared to what you are in a traditional project. This is a great benefit. (TP employee 4).

The aspect of trust can in some way explain our attitude towards uncertainty management as we could have had more focus on uncertainty. (...) maybe it has been a little too collegial, where we have had a mindset of being together in everything, which has resulted in less formal routines when it comes to risk. (TP employee 5).

We established the theme of trust-building practices as a common denominator for the three concepts presented above. Open communication emerged as a trust-building practice in terms facilitating a culture where people saw the value of being

honest and collaborative. For instance, the arranged ICE meetings were contributing to continuous communication across the different units. Thus, these meetings served as an arena where people could share information and knowledge. The concept of information sharing was established on the basis of openness, whereas trust can be seen as a result of people's willingness to share information and be vulnerable. Lastly, the concept of no-blame culture is viewed as a trust-building factor in terms of facilitating a collaborative project culture. It was evident in the interviews that creating a community based on trust was both necessary and wanted in the TP. Through practices such as ICE meetings and common systems for risk management, the project tended to be better equipped for sharing and solving problems as a community. However, it was stated that a high level of trust between the contracting parties could potentially lead to less formal practices of risk management in which the parties become too comfortable in solving things as a community.

5.2 The establishment of new practices for risk management in the TP

5.2.1 Training and onboarding

In the process of establishing the second-order theme of training and onboarding, three concepts were first developed as relevant topics for the realization of IPD as a new delivery model in the industry. The concepts of this theme are 'Lack of competence', 'Shared understanding', and 'Adapting to new practices'. The first concept occurred when talking about IPD as a new delivery model within the industry. It appeared from our interviews that the methodology behind IPD were perceived as challenging due to lack of competence. It was stated by some of the informants that the lack of competence was a negative consequence of not having any IPD training program for project participants. Lack of competence was further addressed in the light of a deficient onboarding of both newcomers and the already participating workforce. It was stated that joining a new and different delivery model without any form for introduction was perceived as difficult. In addition, several practices of IPD seemed to be fading as participants lacked competence to

carry them out. We were told that an onboarding program were called for but not implemented due to time and cost.

We have made some mistakes that we could avoided if we had trained our organization on the form we are working on - using the methodology we have facilitated in the most effective way. But, as a pilot project, we did not have enough expertise to push this far enough out in the organization. (TP employee 5).

We are missing a proper onboarding process. There has been many people entering the project without any knowledge about what this project is all about (...). This is problematic when you have to think in a completely different way then what you are used to. (TP employee 4).

Based on the aforementioned statements, we created a concept complementing the lack of competence since the informants also addressed the need for a shared understanding across the project organization. There seemed to be consensus in knowing the importance of having a shared understanding of the IPD model. Thus, the concept of shared understanding emerged as a relevant concept in relation to the theme of training and onboarding. It appeared from the interviews that the project lacked a shared understanding of IPD in which the contract structure and its mechanisms tended to be quite different from the participants' previous experiences. It was also stated that the understanding of IPD was more absent the further out in the project organization you came.

We have experienced that not everyone really understands how the contract is built and the mechanisms within it (...). In an IPD setting, you have to look at the project as a whole. You cannot only look at your own factors and what strikes you, as an individual or company. You have to look at the actual contribution to the project as a whole. (TP employee 4).

The longer out in the organization you come, the harder it is to maintain a full understanding of all elements of the IPD model. (TP employee 5).

According to some of the informants, there seemed to be similar tendencies in the higher levels of the project organization. It was stated that they had experienced that people were thinking more traditionally in some situations, both at project level

and organizational level. As there is a significant focus on quality due to the involvement of the project owner in IPD, the traditional focus on costs may have challenged the understanding of IPD to some extent. Additionally, it appeared from our informants that adapting to the principles of IPD was difficult due to old routines and procedures embedded in the individual organizations. Based on this, we developed the concept of adapting to new practices. In relation to the management of risk in the TP, several of the informants stated that they had experienced project participants going back to traditional routines when facing certain challenges occurring in the project. It was further stated that without a solid onboarding process, new procedures and practices tended to be forgotten, or ignored. Accordingly, lack of competence and a limited understanding of IPD seemed to be factors that challenged the adaption to new practices, whereas project participants often turned into their old working routines. Moreover, it was stated that because of IPD being a new and unknown delivery model, the different management teams, both within the project organization and in the individual organizations outside the project organization need maturation in order to make total advantage of IPD in practice.

(...) There are people within this organization who do not know what this model entails in practice. We have experienced that some think more traditionally in difficult situations. This also applies to people in leading positions. (TP employee 1).

When something becomes difficult, old practices and routines - your embedded solution strategy - comes into what you have experienced as most efficient in the past. These routines often fit with another contract form, and are therefore not in line with the principles of this project. (TP employee 5).

It is also a new delivery contract model so it is demanding in many ways because it is new and unknown, and we could certainly need some maturation, not only those who are in the project but also managers who are in the project, and the management in Skanska and CURA. (TP employee 8).

What we experienced from our interviews was that proper training and a structured onboarding process was absent in the TP. As a new delivery model, the IPD requires a different approach in terms of becoming more collaborative and transparent, thus several of the related principles of IPD seemed to be challenging to perform without

relevant competence. Additionally, shared understanding appeared to be a coincidental element of the lack of competence. By lacking necessary competence to perform practices in line with the principles of IPD, a shared understanding of the model also seemed to be weakened. Our findings exemplify how knowledge seemed to be received by the project participants but not completely processed through their actions. Thus, learning at project level seemed to be limited. On the basis of this, there seemed to be evident that an adequate onboarding process could have a positive effect on the establishment of new practices for risk management in which people will potentially increase their ability to adapt to the new practices. Moreover, new practices that aligned with the principle of shared risk and reward seemed to be surpassed by old routines for managing risk. Accordingly, adapting to new practices of risk management seemed to be difficult when traditional routines are highly embedded in the individual organizations. These reflections leads us over to the final theme of our data structure, namely learning practices.

5.2.2 Learning practices

The theme of learning practices is developed on the basis of the elementary concepts of ‘Organizational learning’, ‘Innovation’, and ‘Pressure from home office’. The first concept within the theme of learning practices is organizational learning. In terms of the TP, we found several elements in the data collection that was related to this concept. First, it appeared from the interviews that working with a new delivery model was different, yet positive in many ways.

My experience is that we are more interested in finding solutions. (...) you want people to work with finding good solutions instead of only looking at the problems. I think this has been well managed in this project, although we still have our discussions. (TP employee 7).

I hope the organizations involved are good at bringing their experiences forward, because now they have employees who are better at interacting and collaborating compared to what they had before this project. (TP employee 5).

