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Organizational development in the project industry

A learning perspective

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"The projects are like running trains, and there is little room for working on improvements for the next project. The only thing you have is your own experiences and an evaluation report at the end of the project. We are far too few, and the structure of the company is based on a project-organization..."

- Informant

Abstract

The Norwegian project industry is currently exposed to major competition, both nationally and globally. This calls for a more efficient value creating process, and project-based organizations are today looking for ways to systematize organizational development activities for this purpose. Since 60-80% of the project value is typically outsourced, a lot of the value creation in projects takes place in collaboration with subcontractors. This indicates that if a more efficient value creating process is to be achieved, the project-based organizations need to involve their subcontractors in the organizational development.

To investigate how organizational development is approached in the project industry today, we have studied three Norwegian project-based organizations, together with a subset of their respective subcontractors. To illuminate the topic of joint organizational development, we have applied literature from the fields of supply chain management and strategic change management. We have also developed an analytical framework where we look at organizational development as part of a learning process.

Our findings indicate that systematic organizational development is challenging in the context of the project industry. This is largely due to the hectic nature of the project process and the companies' focus on project progress. The project-based organizations in this thesis are currently developing organizational development systems, but do not seem to recognize the potentially important role of their subcontractors in the development work. This indicates that the project industry has overlooked the subcontractors importance for achieving an efficient value creating process.

Sammendrag

Den norske prosjektindustrien er per i dag utsatt for stor konkurranse, både nasjonalt og globalt. Dette stiller krav til en mer effektiv verdiskapningsprosess, og prosjektbaserte selskaper ser i dag etter måter å systematisere aktiviteter innen organisasjonsutvikling med dette som formål. Siden 60-80% av prosjektets verdi typisk er outsourcet, så skjer mye av verdiskapningen i samarbeid med underleverandører på prosjekter. Dette tyder på at dersom man skal få til en mer effektiv verdiskapningsprosess, så er de nødt til å inkludere underleverandører i organisasjonsutviklingen.

For å undersøke hvordan organisasjonsutvikling foregår i prosjektindustrien idag, og hvorvidt underleverandører er representert i dette arbeidet, har vi studert tre norske prosjektbaserte selskaper med et utvalg av deres respektive underleverandører. For å belyse disse forholdene, har vi støttet oss til litteratur innenfor leverandørkjedestyring og strategisk endringsledelse. Vi har videre utviklet et analytisk rammeverk hvor vi ser på organisasjonsutvikling som en del av en læringsprosess.

Våre funn tyder på at systematisk organisasjonsutvikling er vanskelig i konteksten av prosjektindustrien. Dette skyldes i stor grad prosjektprosessens hektiske natur, og selskapenes fokus på framdrift i prosjekter. De prosjektbaserte selskapene i denne tesen er i utviklingsfasen av systemer for organisasjonsutvikling, men ser i midlertid ikke ut til å ha oppfattet underleverandørenes potensielt viktige rolle inn i disse systemene. Dette tyder på at prosjektindustrien har oversett underleverandørenes betydning for en effektiv verdiskapningsprosess.

Acknowledgements

Abbreviations

CODP	Customer Order Decoupling Point
EPC	Engineering, Procurement and Construction
EPCI	Engineering, Procurement, Construction and Installation
ETO	Engineer-to-Order
FEED	Front-End Engineering and Design
FTE	Full-time Equivalent
HSE	Health, Safety and Environment
ISS	Insulation, Surface treatment and Scaffolding
MMO	Maintenance, Modification and Operations
PDCA	Plan-Do-Check-Act
PEM	Production Execution Model
PFP	Passive Fire Protection
PMO	Project Management Office
SOP	Standardized Operating Procedure
SOW	Scope of work
VN	Variation Notification
VOR	Variation Order Request
5S	Sort, Set in order, Shine, Standardize and Sustain (Lean principle)

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Chapter 1

Introduction

"In the last eight years, the Norwegian offshore industry has met considerable competition from the larger offshore yards in Asia. (. . .) They build vessels for a much lower cost than possible in Norway."

- Bull-Engelstad and Nilsen (2015)

The Norwegian offshore industry delivers on time and quality, but is losing contracts to foreign companies outperforming the Norwegian companies on price (Trædal, 2014). As the oil prices have stagnated, the oil companies are looking to yards in Europe and Asia in order to save money (J. B. Jacobsen, 2014). Although they do not face the same international competition, companies in the construction industry are also experiencing challenges with low profit margins (Brekkhus, 2016). It seems that the Norwegian project industry needs to become more cost efficient in order to stay competitive.

Over the years, mass producing companies have developed several methods for improving the cost efficiency of their operations. Many of these methods are based on the Lean paradigm, which seeks to reduce variation and eliminate waste through continuous improvement (Womack, Jones, & Roos, 1990; Netland, 2013). While mass producing companies are built to produce high volumes with low variety, this is not the case for companies in the project industry, which operate under the Engineer-to-Order[1] configuration. This configuration is characterized by high variation, and low volume, as the production is driven directly by customer orders (Semini et al., 2014). While these characteristics seem to undermine many of the production principles that have gained great success in the world of mass production, the complexity of the project-process further seems to complicate the matter.

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[1] Often abbreviated as ETO

The project-process consists of a high number of path-dependent activities, which means that any deviation from the project plan is likely to result in subsequent delays (Mokhatab, Mak, Valappil, & Wood, 2014; Maylor, 2010). It is therefore imperative to coordinate these activities to maintain project progress, and prevent potentially large profit-losses due to delays (Mello, Strandhagen, & Alfnes, 2015a). According to Mello and Strandhagen (2011) and Hicks, McGovern, and Earl (2000), approximately 60-80% of the project value is typically outsourced to subcontractors. This suggests that the profitability of a project is largely dependent upon the performance of the subcontractors, and the project-based organization's ability to coordinate them.

In order to stay competitive, Norwegian project-based organizations are currently looking to systematically develop their organizations (Molnes, 2016; Hartwig, 2015). This seems to have implications for all the actors involved in the value creating process. The fact that 60-80% of the project value is typically outsourced to subcontractors, further suggests that involvement of subcontractors in the development activities is a prerequisite in order to achieve a more efficient project-process. This leads us to the main question of this thesis: *How do project-based organizations manage organizational development in collaboration with their subcontractors?*

Research questions

The ultimate objective of this thesis is to provide advice on how companies in the project industry can succeed in developing their organizations in collaboration with subcontractors. In order to do so, we have operationalized the main question into the following research questions:

1. How do project-based organizations approach organizational development?

2. How do the relations between project-based organizations and their subcontractors affect the possibility for joint organizational development, in a project-context?