These two statements were brought up in relation to what each company could extract and learn from the TP as an individual organization. A majority of the informants reflected on a high degree of individual learning acquired from this project as they got better in collaborating across the different units. However, it appeared the industry needs more representatives who are willing to adapt to the changes associated with the IPD model. In addition, some of the informants also stated an absence in procedures for knowledge storage and transfer within the project. It was further stated that there should have been more focus on formalizing experiences and lessons learned from the project, whereas this could increase the overall industry performance.

I don't think we have been good enough to formalize our experiences to further form a structure we can use in the next project we are involved in. We could have been much better at this, I think. (TP employee 5).

Innovation emerged as a second concept from our data collection. It relates to the theme of learning practices in terms of examine new tools and practices for risk management. As the IPD model is known for facilitating innovation, the TP seemed to have high ambitions of performing innovation. However, it appeared that the informants have different perceptions of the role of innovation within the project. For some, the high ambitions seemed to be overwhelming in which people tended to have more than enough with the new delivery model itself. In contrast, it appeared that some had even higher expectations to innovation than what was realized in the project so far. In addition, there was stated that some informants thought that the project was devoting too much resources on innovating. Some informants also reflected on whether the high ambitions of innovating affected other important elements of the project, such as risk management. More specifically, it was stated that because of the capacity that was spent on developing new systems, other things seemed to be under prioritized.

There has been different opinions about the amount of time we have been spending on these innovations and developments, because we have spent quite a lot of time on it. (TP employee 1).

One element is that an IPD contract facilitates innovation, and if you do not have that in your mind all the time - how can we do this in a best possible way? - It is easier to make people go back to their old ways of thinking. (TP employee 4).

In addition to the issue management system, the Virtual Desktop Infrastructure (VDI) was addressed as one of the solutions developed in the project. The VDI is connecting all participants to a common digital platform, and thus, enables continuous updates of the project's technical systems such as BIM files and systems for risk management. Moreover, the VDI platform appeared to be a critical tool for cross collaboration within the TP.

We were all working in different software, but these were merged into one VDI platform and we were able to work together in a shared environment. This was a new way of working and a new technology, so it occurred some challenges along the way but a lot of work has been done here, and it ended up being much better than we first thought. (TP employee 1).

Pressure from home office served as another recurring concept in our data collection. The three main organizations involved in the project tended to have different reflections about this, but some of the informants addressed the pressure from the home office as significant and that it often was related to financial performance.

(..) It is challenging when the project participants have to explain to their home office what they are doing in the project and what kind of model they are working with. I think that the people who are responsible for following up the project from different home offices have a kind of bonus agreements, so they are dependent on the projects performance to be most profitable. (TP employee 5).

Pressure from home office was further reflected on in relation to the concept of shared understanding of IPD. It appeared from the interviews that even though some of the project participants seemed to share a partial understanding of the IPD model and the project scope, the home office still lacked adequate understanding of what an IPD model requires from the project participants.

The pressure has increased from home office, and I do not think the companies or the people working in the project team have the support they need from their home office. I do not

think the home office has a full understanding of the IPD and its mechanisms. You can see there is a pressure and how it applies to both advisors, advisor side and the contractor side. (TP employee 5).

In addition to the financial pressure from home office, some of the informants also addressed a task related pressure. This aspect was brought up when talking about the co-location. They stated that being located at their home office instead of the co-located office, their attention and competence tends to be required in other situations not related to the project.

(...) when people come home to their respective offices, they are often dragged into internal processes at the office. Because of this, it also takes away a lot of time that they should be using at the interest of the project. (TP employee 6).

It appears from the above findings that several of the informants believe that a change in the industry is necessary, and that both individual and organizational learning is crucial for adapting to new practices. The concept of organizational learning refers to the establishment of new practices in which the IPD model requires new ways of working. It appeared from the interviews that the project parties have engaged in new practices related to how to manage risk. For instance, there was developed shared systems that aimed to account for risk in line with the principle of shared risk and reward. Furthermore, for IPD to be established as a delivery model in the industry, the industry needs to become better at it. This also implies to the concept of innovation, as future projects can extract from innovations developed in previous projects, and thus be able to perform better practices for risk management. However, the project seemed to be lacking structures on how to acquire, store, and transfer knowledge. Moreover, a high pressure from the different parent organizations and home offices tended to have a negative impact on the learning processes in the project in which some of the organizations did not seem to have appropriate support from their home offices. It appeared that some of the home offices seemed to have limited understanding of the project and the IPD model, which can have affected some of the project participants towards a more traditional attitude.

CHAPTER 6 - DISCUSSION

In this chapter, we will draw lines between our empirical findings and the literature. The first two sections will provide the opportunity to reflect and answer our main research question: *Does the IPD model facilitate a more balanced risk management in construction projects, and if so, in what way?* In the last two sections, we will go through both theoretical and practical implications of this research in order to explore if our findings can contribute to the understanding of risk management in IPD.

6.1 Facilitation of shared risk in IPD

We identified three themes for practices that facilitated shared risk in the project. These are effective decision-making, collective risk management, and trust-building practices. Within each of the three themes, we discovered different elements that proved to have an effect on the management of risk in the project. Moreover, our findings show that several of the IPD principles tend to have a significant role in facilitating practices of shared risk. In the literature, AIA (2014) address the principle of early involvement of project participants as one of the key principles of IPD, whereas people, systems, business structures, and practices are integrated into a collaborative process. In relation to the TP, the principle of early involvement aimed to gather key participants and facilitate an overall understanding of the project context and potential project risk. Several benefits were addressed in relation to the management of risk in the project. It appeared that the early involvement of the entrepreneur was especially valuable in which it enabled testing of the feasibility of several solutions in an early phase. In addition, the principle enabled the project parties to make relevant clarifications across units during the planning phase. Accordingly, the principle of early involvement seemed to facilitate valuable practices of risk identification and assessment, whereas the actors were better able to see the totality of the project, and could therefore tolerate a lower risk provision compared to traditional projects. Similar tendencies are also evident in

the literature, where the intention of involving key participants is to achieve a more efficient decision-making process. The literature address different factors such as diversity in expertise (AIA, 2014), shared knowledge, and equal participation (Menches & Chen, 2012) as factors facilitating effective decision-making.