The first research question seeks to identify how the project-based organizations are currently developing their organizations. The second research question seeks to examine how the relations between project-based organizations and their subcontractors affect the possibilities for joint organizational development. In the second research question, we also seek to explore how the project-based organizations, or contractors[2], enable their subcontractors to contribute in development activities. The answer to these research questions will yield an understanding of the general approach to organizational development in the project industry today - and hopefully an answer as to whether this approach is appropriate.

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[2]The terms *project-based organization* and *contractor* will be used interchangeably throughout the thesis.

In this thesis we have included literature from supply chain management and change management, as we believe the answer to how project-based organizations can manage organizational development, are found in the intersection of these theoretical fields. Supply chain management literature is covering the relationships between project-based organizations and subcontractors, and how these can affect the collaboration on joint organizational development. The topic of organizational development is further rooted in the theoretical tradition of change management, and is closely related to organizational learning.

We have further chosen to investigate three Norwegian project-based organizations, currently developing a system for organizational development, and a subset of their subcontractors. By examining the organizations in light of the selected literature, we are going to answer the research questions and the overall question of this thesis.

Delineation

In a master's thesis there will always be a careful consideration of which fields of theory should be included in order to answer the main question. Such an evaluation also involves a considerable degree of exclusion of literature, that even though relevant, may actually obscure the main topic. In the literature review we have excluded literature on the impact of different national cultures on organizational development. This could be an interesting addition to our analysis as many project-based organizations are both operating abroad, and have a high degree of foreign labour. After a careful consideration of the case-companies and their respective subcontractors we argue that the inclusion would provide marginal utility at best, and confuse the reader at worst. We have also assessed whether or not to include literature from the field of project management, as the improvement of project execution definitely is a recurring theme in the project industry. We will however devote little attention to specific project execution models, but rather evaluate how new best practices emerges in the project-based organizations.

Whether or not the specific development activities undertaken by the case-companies are appropriate, given the project context, will not be discussed in this thesis. The main purpose of including the development activities in this thesis is to illuminate how the project-based organizations are discovering and anchoring new best practices.

Structure of the thesis

This thesis is organized in six chapters. In the current chapter we have provided an introduction to the topic of this thesis, and raised the questions which we seek to answer. In the next chapter, a literature review is presented. Literature from the theoretical fields of supply chain management and change management is included. The part on supply

chain management will focus on important relational characteristics, which are likely to affect joint problem solving. The part on change management will focus on issues related to employee participation, and organizational learning. The chapter will culminate in an analytical framework for use in the analyzes later in the thesis. Chapter 1 and chapter 2 thus provides the background, and theoretical foundation, for this thesis.

In chapter 3, we will present the research method used for data collection, and elaborate upon the chosen research design. The measures that have been taken in order to provide the ethical integrity and the quality of the thesis, will also be presented. In chapter 4, a thick empirical description of the three cases will be given. The chapter will provide the reader with insights about the project-processes which have been studied, and on the companies' experience with both internal and joint organizational development. In chapter 5, we will present three single-case analyzes, and a subsequent cross-case analysis. These will be structured according to the research questions, and the analytical framework presented in chapter 2. The thesis will culminate in a conclusion and implications for theory, for further research and for practitioners, in chapter 6.

Chapter 2

Literature review

In this chapter we will present two major theoretical fields, which will help us answer how companies in the project industry can manage organizational development in collaboration with their subcontractors. Organizational development in project-based organizations, must be viewed in the context of the configuration under which these organizations operate. In the project industry, 60-80 % of the value creating activities in projects are outsourced to subcontractors. To examine organizational development in this context, we need to understand the interaction between the project-based organization and its subcontractors, as this interaction has great impact on project performance. In section 2.1 we will examine the concept of supply chains and how project-based organizations can coordinate value adding activities performed in the supply chain through *supply chain management*.

In order to stay competitive in a frequently changing market, a company must continuously adapt to the changing business environment. It is necessary to reduce costs, and add value for the customers. However, organizations are made for being stable, and change affects people, processes and performance in complex interactions. How can project-based organizations systematically facilitate organizational development, create new best practices and increase performance? In section 2.2 we will introduce theory on *change management*[1], and concepts related to organizational development - more specifically organizational learning. Change management will together with theory on supply chain management, provide a foundation for discussing how project-based organizations can achieve organizational development in a complex supply chain in section 2.3.

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[1]This must not be confused with change order management, which emphasizes management of changes in customer orders. This is an important topic within project management, as changes in customer orders can create changes in the production process and delays on delivery (Mello et al., 2015a).

2.1 Supply chain management

In this section we will provide the answers to the following questions: what is a supply chain? Why should project-based organizations collaborate with their subcontractors? Should they always collaborate? and finally how can a project supply chain be managed? We believe that the answers to these questions will provide the contextual insights necessary to identify critical success factors for achieving organizational development in project-based organizations. The section has been structured according to these questions, which enables a logical and narrative dissemination of the field of supply chain management. The section will be concluded with a summarizing paragraph illuminating how supply chain management relates to development in project-based organizations.

A supply chain is composed of all the value-adding activities performed in order to deliver a finished product to the end-customer - from the suppliers of raw material to the delivery to the end-customer (Sukati, Hamid, Baharun, & Yusoff, 2012). The relations with suppliers affect cost and performance of the focal company's activities, and also the overall costs of the supply chain. Since the focal company is part of both the end customers' and suppliers' value chains, the firm must understand its own position and how it relates to the overall supply chain, in order to gain and sustain competitive advantage (Anatan, 2014).

There are many definitions of competitive advantage, and how to attain it. According to Anatan (2014), "a company's competitive advantage is its ability to achieve a position superior to that of its competitors" (p. 318). A company's ability to achieve a superior position - and competitive advantage, thus depends on their ability to align their manufacturing strategy to their competitive strategy (Brown & Blackmon, 2005). The market-led and the resource-based view represents two opposing perspectives on how to achieve a strategic fit. The market-led view suggests aligning the company with external opportunities, while the resource-based view suggests that the firm-level resources (manufacturing capabilities) should provide the basis for choosing the appropriate market in which to compete (De Wit & Meyer, 2014). Brown and Blackmon (2005) suggests that the two perspectives on strategy must be combined in order to align the competitive strategy and the manufacturing capabilities of the company, and thus achieve strategic fit. Achieving a strategic fit is however insufficient in order to gain a sustainable competitive advantage according to Barney (1991). He suggests that in order for a capability or company resource to represent a potential source of sustainable competitive advantage, it must display four characteristics; it must be valuable, rare, inimitable and non-substitutable. If these characteristics are not present, competitors can imitate the capabilities and achieve competitive parity. How do these insights relate to the supply chain?