Furthermore, AIA (2007) describe the importance of identifying clear but flexible roles and responsibilities in the early integration of the project team, and that there is a need for clear boundaries of roles and responsibilities when establishing the project organization. Because of a considerable focus on early involvement in the TP, an overload of employees were participating in the beginning of the project. Accordingly, a waste of resources was experienced due to the unclear roles and responsibilities in the early project organization, and thus a sense of responsibility disclaim was present. This seemed to be affecting the intentions of the early involvement, whereas the ambitions of a more efficient decision-making process were challenged in which decisions were passed to the higher levels of the project organization instead of being solved in their current levels. Thus, even though the principle of early involvement seemed to facilitate shared risk in IPD, the results also show that the project organization needs to consider who and why to involve project participants at an early stage.

Zhang and Li (2014) argue that the compensation structure of the IPD model can be seen in relation to the participant's perception of the incentive mechanisms and the assessment of risk in the early stages of a project. The compensation model of IPD emphasizes project optimization through a best-for-project mindset, whereas the incentive mechanisms align the parties' interests of both project cost and profit (AIA, 2014). Accordingly, Zhang and Lie (2014) argue that cooperation is crucial for the contracting parties to maximize individual and project return. In the TP, it became clear that the incentive mechanisms of IPD were positively affecting the collaborative environment in which the project culture seemed to be focusing on achieving goals collectively. In the literature, Ghassemi and Becerik-Gerber (2011) address the alignment of goals and behavior as beneficial for the allocation of project risk in IPD. This was also evident in the TP, whereas the incentive mechanisms seemed to facilitate a collaborative environment and a best-for-project mindset in favor of the management of shared risk. Additionally, co-location

appeared as another facilitating factor for shared risk in the project, whereas team integration and collaboration appeared as two main benefits. The co-location seemed to enable an efficient decision-making process in which the project participants were to discuss issues regarding risk directly with each other across the different units. Thus, project risk seemed to be solved consecutively as they were identified. The co-location also seemed to contribute to a better project culture in which people got to know each other at a more personal level. Similar benefits in relation to close collaboration and risk management are also evident in established literature. Walker and Lloyd-Walker (2016) address that close and efficient collaboration aims to improve risk management due to the creation of dynamic relationships and capabilities between the actors. Additionally, Cohen (2010) describe how close collaboration provides the ability to make decisions at the right time and place.

In addition to the incentive mechanisms and co-location, the principle of transparency also seemed to facilitate a closer collaboration between the project parties. Moreover, it appeared that the collaborative environment facilitated practices for shared risk, whereas transparency seemed to increase the parties' confidence to bring up project risk as a shared responsibility. Additionally, the project participants seemed to understand the value of transparency when dealing with shared risk. In the literature, Loosemore and Richard (2015) address the development of effective solutions for risk management in relation to transparency and integration. They state that the aspects of openness and integration enable an earlier identification and assessment of risk in which new solutions for managing risk are easier to test. This is also evident in the results of the TP, whereas the policy of open-book seemed to have positive effects on practices related to shared risk management. Tendencies showed that when the environment became more collaborative, practices for managing risk also became more collaborative. Accordingly, practices of shared risk management tend to mature during the project as the understanding of transparency increased. Moreover, as the integration of all project parties seemed to contribute to an earlier identification of project risk, all parties were able to share and discuss risk together in an open and transparent forum. These results are in accordance with AIA's (2014) definition of IPD, whereas the integration of people, systems, and practices together with transparency

facilitate a collaborative process where waste is reduced and efficiency is optimized.

Furthermore, the principle of shared risk and reward aims to motivate collaboration as a compensation model (Zhang & Lie, 2014). The principle refers to a collective management of risk, where project risk is shared between the contracting parties (AIA, 2007). Moreover, sharing the responsibility for risk can also facilitate new ideas of risk identification and how to deal with project risk (El-Adaway et al., 2017). In the TP, collaborative practices of risk management were gradually introduced throughout the project. In line with the principle of shared risk and reward, an issue management system was developed to facilitate transparency and openness across the project parties. The aim of this system was to make project risk visible for all the contracting parties as fast as possible. In addition to the issue management system, the standardized uncertainty analysis were adjusted in order to calculate forecasts on shared profits. Thus, in line with the literature, the results show the importance of having common systems for managing risk in order to optimize the efficiency of shared risk management in the project.

Kent and Becerik-Gerber (2010), among others, emphasize transparency and open communication in relation to information sharing, arguing that these are factors promoting information to be shared across project participants. However, protective behavior can impede an open information sharing between the parties if their relationship is defined by risk allocation (Menches & Chen, 2012). The aspect of trust can be discussed in relation to such protective behavior in which the establishment of trust is stated as one of the most important principles of achieving the collaboration necessary for integrated projects (Briscoe & Dainty, 2005; Ghassemi & Becerik-Gerber, 2011). In the TP, different trust-building practices emerged as facilitating factors of a collaborative project culture where project risk seemed to be shared openly between the parties. The results show several trust-building practices in relation to shared risk management. For instance, open communication and information sharing proved to increase the parties' willingness to take on risk in order to engage in actions of trust. Thus, shared risk was facilitated in terms of the establishment of trust between the parties across the different organizations. Moreover, it appeared that the assessment of risk was more efficient

due to the close communication and openness between the project parties. In the literature, Cohen (2010) states that trust is a result of an open, transparent and collaborative environment. This was also evident in the results from the TP. The collaborative environment served to address a no-blame culture where the parties tended to focus on solving challenges together rather than claiming who is responsible. Moreover, information sharing appeared as a trust-building factor in which people seemed to understand the value of being open and honest with each other when dealing with project risk. Information was distributed both manually in meetings and technologically through systems. The technological systems and tools made information available for all project parties, while the ICE meetings aimed to ensure that relevant information was discussed between all parties. These practices align with relevant literature in which information sharing is described as practices that aim to ensure coordination across project participants.

6.2 From risk transfer to shared risk

In addition to the elements that appeared as facilitating factors of shared risk in the project, we identified some factors that seemed to both enable and constrain the transition from traditional risk management to shared risk management. In the above discussion, different practices that proved to facilitate shared risk in the project were identified, however, the results show some challenges related to the establishment of the new practices. While project parties in traditional projects have been identifying and assessing risk individually, the IPD model facilitates a shared management of project risk. Thus, the project parties need to adjust to a more collaborative approach when managing project risk in IPD (Zhang & Lie, 2014; Walker & Lloyd-Walker, 2016). This shift towards more collaborative practices for risk management can be seen in relation to a change in the existing practices. In the literature, Scott (2001) argues that the emergence of new practices can be associated with deinstitutionalism, also known as institutional change. The process of deinstitutionalism involves weakening or disappearance of established practices and beliefs, and is often due to the appearance of new practices and norms (Scott, 2001).

The results from this research show that there are certain barriers related to a change in the practices from traditional risk management to shared risk management. In the literature, Ghassemi and Becerik-Gerber (2011) describe different barriers related to the implementation of IPD. When addressing cultural barriers, they argue that the embeddedness of routines within traditional delivery models are challenging the implementation of IPD (Ghassemi & Becerik-Gerber, 2011). In relation to institutional theory, motives for organizational behavior can be seen in relation to stability. DiMaggio and Powell (1983) define stability as the organization's resistance to change in which the organization is restricted by conformity of the institutional environment. In other words, the established routines and practices embedded in the organization tend to inhibit the development of new routines and delivery models in construction (Hartmann & Bresnen, 2011). Similar tendencies is evident in the TP, whereas the embeddedness of a traditional mindset regarding risk seemed to inhibit the establishment of the new practices. New practices introduced in the earlier phases tended to be forgotten or ignored in several situations during the execution of the project, and the new practices seemed to be surpassed by old routines and procedures in challenging situations. The results indicate that this was due to lack of relevant competence and a limited understanding of the IPD model within the workforce. Accordingly, the lack of expertise seemed to challenge the parties' ability to encourage people far enough out in the project organization. Thus, practices introduced in the beginning of the project were gradually abolished, because people did not have the competence to carry them out.

Furthermore, the lack of competence also seemed to affect the establishment of a shared understanding of the IPD model. The project organization was characterized by different levels of understanding, and it appeared that the understanding of IPD tend to be more limited the further out in the project organization you came. In relation to the risk management in the TP, the different levels of understanding in the project organization also seemed to challenge the use of new solutions and practices when managing risk. It appeared that new procedures of risk management was not only affected by the individual's low competence, also the limited shared understanding seemed to constrain the actors ability to perform the new procedures. Thus, lack of competence and a limited understanding across the project

organization seemed to be two factors challenging the adaptation to new practices in the TP. In the literature, Kim (1998) argues that lack of knowledge in an organization can result in slow adaptation to new routines. Additionally, Bresnen et al. (2005) emphasize slow adaptation in relation to a resistance to change. As the project-based environment often is characterized by highly embedded routines and practices, new practices are often affected by slow adaptation. Thus, a change often involves replacing old cultural assumptions with new ones (Bresnen et al., 2005). This is related to literature on institutional change, where institutional change is viewed as an outcome of the interaction between “institutional contradiction and human praxis” (Seo & Creed, 2002:240). Zilber (2002) emphasizes the interplay between actions, meanings, and actors as drivers of institutions, and that they serve as the mechanisms behind institutional processes such as institutional change. Additionally, Garud et al. (2007) emphasize the regulative, normative, and cognitive processes of institutions when addressing the actors’ ability to adapt to new practices, whereas the institutional processes define the actors’ cognition, interests, and identities. Moreover, Garud et al. (2007) are questioning the actors’ ability to reflect and act outside the boundaries of established and taken-for-granted practices within the organization. This can be discussed in relation to the implementation of new practices for risk management in the TP. The findings of this research show how knowledge seemed to be received by project participants but not completely processed through their actions. It appeared from the results that the new practices seemed to be affected by traditional ways of thinking. Accordingly, due to lack of competence and limited understanding across the organization, it was brought up that project participants tended to think more traditionally when facing challenges regarding project risk.

As lack of competence and limited shared understanding seems to be factors that constrain the participant’s ability to adapt to new practices, the importance of having a proper IPD training was confirmed. In the literature, Ghassemi and Becerik-Gerber (2011) address the value of IPD training in relation to overcoming barriers in the implementation of IPD. They state that IPD training should be performed at both organizational and project level in order to establish an appropriate workforce who are open for collaboration, as well as to ensure common project goals throughout the project (Ghassemi & Becerik-Gerber, 2011). As such,

a training and onboarding process has the potential to increase the overall knowledge across the project organization, and thus better enable the transition from traditional risk management to shared risk management. In addition, a training program has the potential to facilitate a shared understanding of IPD across the project organization. In the findings of this research, it appeared that the project was lacking a proper training and onboarding program. Even though a project school was called for in the early stages of the project, it was rejected due to time and cost constraints. Accordingly, the project participants' ability to perform the new practices seemed to be reduced in which misinterpretations and misunderstandings across the organization was present. Thus, in line with the literature, the results from TP show the importance of having a training and onboarding program to ensure that the project participants have the necessary competence to perform new practices and understand the value and the logic behind them. As Feldman and Pentland (2003) address, routines are developed when individuals apply a specific logic to an action. Such logic can be provided through training and onboarding. Moreover, when logic of actions are repeated, it becomes routines (Feldman & Pentland, 2003).

During the research, we experienced a significant connection between new practices resulting from IPD and the project participants' ability to adapt to these practices. In the literature, Bresnen et al. (2005) argue that implementing changes in a project-based organization requires an enculturing in shared understandings, and not only translation of new knowledge. Moreover, organizational routines can be viewed as a form of learning in project-based organizations, and that individual learning enhances organizational learning in which organizational members absorb new knowledge and transfer it to the organization (Bresnen et al., 2005). The concept of organizational learning refers to the establishment of new practices in which the IPD model requires new ways of working. On the basis of this, Crossan, Lane, and White's (1999) article on organizational learning appeared as highly relevant in which we discovered tendencies where organizational learning seemed to have a vital role in the process of adapting to new practices in the workforce. Accordingly, practices of risk management embedded in the individual organizations seemed to no longer fit the complex and dynamic processes of IPD. Crossan et al. (1999) address such misfit in relation to organizational learning due

to a constantly changing environment. They state, “There may be a gap between what the organization needs to do and what it has learned to do.” (p. 530). In the literature, Ashcraft (2012) addresses the importance of knowing when past experiences and practices are useful and when they should be neglected. According to Crossan et al. (1999), the organization needs to manage embedded institutional learning from the past in addition to be open for new learning. This balance is described through the processes of exploitation and exploration in which organizational learning can be described as a dynamic process (see Figure 2). Exploitation refers to the organization’s ability to exploit what they already have learned, and is related to the feedback processes of how institutionalized learning affects individuals and groups within the organization. Exploration refers to the assimilation of new learning, and is related to the feed forward processes of transferring learning from individuals to learning that becomes embedded in the organization (Crossan et al., 1999).