As previously stated do businesses not operate in a vacuum, which means that a company's performance will be affected by their suppliers. In order to achieve a superior fit between a company's resources and the external business environment, Porter (1985) and Anatan (2014) state that the supply chain activities must be coordinated, which requires collaboration and openness between the different actors in the supply chain. Búrca, Fynes, and Marshall (2005) argues that members of the supply chain must be open for collaboration and transparency, where information and processes will be visible for the other members of the supply chain. Mentzer et al. (2001) and Lorenzoni, Baden-Fuller, and Lorenzoni (1995) support this view, and argue that information-sharing of tactical data, such as forecasts and marketing strategy, may enhance the possibility for joint planning and process monitoring, which will enable the reduction of inventory levels. Lorenzoni et al. (1995) further argues that this will reduce uncertainty for all members of the supply chain, which in turn will enhance both cost efficiency and customer value, through joint improvement efforts of e.g. best practices. Information-sharing of this nature, can thus be said to increase the potential for coordinated improvement efforts, strategic fit with the external business environment, and competitive advantage. Anatan (2014) suggests that long term relations with suppliers will enable such information-sharing and collaborative efforts, and have a mediate effect on the supply chain performance in terms of costs, flexibility, quality and response capabilities. Búrca et al. (2005) found however that many companies were reluctant to share performance information, despite the wealth of research and literature describing the possibilities and benefits associated with doing so. This suggests that even though information sharing and openness seems to be important in order to achieve a competitive advantage, the decision to share such information is not always as clear cut.

De Wit and Meyer (2014) define two opposing perspectives on how companies should relate to one another, within the context of a business area - the discrete view and the embedded view. The discrete view suggests that competition with other companies motivates innovation and improvement, and advocates caution when collaborating with competitors. Mitchell, Agle, and Wood (1997); Kraljic (1983) argue that the relative power positions of collaborative partners strongly influence the degree of dependence between the firms. In the discrete view collaboration is a zero-sum game, which suggests that the company with a lower relative bargaining power is exposed to opportunistic behaviour (De Wit & Meyer, 2014). The embedded view on the other hand, states the advantages of collaboration across the supply chain, as this will increase the total wealth 'pool' for all actors within the supply chain. The embedded view thus denies the assumption that the value creation is a zero-sum game, and opens up for synergy effects through collaboration and specialization (Haines, Aller-Stead, & McKinlay, 2004). Hamel, Doz, and Prahalad (1989); De Wit and Meyer (2014) suggests to balance these perspectives, as they recognize both the benefits and threats associated with collaboration in a business network.

How can a firm seek to collaborate, while still protecting themselves from opportunistic behaviour? Hamel et al. (1989) suggest that partners should limit the transparency to the information that is necessary, and that the scope of information to be shared should be part of the collaboration agreement. In order to differentiate between relational approaches towards different suppliers, Kraljic (1983) identified a set of criteria for determining the relative power between the focal company and the different strategic suppliers. Based on an assessment of the relative power, he distinguishes three general relational arrangements - non-contractual, partnership and contractual, which enables the focal company to balance DeWit and Meyer's (2014) two perspectives. In the case of buyer dominance, the buyer company should seek to exploit its purchasing power through multiple sourcing, and the appropriate relational arrangement is non-contractual. In the case of balanced power, the appropriate relational arrangement is a partnership (e.g. joint venture). And in the third situation, where the supplier is dominant, the appropriate relational arrangement is through contracts (Caniëls & Gelderman, 2007; De Wit & Meyer, 2014). The buyer could alternatively attempt to lower supplier risk by sourcing from several suppliers (Kraljic, 1983).

There are three main contract types used in the project-based industry. *Lump sum contracts* gives the subcontractor a degree of certainty in the amount of money to receive. Quantities are fixed and only subject to legitimate changes in the scope of work. The downside is that many projects involve variation notification orders (i.e. changes in scope of work), which increase the possibility for contractual disputes. *Measure and value (re-measurement) contracts* are appropriate when the design of the work is detailed, but the exact quantity to be delivered is not. The tenderers deliver an offer with a cost rate based on an approximate quantity. However, the exact value of the contract is not known before the work is completed. *Reimbursement contracts* pay the subcontractor based on the actual costs together with a fee. This type of contract removes the risk of losing a profit, but also excludes the possibility of increasing the profit (Ross & Williams, 2012). The contracts seem to have an important influence on the course of the collaboration.

In addition there are two types of contracts, which can be said to be hybrids of the lump sum and measure and value contracts, that have gained popularity in the construction industry since the 1990s. *Target cost contracts* and *guaranteed maximum price contracts* are contracts that anticipates an approximate quantity of work, and gives a target or maximum price. For the target cost contract, any deviation from the anticipated cost is split between the contractor and subcontractor according to a predetermined fraction. For the guaranteed maximum price contract, savings are split between the contractor and subcontractor according to a predetermined fraction, but any overrun is covered by the subcontractor, unless the scope of work has changed during the project (Chan, Chan, Lam, & Wong, 2011).

Research suggests that there is a general lack of information-sharing and focus on coordination of supply chain activities in the ETO industry (McGovern, Hicks, & Earl, 1999; Mello & Strandhagen, 2011; Mello, Strandhagen, & Alfnes, 2015b). Why is there a lack of tradition for this in the ETO industry? Large-scale manufacturers such as Toyota, benefit from economies of scale as they produce large quantities of the same product. Because of the stability this entails, the members of the supply chain are fixed to a greater degree, which enables long-term relations with suppliers. The relational power is furthermore usually tipped in the favour of the focal company because of the large quantities they produce. The relative value of the order may therefore be of higher significance to the suppliers, which according to Kraljic (1983) will increase the focal companies dominance over its suppliers. In an project supply chain however, the relational power is normally tipped in the favour of the suppliers. This creates a different power dynamics, which may affect the risk for opportunistic behaviour (McGovern et al., 1999). Hicks et al. (2000) states that there is a tendency of mistrust between the focal company and suppliers in project supply chains, which could help explain the lack of coordination and information-sharing. The fact that the project-based industry is characterized by short term and project-specific contracts (Maylor, 2010; Vrijhoef & Koskela, 2000), also limits the possibilities for creating close and long-term relationships where such information-sharing is enabled. McGovern et al. (1999) states that the projects undertaken by project-based organizations can differ greatly in scope and design, and that the end-customer has influence over the supplier composition and . The uncertainty in demand, and the large variability in customer orders are direct consequences of the ETO-configuration, and makes it difficult to anticipate all the suppliers required for a specific project. Substantial outsourcing of project value has however increased the need for better coordination with key suppliers, which in turn requires project-based organizations to better manage supplier relations (McGovern et al., 1999; Anatan, 2014; Mello & Strandhagen, 2011; De Wit & Meyer, 2014).