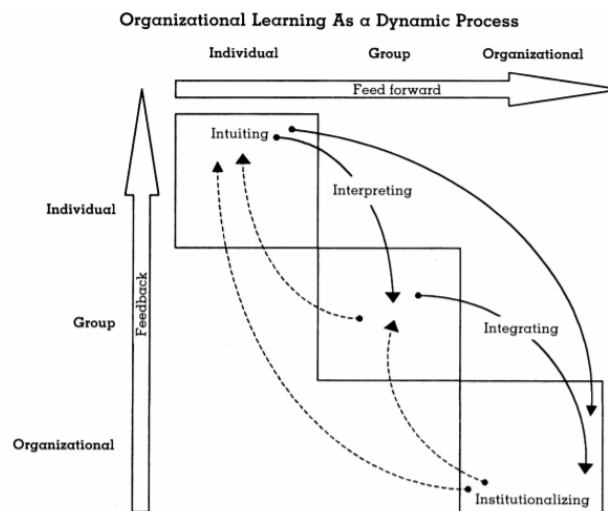


Figure 2: Organizational learning as a dynamic process (Crossan et al., 1999:532)

It appeared from the findings that working with a new delivery model offered some interesting opportunities for the parties involved in the project. As a pilot project, the project participants seemed to be aware of the potentials of extracting and learning from their experiences, and some of the informants were claiming a significant degree of individual learning in the project. However, the learning processes within the project did not seem to move beyond the individual level of learning due to the lack of a shared understanding in the workforce. In relation to

the literature on organizational learning, organizations are more than just a collection of individuals (Crossan et al., 1999). Crossan et al. (1999) describe the processes of organizational learning through three levels, the individual level, the group level, and the organizational level. At the individual level, the preconscious recognition of similarities and differences is present in the process of intuiting, and it is the beginning of new learning. The second process of individual learning is interpreting. Interpreting is a social activity that creates shared understanding, whereas individual interpretation becomes embedded at the group level. Crossan et al. (1999) describe the transition between the two levels as “when actions take place in concert with other members of a workgroup, the interpreting process quite naturally blends into the integrating process.” (p. 525). At the group level, the process of integration takes place through the continuing conversation between group members and shared practices (Crossan et al., 1999). The final process of organizational learning is the institutionalization, whereas the actions considered as effective are repeated, and formal rules and routines becomes embedded (Crossan et al., 1999). Based on our findings, it seems like individual learning has taken place in the project. Some of the informants were stating that their overall impression is that participants in the project were getting better at collaborating, compared to what they were before. In relation to the management of risk, it was stated that the parties tended to become more interested in finding good solutions instead of only looking for problems. However, it appeared that there should have been more focus on formalizing experiences and lessons learned in the individual organizations as there seemed to be lacking procedures for knowledge storing and transfer within the project.

In the literature, Bresnen and Marshall (2000) argue that the establishment of a collaborative environment requires more than team building and appropriate tools for collaboration. They further address the importance of understanding how the changes will affect the participants’ interest and motivation. Similarly, Crossan et al. (1999) are questioning the individuals’ motivation and understanding to interpret their environment, and how individual and group experiences help to develop a shared understanding. These questions are tied to the three levels of organizational learning and the link between interpreting and institutionalizing. Crossan et al. (1999:534) argue that even though individuals are motivated and capable of

interpreting things of relevance, their learning needs to be integrated and institutionalized in order to “realize its future value”. In the results, it appeared that there was a significant pressure from some of the parent organizations. This can be seen in relation to the feedback processes of institutional learning in which institutionalization can easily outperform intuition (Crossan et al., 1999). In the TP, the pressure seemed to challenge the processes of organizational learning in which institutionalized routines and practices in the parent organization were driving out the individual learning that took place at the project level. Moreover, the pressure from the home offices seemed to occur due to their limited understanding of IPD. It came clear from the interviews that most of the pressure seemed to be related to financial performance of the individual organizations. Thus, it can be argued that a more traditional mindset based on individual gain may have influenced the behavior of some of the organizations at the project level. Crossan et al. (1999:533) describe a tension between the feed forward and feedback processes of organizational learning, whereas “institutionalized (what has already been learned) learning impedes the assimilation of new learning”. In relation to the TP, one can argue that the learning embedded in the parent organization has been hindering the absorption of new learning from the project. While the project participants are intuiting and interpreting new practices of risk management in line with the principles of IPD, the embedded norms and routines in the parent organization challenges the potential for learning to be integrated on a group level, which again affect learning to become institutionalized at project and organizational level.

Furthermore, the perspective of organizational learning can also be seen in relation to innovation. While we have identified the constraining factors of organizational learning in the project, there seemed to be signs of exploration and feed forward processes. According to the literature, close collaboration, information sharing, and open-book are facilitating factors of innovation (Loosemore & Richard, 2015). Additionally, Rowlinson and Walker (in press) state that IPD tend to facilitate a safe environment with a culture that is more open for innovation and change but that the industry is described by having a strong sense of inertia in terms of overcoming barriers of innovation. This is also evident in our findings, where there seemed to be variations in the attitude towards innovation in the project. While some stated that they had expected to see more innovation in the project, others

gave the impression that the ambitions of innovation were too high. Thus, even though some of the systems were developed to facilitate shared risk management in the project, tendencies showed that several of the project participants did not use the systems, or they did not see the value of their use. Accordingly, one can argue that the embeddedness of traditional procedures and routines is relevant in terms of innovative feed-forward processes, whereas learning that has become institutionalized in the organization makes it difficult for an organization to change (Crossan et al., 1999).

6.3 Theoretical implications

Altogether, the theoretical contributions of this research is related to IPD as a new governance model within the industry of construction. Firstly, this research contributes to the understanding of how the IPD model facilitates shared risk in IPD projects. The findings provide further insights of what elements that facilitate shared risk management in construction. Moreover, the results show similar tendencies as in established literature, whereas the principles of IPD tend to have positive impact on practices of shared risk. Secondly, this research provide empirical evidence for that the use of new governance models not necessarily leads to an immediate change in practice. In the process of identifying the facilitating practices for shared risk in the project, we discovered that the embeddedness of traditional norms and routines tend to inhibit the realization of new practices for shared risk. Thus, even though the IPD model promotes practices for shared risk, it does not necessarily leads an immediate change in the existing routines embedded in the organizations. Thirdly, this research shows that a new governance model is enacted differently across actors of a project. Accordingly, the differences in how the IPD model is enacted by the actors seem to be one factor constraining the transition from traditional risk management to shared risk management.

6.4 Practical implications

The results of this research have several practical implications, which address practitioners in the construction industry that are to apply the IPD as governance model. This research highlights different practices that are facilitating shared risk management in IPD. However, the findings show that even though practices for shared risk are facilitated by the IPD principles, there are elements that constrain them in practice. In line with existing literature, the results of this research demonstrate the importance of IPD training as a practice to increase competence and a shared understanding between the project participants. Moreover, IPD training proves to be vital on both project and organizational level. As the pressure from parent organizations tend to challenge the establishment of new practices, the individual organizations tend to be affected by feedback processes of practices embedded in their parent organization. In addition, the results of this research show the importance of formalizing the experiences from the project to increase the possibilities for learning at both project and organizational level. On the basis of this, the practical contributions of this research include the following:

- *Act in accordance with the principles of IPD in which they facilitate practices for shared risk management.* Practitioners should emphasize the opportunities provided through the principles of IPD, such as early involvement, co-location, transparency, and open communication. More specifically, the project organization needs to consider who and why to involve key participants at an early stage. Additionally, there is a need for clear boundaries of roles and responsibilities when establishing the project organization. This will facilitate an effective decision-making process where decisions are made at their current levels. Furthermore, the project organization should focus on establishing and implementing common systems and procedures for managing project risk, whereas information regarding risk is distributed across the different organizations involved in the project.

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- *Establish a training and onboarding program on both project level and organizational level.* As relevant competence and shared understanding are factors tied to the project parties' ability to adapt to new practices, the practitioners should emphasize the establishment of a training and onboarding program, on both project and organizational level. Such a program has the potential to increase the overall competence and establish a shared understanding of IPD. Thus, a shared understanding and logic of action can facilitate the adaptation of new practices at the project level. At the organizational level, a training program can have positive effects on the individual organizations' embedded routines. By training the different organizations in IPD, one can reduce the pressure from the embedded practices in the parent organization, and thus promote the establishment of new practices of shared risk.
 - *Extract and save both knowledge and experiences throughout the project in order to reinforce organizational learning.* In order to increase the potential for organizational learning, a formalization of experiences and knowledge storing proves to be vital. As one gain new experiences of shared risk management through manually practices and developed solutions, one is able to extract knowledge that can be valuable for future projects of similar kind. Furthermore, by extracting and saving knowledge, one can reinforce the possibility for organizational learning at both project and organizational level. Knowledge and experiences are also related to the innovations that are developed throughout the project in which innovative systems and solutions for shared risk can be valuable for future projects.

CHAPTER 7 – CONCLUSION

This research has been focusing on how the IPD model can facilitate a more balanced risk management in construction projects. A single case study of the first Norwegian IPD project was conducted, and eight interviews were held with people of different roles within the project organization. In line with the principles of IPD, several practices were identified as facilitators of shared risk management, such as effective decision-making, collective risk management, and trust-building practices. However, there were identified factors that proved to constrain the transitioning from traditional risk management to shared risk. Through the lens of institutional theory, the research sheds light upon the constraining forces of routines and norms embedded in traditional risk management. The results of this research confirm the importance of IPD training, on both project and organizational level to increase the degree of relevant competence and shared understanding of the parties involved. Throughout the research, organizational learning also appeared as one vital element in which the establishment of new practices seem to rely on a dynamic process of organizational learning. This research aims to contribute with relevant knowledge to the construction industry as the IPD model can be applied to other complex projects than just healthcare facilities.

7.1 Limitations and future research

There are several limitations to our study that need to be addressed. First, we acknowledged that the general limitation of a single case study is relevant in terms of the concept of generalizability (Eisenhardt & Graebner, 2007). By investigating a single construction project, we were not able to test if our research was applicable to other construction projects. Our practical contributions may be specifically limited to construction projects applying an IPD model, or projects evaluating whether to use this model. Moreover, it is important to consider the TP as a pilot project in which it involves the first IPD model in the Norwegian construction industry. On the basis of this, we have been aware of how this can have affected our findings. As a pilot project, the project team may have been putting extra effort

into the project in which they are willing to go far beyond what they usually would do. Accordingly, many of our findings can be limited to this specific case. Limitations can be also be found in relation to our data collection and research objectives. Even though all of our informants represented different organizations and possessed various positions within the project, they were all representing managerial roles. By including informants from lower levels of the project organization, our research could most likely have been enriched with various perspectives regarding practices of risk management. Another limitation is related to the methodology of Gioia, which emphasizes a possibility of “cognitive stickiness” (Langley & Abdallah, 2011). As our data structure is based on our perception, the findings might be different if others were to perform the same study. Moreover, there are various possibilities of how to structure the empirical findings. Thus, another approach of the structure may result in other findings.

The major focus of this research was limited to the management of risk within an IPD project, whereas organizational learning was emphasized when transitioning from traditional risk management to shared risk. Based on the implications of our research, we encourage future researchers to focus on the organizations’ capacity to absorb learning that results from the investments in a training and onboarding program. Furthermore, the results of this study may not only be applicable for the management of risk within construction projects. Thus, other variables could also be tested. In addition, future research should perform a quantitative study of shared risk management in IPD to help advance the theory within the field of construction. We also recommend a longitudinal study of one or several cases in order to observe the transition to shared risk management over a longer period of time.

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APPENDICES

LIST OF APPENDICES

Appendix 1: Interview guide

Appendix 2: Project documents

Appendix 3: Nvivo mind map

Appendix 4: Additional quotes

Appendix 1: Interview guide

Interview guide - Tønsbergprosjektet

INTRODUCTION

- Presentation of the interviewers
- Explain the purpose of the interview and the approximately duration
- Short elaborate what we are looking for; experiences and reflections
- Confirm the use of sound recording and subsequent citation in the investigation
- Explain the concept of confidentiality and anonymity

INTERVIEW QUESTIONS

PART 1: Participants background and project role

Question 1: What is your background and what role do you have in this project?

PART 2: IPD

(Guidelines: With the IPD we refer to the interaction model used in the Tønsberg project, where the project performance is guiding for all project participants (incentive mechanisms), other elements of this interaction model are: early involvement of participants, joint responsibility for risk, co-location)

Question 2: What advantages and disadvantages have you experienced in this project in regards to the application of IPD?

Question 3: If you were going to assess the contract form IPD against your experience from previous construction projects, what would you like to point out as different / challenging in relation to general practices in construction processes?
(Guidelines: With practices, we mean, for example, new elements in regards to implementation, activities, change of routines, etc.)

Question 4: In relation to IPD, what are you left behind with from experiences and lessons associated with this form of contract?
(Guidelines: With learning we refer to new experiences that can be valuable for the implementation of future IPD projects)

PART 3: Uncertainty

(Guidelines: With uncertainty, we mean risk in the form of threats and opportunities related to a construction project)

Question 5: What is your experience of the risk management in this project compared to previous projects you have been participating?

Question 6: What kind of uncertainties have you talked about in project planning and implementation?

Question 7: What practices for uncertainty management will you highlight as beneficial / not beneficial in this project? Can you possibly pull out some new solutions or practices related to the management of risk?