There are several definitions of supply chain management in the literature. Sarkis and Talluri (2001) state that "supply chain management is the management of activities and processes associated with the flow and transformation of goods from raw materials through the end user and to disposal or back into the system. Materials also include related information flows" (p.359). The philosophy of supply chain management is that each firm in the supply chain affect directly, and indirectly, the performance of other firms and of the supply chain as a whole (Porter, 1985). Supply chain management seeks to synchronize all operations, and to align each supply chain member's strategic capabilities with the supply chain's overall competitive strategy, through the supply chain strategy (Mentzer et al., 2001; Chopra & Meindl, 2016). Supply chain strategy here refers to the pattern in the stream of decisions and activities, that has impact on the achievement of the competitive strategy of the supply chain (Håkonsson & Snehota, 2006). According to Porter (1985), the generic competitive

strategies are cost leadership, differentiation or focusing (i.e. focusing on a particular customer segment). Chopra and Meindl (2016) identify three logistical (facilities, inventory and transportation) and three cross-functional (information, sourcing and pricing) drivers that may be used to position the supply chain strategy. The competitive strategy will require the supply chain strategy to balance efficiency and responsiveness, through these drivers. In the case where the supply chain strategy mainly emphasizes responsiveness, all the logistical and cross-functional drivers should be structured in such a way, that the supply chain is able to perform the desired level of responsiveness. Sukati et al. (2012) and Ben Naylor, Naim, and Berry (1999) suggest that responsiveness is best suited for supply chains producing complex and innovative products in unpredictable markets. In the case where the supply chain strategy emphasizes mainly efficiency, the drivers should be structured in such a way, that the supply chain operates at the lowest possible cost (Chopra & Meindl, 2016). Sukati et al. (2012) and Ben Naylor et al. (1999) suggest that standardized and mass produced items should be produced in efficient supply chains with a focus on eliminating waste. The overall objective for the supply chain is to create value for the customer, and nothing else (Womack et al., 1990; Chopra & Meindl, 2016).

Companies operating in markets with frequent and unpredictable change, should develop the capabilities necessary to respond to these changes (Sarkis & Talluri, 2001). McGovern et al. (1999) further state that in a market which is increasingly characterized by time-based competitiveness, project-based organizations become more dependent on their suppliers' capabilities to be responsive to changing customer requirements. The fact that project-based organizations produce complex and innovative products, in a market where frequent changes is the rule rather than the exception, suggests that project supply chains should strive to become responsive, rather than efficient. Project-based organizations are however not exclusively competing on responsiveness, as stated in the introduction to this thesis (section 1). McGovern et al. (1999) argue that a major challenge for project-based organizations is to develop more efficient supply chains, even though this is necessary in order to balance responsiveness and efficiency (Chopra & Meindl, 2016). Complex products with deep product structure, as those of project-based organizations, require a wide range of components and likewise a complex supply chain. As the project-based industry is prone to outsourcing, a typical project supply chain requires a variety of supplier relations, as found by Hicks et al. (2000). Therefore, it may not be so simple as to say that the supply chain should be either efficient or responsive. In the same way as Brown and Blackmon (2005) suggest combining the market-led and the resource-based view for achieving strategic fit between manufacturing capabilities and competitive strategy, Ben Naylor et al. (1999) suggest that it is possible to balance the efficient-responsive paradox, through a hybrid supply chain. The hybrid supply chain makes it possible to balance the market-led and the resource-based view, and achieve a strategic fit for the entire supply chain.

Ben Naylor et al. (1999) found that the customer order decoupling point (CODP) was an important factor in deciding which supplier relations that should adopt either of the two paradigms. According to Semini et al. (2014), "The CODP is the point in the manufacturing value chain of a product, where the product is linked to a specific customer order" (p. 363). More specifically, they found that the supply chain upstream of the CODP should adopt the efficient manufacturing paradigm, while the supply chain downstream of the CODP should adopt the responsive manufacturing paradigm. For project supply chains, the CODP is positioned at the engineering function (Gosling & Naim, 2009). This suggests that the part of the project supply chain that is involved in engineering, procurement and construction should be responsive, as the EPC process is downstream of the CODP, while the upstream supplier relations should focus on efficiency.

Identifying the CODP may also enable what Kristianto, Helo, and Jiao (2015) describes as modularity. Common components delivered by suppliers upstream of the CODP, where the efficient paradigm is to be adopted, may be used for standard parts to increase efficiency. Giving procurement a strategic function in the marketing and tendering phase may prevent engineering from "reinventing the wheel", and thus shorten the design phase and overall lead time (McGovern et al., 1999). Also, a substantial amount of waste is associated with the outsourcing of the engineering function in project supply chains (Mello et al., 2015a). Outsourcing of the engineering function typically increases delays and amount of extra work when change orders emerges. Closer relations within the supply chain, may enhance coordination and reduce this waste. This suggests that the efficient and responsive paradigms are not necessarily mutually exclusive, but rather complementary, as the supply chain may become more efficient, even though the main objective is to become more responsive.

What are the prerequisites for successful supply chain management? While some researchers (Búrca et al., 2005; Lorenzoni et al., 1995; Anatan, 2014) stress the need for collaboration, openness and sharing of information, Mentzer et al. (2001) highlights commitment and corporate compatibility as important prerequisites for successful supply chain management. The commitment among partners is important as it is an essential ingredient in long-term relationships (Lassar & Zinn, 1995), and the corporate compatibility is a strong indicator of the effectiveness of the relationship and supply chain performance. The corporate compatibility emphasizes similarities in visions and goals, which is imperative to achieve strategic fit, as well as a shared corporate culture (Al-Mutawah, 2009). This seems to confirm the findings of Brown and Blackmon (2005) and Chopra and Meindl (2016). This also suggests that corporate compatibility is an important indicator for the collaboration, and a prerequisite for joint organizational development.