(Guidelines: With new solutions, we mean practices related to uncertainty management in the IPD project)

Question 8: In what way would you say that the contract form IPD has affected the risk management?

(Guidelines: Here we are thinking in particular of practices relating to the transfer of uncertainty, transparency between the contracting parties, etc.)

PART 4: Closure

Question 9: Do you have other views or opinions you would like to address, related to what we have been through in the interview so far?

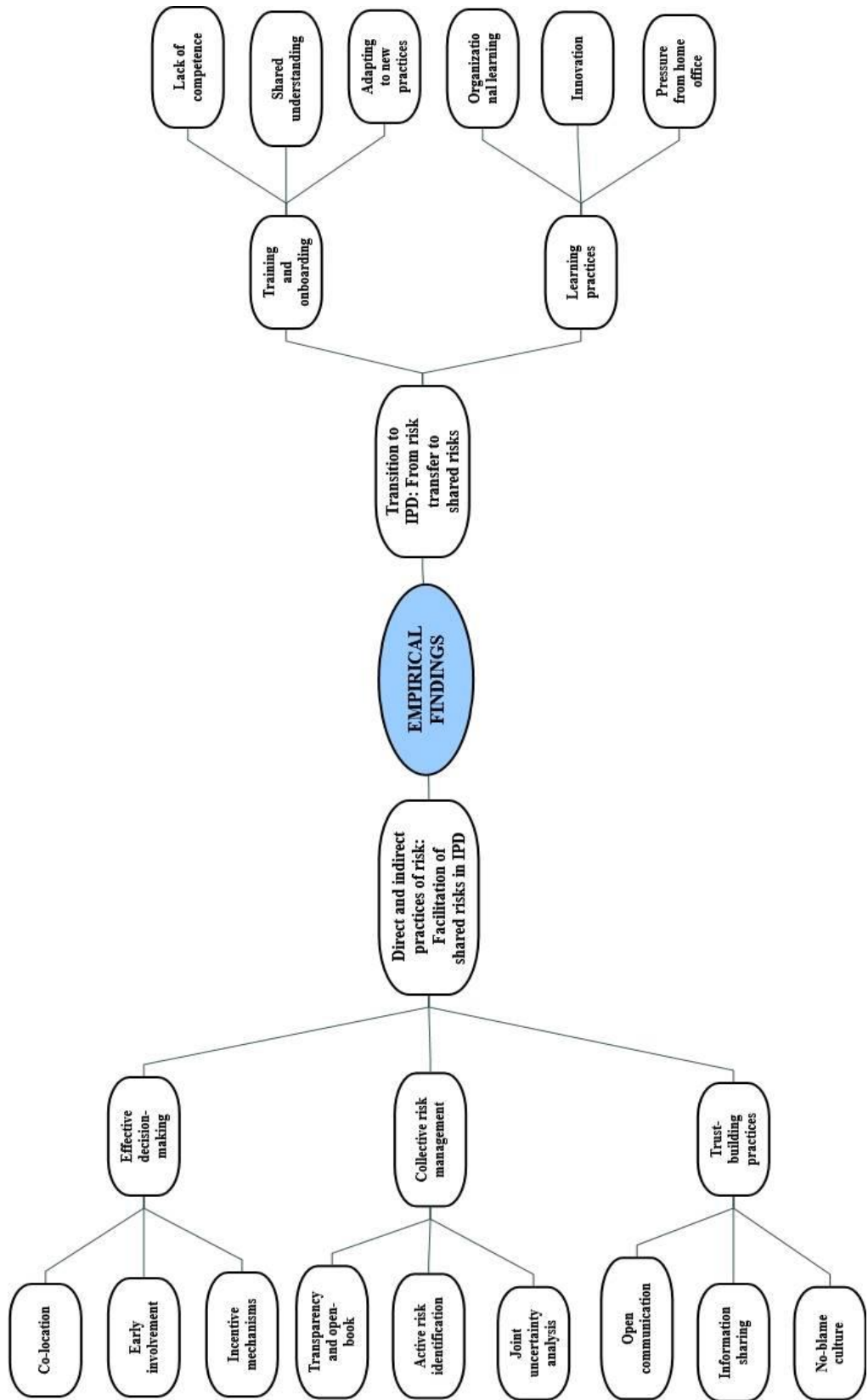
Question 10: Are there other things you think can relate on the topics we have gone through - something we have not addressed during the interview?

Thank you for your participation!

Appendix 2: Project documents

<i>Document name:</i>	<i>Document type:</i>	<i>Document description:</i>
«Tønsbergprosjektet» Retrieved: 13.02.2019	PowerPoint	This document contains general information about the projects goals and ambitions, project progress and organization, the IPD agreement, tools and experiences made during the project.
«Møte med BI-Prosjektstyring» Retrieved: 14.02.2019	PowerPoint	This document contains information regarding the projects reporting procedures, cost and change management. In addition to uncertainty management and analysis.
«Erfaring med digitale verktøy» Retrieved: 14.02.2019	PowerPoint	This document contains explanations about the digital tools used in the project, the projects experiences with them, and why these selected tools has been implemented. BIM, VDI, Issue Management System, ICE-meetings, Last Planner System are some concepts elaborated on in this document.

Appendix 3: Nvivo mind map



Appendix 4: Additional quotes

Second-order theme	First-order concept	Additional quotes	Interviewee
Effective decision-making	Co-location	<p>“The co-location means that we work very close together. It is very positive because we can go directly to each other and discuss solutions right away.”</p> <p>“There are many companies that sit in different places so, co-location is important so that they make them sit together as much as possible, most days a week and I think we have managed this.”</p> <p>“On the social level, I think the most important thing we did, and neither is IPD dependent, it was co-location. I think it's important in any interaction project of a certain size (...), co-location has a lot to say for the collaboration.”</p>	<p>TP employee 3</p> <p>TP employee 6</p> <p>TP employee 7</p>
	Early involvement	<p>“The challenges at the start were that we had a quite flat organization - who is the one who decides? Is it the project owner who decides, or is it the contractor, or is it the ones that are sitting with the design who are designing things? It has been a challenge because it has taken a long time before we have clearly made a decision - is it the economic thing that should apply, or is it the quality of the hospital that will control it.”</p> <p>“We struggled with the organizational structure in the beginning of the project. We had a very flat structure and therefore some troubles with</p>	<p>TP employee 1</p> <p>TP employee 5</p>

		<p>distributing responsibilities. People were given responsibilities but the boundaries of them seemed to be unclear.”</p> <p>“You get to involve the players earlier and you can say, in IPD one can make the optimization of the project together - one can make cost estimation and calculations (...).”</p>	<p>TP employee 8</p>
	Incentive mechanism	<p>“We help each other to identify uncertainties, and we are together in the process of solve them to the best for the project. We do not have any bureaucracy in doing this, because that is the danger of it, that everyone disclaim responsibility for any risk that occur and leaves it to someone else. In this project, we solve everything together.”</p> <p>“Now it is so that one also have to think what I can do for the other to lower the risk to the other. What can we do to make this get better, it is extremely important.”</p> <p>“We’re in no doubt what the economic incentives are (...). So who does it does not matter on the profits of any of the companies, it must be done. (...). It is a great benefit with this model, that everyone within the contract is that everyone is served by the fact that it goes as well as possible.”</p>	<p>TP employee 1</p> <p>TP employee 6</p> <p>TP employee 7</p>
Collective risk management	Transparency and open-book	<p>“The collaboration requires that everyone is open but there are many degrees of openness.”</p>	<p>TP employee 3</p>

		<p>“It is about establishing trust and collaboration, as well as people need to be confident that we solve things together. We have few experiences with people keeping something hidden.”</p> <p>“In this project, it is all about being as open as possible, and be honest about the problems one is facing. If this was a traditional contract, it is often much more tactics (...).”</p> <p>“My experiences is that we have a completely open dialogue about uncertainty. We are discussing potential risk and appropriate solutions to reduce them, all together.”</p>	<p>TP employee 5</p> <p>TP employee 7</p>
	<p>Active risk identification</p>	<p>“One help each other to identify the uncertainties, and help each other to solve the uncertainties and not make a very bureaucracy around it because it is the danger that everyone sits on their own tune and says that "this is not my responsibility, this you have to fix and fix "- here we fix it and solve it together.”</p> <p>“We have not enough capacity to build good enough management, but very much is done to follow up on risk. Some also does it internally. And some have their own risk registers that are updated monthly.”</p> <p>“(...) Here you can see the issues that are open and which ones are closed. You can keep up with the progression. And if there is something you are wondering then you can just take a search also you can go in and see what the different</p>	<p>TP employee 1</p> <p>TP employee 2</p> <p>TP employee 4</p>

		<p>people really work with, but what it was something we got established right from the start, so yes it is used. Some are better at using it than others.”</p> <p>“It is also up to you to set up action plans that ensure that we have received enough information, and always be in advance of what you identify. So you avoid that it suddenly shows up new risk factors that you have to deal with. So being in advance, we have also tried before, but we have not been that good at it always.”</p>	<p>TP employee 5</p>
	<p>Joint risk analysis</p>	<p>“The only thing we haven't done before is to sit together with the other parties and their uncertainty analyzes, which I haven't been to before. But I have been sitting together with the other parties and considered risk, but not that systematically.”</p> <p>“There is not all projects that perform such uncertainty analysis consecutively, because it is more like that the uncertainty analysis are milestones for quality insurance, and that is it. So, I think what we have done is good.”</p>	<p>TP employee 3</p> <p>TP employee 7</p>
<p>Trust-building practices</p>	<p>Open communication</p>	<p>“It has been an open culture in terms of being honest with what is going on and how we solve tasks.”</p> <p>“We are discussing uncertainties in an open forum, where we work with all the actors involved, and not like the project owner used to do - try to come up with their uncertainties alone. Here we are together in the</p>	<p>TP employee 1</p> <p>TP employee 6</p>

		identification of the uncertainties. And thus comes up with better results.”	
	Information sharing	<p>“How do we get a cultural change in trusting each other and working in a completely different way and getting the feeling that “yes, I can share it right away, even though I've done a great mistake". And that is perhaps the most important part of it, when we now come to experience, we talk extremely much about how important it is to inform everyone who participates in this project.”</p> <p>“We have these Last Planner and ICE meetings, it is right to conclude that the decisions you make working groups that make one retrieve all information.”</p>	TP employee 5
	No-blame culture	<p>“We are not pointing fingers anymore. The culture is more about sitting together working on solutions in common.”</p> <p>“(…) then the spinal cord reflex is that you go home and find out who is to blame. There have not been like that in this project.”</p>	TP employee 5 TP employee 7
Training and onboarding	Lack of competence	<p>“We have been applying Last Planner and ICE meetings (...). We were good at using these things in the beginning. Some were good at continuing to use them, while others were lacking the competence of doing it. (...) the fact that we have not managed to maintain a project school made this hard to implement this.”</p> <p>“And Lean was also something that disappeared quite quickly</p>	TP employee 5

		because we did not have the competence everyone said they had. But when it got to the point, it was hard to obtain the right resources.”	
	Shared understanding	<p>“It is not everyone who understand wat this is all about, they do not understand IPD, and I am also sure about that not everyone understands the interaction. But the ones in the leading positions know.”</p> <p>“There is a complex incentive mechanism in relation to earnings, which I believe the management of the various companies do not understand a hundred percent.”</p> <p>“(…) you have what is called Target Value design. After all, it is about not only focusing on the costs, because when a client is in the partnership, you should also have a bit of what is quality for the money.”</p>	<p>TP employee 1</p> <p>TP employee 2</p> <p>TP employee 5</p>
	Adapting to new practices	<p>“New things require a new way of working. So when you have a weak onboarding, errors will follow.”</p> <p>“We have not been good enough to ensure that those who enter the project is given the training of IPD that they need.”</p>	TP employee 5
Learning practices	Organizational learning	<p>“It took time to establish routines on this (…) and you can reuse information and that is really important. I don’t think this is fully utilized.”</p> <p>“If we all get better at this form of working, we will increase the productivity in the overall industry – this means</p>	<p>TP employee 6</p> <p>TP employee 5</p>

		better products and more profit.”	
	Innovation	<p>“IPD is a contract that facilitates innovation but when we are struggling with people and companies with other expectations when it comes to innovation, it becomes hard.”</p> <p>“I wish I had seen more innovation in this project. We have done a great deal of innovations but we have not accomplished as much as we initially aimed for.”</p> <p>“We have had a lot of ambitions, maybe too many. We had a brand new contract form, (...). This digital process, we had very high ambitions. (...). You have to bring in the assessment when looking at new areas, and to work in new areas, then it will be connected with a cost, I do not think we totally took that in.”</p>	<p>TP employee 4</p> <p>TP employee 6</p>
	Pressure from home office	<p>“We have routines on risk management and some of these must be sent to our own management group (...).”</p> <p>“There is a strong pressure on performance from the home offices. We have noticed that some people are forced to present things they do not agree on (...). Because it is a tough performance requirement in their internal monthly reports.”</p>	<p>TP employee 3</p> <p>TP employee 5</p>