Close and strategic supplier relationships is one of the prerequisites for successful supply

chain management (Mentzer et al., 2001). Sarkis and Talluri (2001) and Sukati et al. (2012) emphasizes that the strategic supplier relationships should be oriented towards developing supply chain capabilities and improving the supply chain performance. One of the most important prerequisites for strategic supplier relationships is long-term partnerships (Mentzer et al., 2001), and although this has not been a strong tradition in the project-based industry (McGovern et al., 1999; Maylor, 2010), several researchers have suggested that it could benefit from developing such relationships (Mello & Strandhagen, 2011; Mello et al., 2015b; McGovern et al., 1999). Roh, Hong, and Min (2014) found that long term relations and partnerships with suppliers is even more important for developing a responsive supply chain, than for efficient supply chains. The responsive supplier relationships is further characterized by cross-functional cooperation, across both organizational borders and management levels , and extensive sharing of information on market forces, strategy and processes (Mentzer et al., 2001; Sarkis & Talluri, 2001). According to McGovern et al. (1999), the competitive advantage of project-based organizations comes from their unique ability to understand customer requirements, and deliver complex products that meet these requirements. Sharing of information and collaboration in the supply chain is necessary in order to respond to changing customer requirements, as found by Sukati et al. (2012). By providing mutual support and indulge in joint problem solving, the supply chain may effectively develop capabilities to align the supply chain strategy with the competitive strategy, as advocated by Chopra and Meindl (2016) and Brown and Blackmon (2005).

In this section, we have examined the literature on supply chain management, and we will now present the findings that are most likely to have an effect on joint organizational development in the project-context. First, we recognize that in order to achieve competitive advantage, the individual members of the supply chain must align their company-specific capabilities with the supply chain capabilities, and overall competitive strategy. The subcontractors participate in project-processes downstream of the CODP, which means that the project-based organization and their subcontractors should develop responsive capabilities (Ben Naylor et al., 1999). In order to develop a responsive contractor-subcontractor relationship, researchers suggest that the relationships must be close and strategic (Mentzer et al., 2001), and further long-term (Roh et al., 2014).

Second, the effectiveness of the contractor-subcontractor relationship, and the supply chain performance is further affected by the corporate compatibility (Lassar & Zinn, 1995), which is likely to increase with time, as the organizations jointly develop their capabilities according to Brown and Blackmon (2005). Third, in order to develop joint capabilities and achieve a superior fit between capabilities and the external environment (Anatan, 2014), Búrca et al. (2005) and Mentzer et al. (2001) suggests that the supply chain members must be open for collaboration and information sharing. Both long-term relationships and

information sharing seems however difficult, because of the supply chain mistrust, which is prevalent in the project industry (Hicks et al., 2000). Contracts is a way of protecting against opportunistic behaviour, which is related to mistrust (Caniëls & Gelderman, 2007; Kraljic, 1983). This can be seen as a discrete approach towards the subcontractors (De Wit & Meyer, 2014), which again could have implications for the close and strategic relationships required for joint problem solving (Chopra & Meindl, 2016).

In rapidly changing markets and organizational environments, both in terms of customer requirements and new technological solutions, organizations need to continuously adapt and improve in order to stay competitive. The ability to effectively implement organizational change, thus becomes a source of competitive advantage (Anatan, 2014; Netland, 2013). Organizational development involves changes that affect processes, human behaviour, and ultimately performance. We have in this section elaborated upon how to coordinate the individual organizations, and manage a project supply chain. However, organizations can not act on their own, and organizational development depends on human direction and change. As the human factor is essential for the outcome of changes, change management is most relevant for illuminating how companies in the project industry can manage organizational development.

2.2 Change management

Most of the change management literature deals with internal organizational changes, and the material on inter-organizational changes is scarce. In this section we will examine insights and concepts stemming from change management literature, and how they can be applied to effectively implement changes in an ETO-supply chain. In order to provide an explicit link between internal organizational changes and change management in project-based organizations, we will first present what planned organizational changes is, before we study the human factor's influence on the outcome of these changes. Next, we will investigate how individual learning are transferred to organizational learning, and why this is important for organizational development.

2.2.1 Planned Organizational Changes

In order to talk about planned organizational changes it is necessary to understand what an organization is, and what elements it consist of. In newer organizational theory, the systems thinking of organizations has become the standard (D. I. Jacobsen, 2012; Schiefloe, 2011).

The system view implies that each organization can be divided into sub-systems, and that these systems are interconnected and parts of a larger system. Leavitt (1965) proposes that all organizations consist of four basic elements: tasks, people, technology and structure. The structure element is today often extended to include goals and strategy, formal structure, organizational culture, and power relations (D. I. Jacobsen, 2012). Scott (1995) argues that elements of an organization is interconnected, and that changing one element will affect the other elements as well. An example that illustrates this point is the introduction of new production technology. The introduction of new technology often requires employees to perform their work in new ways, which produces new structures for interaction. By interacting in a different way, new norms and values can emerge, which over time can affect the culture of the unit of change (Scott, 1995). When changes are of a certain magnitude, where the entire organization and its supply chain is involved, the systems are complex, and it becomes difficult to reveal causalities. By accepting the systems view on organizations, we also accept that planned organizational changes often have repercussions beyond the intention of the change. How can researchers and practitioners cope with the complex and uncertain reality, in order to achieve the intended outcome of organizational changes?

Change management theory deals with the area of planned organizational change, and are typically framed within Lewin's (1947) stage model of unfreezing, moving, and refreezing (Klein, 1996). In the unfreezing stage the organizational objectives is to ready the organization for change, by providing rationale and challenging the status quo. In the changing- or moving stage, the change process is started and momentum is developed, while the refreezing stage concerns reinforcement of the change. Where Lewin's framework focuses on the general process of planned change, others have developed more specific frameworks for organizational development activities, such as Kotter's (1995) eight-step framework for successful change processes. This framework is framed within Lewin's three-stage model, and provides a more detailed check-list for the different stages in the change process.

The change process is an important factor to consider when determining an appropriate change management approach, but do these frameworks accurately depict the rapid pace of change, the complexity and the uncertainty facing organizations today? Critics claim that the linear and static conception of the organization is inappropriate in a complex world that requires flexibility and adaptation, and that the criteria used to evaluate the outcome of change is insufficient as they primarily focus on profitability or market share (Senge, 2000; Netland, 2013). Kattman (2014) and Armenakis and Bedeian (1999) argues that these criteria are insufficient to evaluate the outcome of change, and suggests that the response of employees should be taken into consideration. By acknowledging the responses of employees as complementary criteria to evaluate the outcome of change, Armenakis and Bedeian (1999) accepts that organizations depend on human direction to successfully

implement change, which requires encouragement of individuals to enact new behaviours. The responses of employees, like receptivity, denial and resistance, the feeling of stress and cynicism, organizational commitment, and ultimately, employee-turnover, thus serves as indicators for whether or not employees are adopting the behaviours necessary to achieve the desired changes. Researchers such as Pettigrew, Woodman, and Cameron (2001) and D. I. Jacobsen (2012), agrees that other contextual factors must be addressed in order to predict the likely outcome of change initiatives, and suggest that the outcome of change can be understood by examining the factors: *content, context and process*. D. I. Jacobsen (2012) proposes an extended conceptual model, that highlights four elements that should be considered in order to achieve the desired outcome for planned changes: *Driving forces and change agents, content and scope, context, and the process of change*. This model is more nuanced, and recognizes that information about organizational features and the intended outcome of change, is highly relevant in order to discover the contingencies upon which successful change depends.

Researchers such as Kuipers et al. (2014) and De Wit and Meyer (2014), states that changes can be either incremental or disruptive, which constitutes the *scope of change* in Jacobsen's (2012) framework. Incremental changes refer to the continuous development of existing parts of the organization, such as the implementation of a new best practice in a construction process. Disruptive changes are more comprehensive, and refers to changes that require the organization to change in a more fundamental way. The implementation of the Lean philosophy[2] or organizational communication tools, such as an Enterprise Resource Planning-system (ERP)[3], can be examples of disruptive changes. Kuipers et al. (2014) believes that this conception is insufficient in order to understand the nature of the different types of changes, and introduces the concept of *orders of change*. These orders constitutes the *content of change* in Jacobsen's (2012) framework, and include everything from changes in a small part of the organization, to sector-wide changes. According to D. I. Jacobsen (2012) and Pettigrew et al. (2001), the *organizational context* must also be taken into consideration. The context refers to both internal and external organizational characteristics. Amongst the internal characteristics are factors such as economic resources, organizational culture, existing technology and structures, while the external context refers to factors such as technological stability, governmental regulations and cultural values of society (D. I. Jacobsen, 2012; Steven, 1995). New regulations, scarce economic resources, and technological instability in the organizational environment put pressure on organizations to change. Both internal and external contextual elements can therefore serve as *driving forces* for change. In order to effectively translate the need for change, into organizational action, D. I. Jacobsen (2012) states that the driving forces must be perceived and communicated

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[2]This is based on the famous production principles of Toyota Motor Corporation (Womack et al., 1990).
[3]Software system for information flow and joint planning (Slack, Brandon-Jones, & Johnston, 2013)

by a *change agent*. Internal characteristics such as organizational culture and structures can either inhibit or enhance an organization's capability to perceive and communicate the need for change.

The change management literature further outlines two different strategies for planned organizational changes: strategy E (Economic), and strategy O (Organization) (D. I. Jacobsen, 2012). Strategy E has the purpose of creating economic growth and returns for the shareholders. The content of change is often the formal elements of the organization, and management is the agent of change. The process of change is often planned and the communication is mainly "top-down" (D. I. Jacobsen, 2012), which means that most of the information regarding the change, such as urgency and vision, comes from management (Kotter, 1995). Conger (2000) argues that top level management has a broader perspective on the organization, as they are able to see the organization as a set of interdependent functions, as change in one part of the organization will affect the others (Leavitt, 1965). Top level management also has the power necessary to enforce changes, as their positional power gives them control over the organization's reward system. D. I. Jacobsen (2012) further argues that strategy E is likely to be preferred when the driving forces are external to the organization, and the changes are disruptive. Top management can more easily detect external driving forces, and the positional power is an advantage in situations requiring rapid change.

Strategy O on the other hand has the purpose of developing the dynamic and learning capabilities of the organization, through "bottom-up" communication and employee participation (D. I. Jacobsen, 2012). Levin, Nilssen, Ravn, and Øyum (2012) states that involvement and participation may be time consuming, as a achieving consensus may be difficult (Levin & Rolfsen, 2004). However, it secures greater support among employees, which is likely to reduce the time spent on the implementation process (Levin et al., 2012). The content of change is often directed towards informal and cultural elements of the organization, which in time will also affect the organization's formal and structural elements (Senge, 1990; D. I. Jacobsen, 2012; Leavitt, 1965). In order to facilitate organizational learning, the company however also need to adapt structural configurations that facilitate free discussions and motivation among the employees (Bies & Tyler, 1993; Nonaka, 1994; D. I. Jacobsen, 2012). The role of management is to provide these structures, and thus facilitate and motivate organizational development. This suggests that structural changes also is an important part of strategy O. As opposed to strategy E, strategy is appropriate when the driving forces are internal and the scope of change is incremental.

Which of these strategies should companies use when performing planned organizational changes? There are no easy answers to this question, which raises other questions as

well. To what extent should employees and other stakeholders be involved, and participate in the development of change activities? and will the intended outcome of change be realized if management relinquish some of its positional power in the change process? Most researchers agree that a combination of the two strategies is warranted, and that the nature of the change initiative in question, combined with other contextual factors, should determine which strategy to use, and consequently the degree of stakeholder involvement, and employee participation (Dunphy & Stace, 1988).

2.2.2 Resistance to change and employee participation - The human factor

Scholars such as Lewin (1947) conceived of change as a modification of those forces keeping a system's behaviour stable. This view implies that there are three ways to change the stable state - one can increase the forces pushing for change, decrease the forces maintaining the current state, or apply some combination of both. He suggests that decreasing those forces maintaining the status quo is the most effective change strategy, as it produces less tension and resistance than increasing the forces for change. Kotter (1995) states that two out of three change processes stagnate due to resistance, and suggests removing the obstacles to change. D. I. Jacobsen (2012) states that in order to achieve the desired outcome of changes, we need to understand why people resist changes.

D. I. Jacobsen (2012) and Tichy and Ulrich (1984) suggest that fear of the unknown, loss of identity and changed power relations are some of the reasons why people resist change. These employee-responses are more prominent when the scope of change is disruptive and of the third order (D. I. Jacobsen, 2012; De Wit & Meyer, 2014; Tichy & Ulrich, 1984). Pavitt (2005) further states that a common source of resistance in innovation processes are the many differing interests and professions inside a firm. The increased division of labor and specialization both within and between firms that is prevalent today, strengthens profession cultures and differences between them (Levin et al., 2012). Pavitt (2005) describes change initiatives as a political process, where the champions of the initiative must convince the resistance that the change is in fact a good solution. He argues that the strengthened profession cultures is likely to make it difficult to reconcile the diverging range of opinions, and achieve coordinated action. Recent European research indicates that the increasing trend of specialization negatively impacts employees opportunities for influencing changes in the workplace, which represents a potential source of resistance (Levin et al., 2012). The degree of resistance depends on the country-specific tradition for employee participation in organizational development. In Norway there is a long tradition for cooperation between employees, management and unions. If changes introduced by management threaten such

a tradition, they could be seen as an attempt of union bust, and increase resistance from employees and unions.

Many scholars agree that a common source of resistance is the lack of employee participation and involvement in the change process (Levin et al., 2012; Flores, Wei, Rau, & Thomas, 2012; Steven, 1995; Cole, 2002; Gill, 2002; Vallas, 2003). Klein (1996) also points out the importance of keeping the first level supervision completely informed about the rationale and progress of the organizational change, as this is likely to also keep the lower levels well informed. Stensaker, Meyer, Falkenberg, and Haueng (2002) found however, that too little emphasis is put on keeping middle-management and employees completely informed. Where top-management described the different change processes as part of a bigger picture, with logical connections linking them together, employees and middle-management perceived the same change processes as independent and often contradictory. The lack of information and participation was identified as major contributors to the failure of many change initiatives, as the changes was perceived as excessive. This led to high turnover amongst middle management, which further increased the resistance towards the change initiatives, as the lack of continuity in the middle-management position made it difficult to keep track of the different change processes. To what degree should employees be involved and participate in order to achieve the desired outcome of the planned organizational changes?

Steven (1995) found that employee participation affected organizations' degree of change readiness. The internal state of change-readiness together with the organizational culture and climate combine to establish the extent and directions of change that an organization can expect to accomplish. Kuipers et al. (2014) argue that the level of involvement and participation of employees in the change process should be a function of its order. When changes are complex, and of a certain magnitude (order two and three), they affect the informal elements of the organization to a greater extent, which means that a multitude of different viewpoints, power-relations, and individual goals must be reconciled. These informal elements refer to the processes and structures affecting the cultural values and social behaviour (Leavitt, 1965; Glosvik, 2002; Argyris & Schön, 1978). The objective of First order changes on the other hand are often structural, and do not affect as many people as second and third order changes, and the need for involvement and participation of employees is reduced. Kuipers et al. (2014) here takes the position that employee participation is a means to an end, and thus differs from the viewpoint of researchers such as Levin et al. (2012), who argue that employee participation, direct and indirect, should be a goal in itself in order to democratize the workplace and society as a whole. Levin et al. (2012) argue that management should relinquish some of its positional power to employees, as employee participation in the daily operations, creates an atmosphere where continuous

organizational development is possible, which further creates a greater flexibility in the face of change. Both Kuipers et al. (2014) and Levin et al. (2012) recognize the need for employee participation in order to create a climate and culture for change - the extent of which is the authors' point of divergence.

Steven (1995) states that organizational culture is not something that can be changed or manipulated at will, but rather it is an integral part of an organization. The culture is a particular combination of beliefs, values, professional traditions, behavioral norms, and ways of thinking that members of an organization share. Efforts to change a culture must therefore focus on a broad array of organizational elements over a period of years, including formal and informal structures, work processes, employee selection procedures, reward and punishment systems, celebrations, and other rituals. Scott (1995) argues that the existing structures, social behaviours and norms within an organization are seeking to reproduce themselves, which makes changing the organizational culture difficult. Researchers such as Netland (2013) states that it is the development of the cultural elements in the organization that often fails, and that not enough resources and thought are given to develop them. In his study Kattman (2014) also found that one of the most serious problems when implementing quality improvement programs, was management's desire to believe that the culture had been changed. Huehn-Brown and Murray (2010) states that managers do not know how to change their cultures or how to best deal with the inherently challenging and demanding nature of process improvement.

Kotter (1995) suggests highlighting the positive effects of the change on company performance as a way of anchoring the change in the organizational culture. Highlighting the effects of the change efforts illustrates the appropriateness of the change, and is likely to motivate employees to support the initiative, gain momentum and keep the wheels of change turning. Other researchers argue that many concurrent organizational development activities can be confusing to employees, and be perceived as excessive if not enough thought is given to communicating the rationale, the progress and the impact of change (Stensaker et al., 2002; Klein, 1996). Kattman (2014) further argues that it is insufficient to focus on observable quantitative changes in employee or unit output, organizational climate, work processes, or program outcomes. In order to create a culture for organizational development and employee buy-in, he states that a focus on qualitative changes in relationships, approaches to work, the operational definition of loyalty, and the psychological contracts between people and the organization is required. If management puts too much emphasis on measurable changes, it will block qualitative change. Cole (2002) states that a prerequisite for qualitative change is broad mobilization of employees, which requires both momentum and basic learning - rooted in daily work routines. Cummings and Worley (2015) and Weick (1991) further state that in order to achieve a major cultural change, and effectively

transform lessons learned into new best practices, the organization needs a systemic process of organizational development in which patterns of behavioural routines are extended and reinforced.

Flores et al. (2012) found that participative decision-making was the cultural factor that had the greatest impact on the efficiency of the organizational learning process. This corresponds with the findings of Coyle-Shapiro (1999), who found that employees' perception of the participative style of their supervisors prior to the introduction of improvement programs, was connected to their subsequent support. These findings indicate that strategy O is important in order to shape employees' perceptions, and the degree of support for change initiatives in the organization. Management should facilitate organizational development by providing visible leadership and direction, enabling structures and resources (D. I. Jacobsen, 2012; Huehn-Brown & Murray, 2010). We have in this section identified employee participation as a prerequisite for developing a culture for organizational development, but how do this participation actually translate into organizational action? Huehn-Brown and Murray (2010) states that introducing and embedding new behaviour patterns is something that involves intensive learning over a sustained period of time. In the next section we will elaborate upon organizational development from a learning perspective, and the role of employees in the organizational learning process.

2.2.3 Organizational learning and organizational development

Netland (2013) states that in order to achieve a sustainable competitive advantage, a company must be able to respond to changing market requirements; otherwise the competitive advantage is temporary at best. In order to face a rapidly changing environment, a company must have the ability to evolve and continuously change in pace with the environment. Anand, Ward, Tatikonda, and Schilling (2009) state that in order for organizational development initiatives to serve as a dynamic capability, the organizational infrastructure should enable the organization to coordinate and sustain their organizational learning efforts towards systematically improving processes. Huehn-Brown and Murray (2010) support this view, and suggest that learning must be incorporated as part of the organizational culture in order to achieve a systematic approach towards organizational development. The most important part of organizational learning is the ability to create and manage knowledge that drives innovation and organizational development (Nonaka, 1994). Without substantial learning, Bessant and Francis (1999) state that organizational development efforts will be operated at a suboptimal level (Bessant & Francis, 1999).

How can an organization learn? While Argyris and Schön (1978) argue that organizational

learning is an aggregate from individual learning, Cook and Yanow (1993) and Weick (1991) argue that organizational learning are embedded in structures and processes of the organization. The latter perspective is built on institutional theory (Scott, 1995), which states that processes and structures affect social behavior through cognitive, normative and regulative elements of the society. Snyder (1996) suggests that both perspectives are necessary in order to fully understand organizational learning, and proposes three criteria for categorizing learning as organizational. The learning must be done in order to achieve the organization's purpose (i.e. achieve strategic fit), it must be shared throughout the organization, and it must be institutionalized in structures and processes. Further, Glosvik (2002) states that regulative, normative and cognitive elements of an organization, not only affect social behavior, but individual learning as well. He further argues, that the institution of an organization provides stability, through what he calls organizational memory. Individual learning, affected by the organizational structures, may be used to change these structures.

What constitutes the organizational memory? According to Flores et al. (2012), the organizational memory "...is a process that involves encoding, storing, and retrieving the lessons learned from an organization's history, despite the turnover of personnel" (p. 644). That is, the mechanisms an organization use to encode, store and retrieve lessons learned. Examples of such mechanisms can be standardized operating procedures (SOPs), routines and scripts. Scott (1995) argues that there are four institutional knowledge carriers that constitutes the organizational memory; symbolic systems, routines, relational systems and artifacts (see table 2.1). These institutional knowledge carriers are also a product of the three institutional pillars of cultural-cognitive, normative and regulative elements, which stabilizes the organization. The organizational memory can thus be said to be the elements that constitutes the institution of the organization.

Institutional knowledge carrier	OM elements
Symbolic systems	Values, norms, beliefs, etc.
Routines	SOPs, routines, etc.
Relational systems	Roles, network, communication lines, etc.
Artifacts	Knowledge products, IT-systems, documentation, etc.

Table 2.1: Institutional knowledge carriers as building bricks of the organizational memory.

How does the process of changing the organizational memory look like, and how can the organization make it more effective and efficient? Flores et al. (2012) suggest that the pro-

cess of organizational learning starts with *information acquisition*, where the organization obtains information through internal or external sources. If the information is going to contribute to more than individual learning, *information distribution* throughout the organization is necessary. Without information distribution, tacit knowledge will be developed, and the organization are achieving single loop, or Model 1 learning, at best (Bateson, 1972; Cummings & Worley, 2015). That is, the actions are restricted to improving the status quo, and filling the gap between current and desired state, without any information about causality. Individuals of the organization *interpret* the information, and if various interpretations converge, the organization have achieved a unified understanding through the process of *information integration*. The concluding part of the process, is the *institutionalization* of the developed knowledge. By distributing and eventually institutionalizing knowledge, the organization facilitate a sensemaking process of the acquired information, and attempt to reveal the causalities between deviations and correctional activities (Termeer, Dewulf, & Biesbroek, 2017). This is called double loop deutero-learning, or Model 2 learning, and can enable the organization to change the circumstances under which the single-loop learning operates . At best, it can also involve learning about the learning process itself, improving both the double and single loop learning. This is characterized as the highest degree of deutero-learning (Bateson, 1972; Cummings & Worley, 2015).

There are however several challenges to the process of converting individual knowledge into organizational knowledge. Levitt and March (1988) argue that the interpretation of causalities derived from single events gives uncertainty regarding the validity of the knowledge generated. Flores et al. (2012) examined four cultural factors affecting the efficiency of an organization's learning process. They found that participative decision making could increase the efficiency of the process, followed by transformational leadership, learning orientation and organizational openness. Goh and Richards (1997) also points to the organizational culture, which has to facilitate openness and encourage experimentation in order to enhance organizational learning capability.

While Flores et al. (2012) defines the learning process as interpretive, Argyris and Schön (1978) state that the process of learning can be divided into four successive phases; discovery, invention, production and generalization. This definition takes a more experimental approach. Snyder and Cummings (1998) describes common organizational learning disorders for each of the four phases caused by inappropriate structures and processes. Organizations that share too little information may be prone to *blindness* and fail to discover gaps between current and desired state, or experience *multiple personality disorder* in the invention phase, as different parts of the organization try to apply different incompatible solutions to the problem in question. When different parts of the organization are insufficiently coordinated, the organization may experience the *alien-hand syndrome* in the production phase, as the

implemented solutions are inconsistent with the intentions of the organization. In the final phase, of generalization, the organization may fail to institutionalize the experiences from the learning process as they fall prey to *amnesia*. These disorders are affected by the ability to share and spread information throughout the organization, coordinate its different functions, and collect and incorporate new knowledge in the organizations base of knowledge (i.e. the organizational memory). These abilities can be enhanced by knowledge management, which are tools for creating, collecting and translating information into useful knowledge (Cummings & Worley, 2015).

How can knowledge management secure successful learning processes? Nonaka (1994) argues that research has put too much emphasis on traditional top-down and bottom-up management when it comes to organizational change. He proposes the middle-up-down management as a more suitable management style for knowledge creation and organizational development, where middle management function as a bridge for information flowing up and down through the organization. Middle management should secure a common understanding of the created knowledge, and facilitate what Gioia and Chittipeddi (1991) call a joint *sensemaking* process. The sensemaking process is important, as a unified understanding of information is a crucial part of the learning process (Flores et al., 2012). According to Stensaker et al. (2002), a failed joint sensemaking process can increase resistance. Organizations should focus on facilitating high quality sensemaking processes (i.e. sensegiving) during implementation of change initiatives (Balogun & Johnson, 2005; Gioia & Chittipeddi, 1991). It should also be noted that resistance to change interpreted as a result from personal sensemaking, could be a valuable resource for improving the quality of change initiatives (Simoes & Esposito, 2014). This underlines the importance of the interpretation and information integration step in the learning process of Flores et al. (2012).

However, middle-up-down management is not sufficient in order to secure knowledge creation. Nonaka (1994) suggests that the organization should provides the necessary structures and processes for acquiring, creating, exploiting and accumulating new knowledge in a cyclical process. For creation of knowledge to happen, the company must offer platforms that facilitate sharing of information, both tacit and explicit, on an interpersonal or social level. According to Nevis, Dibella, and Gould (1995), cross-functional or self managed teams could serve as appropriate knowledge creating platforms. There must also be easy access to information in the organization, to enable members to question the status quo. Nonaka (1994) argues, that in order to spread knowledge throughout the organization, the organization must have appropriate channels for distribution of information. A base for knowledge is equally important, in order for the knowledge to be saved and eventually redistributed. The knowledge creating platforms, information channels and a knowledge base are the most important parts of a learning organization's infrastructure.

Lawler, Worley, and Porras (2006) argue that in rapidly changing environments, the ability to change constantly is the best sustainable source of competitive advantage. The organization should therefore allocate significant resources to evaluate the organization design elements and how they can be changed, in order to facilitate flexibility, and not rigidity. While Nonaka (1994) suggests changing the institutional elements providing stability so that they facilitate learning, Lawler et al. (2006) argue for not letting them settle as this will create organizational rigidity. However, both perspectives emphasizes the importance of the institutional knowledge carriers in the learning organization, as a means to achieve a sustainable competitive advantage.

How do the learning process relate to organizational development? There are many frameworks for systematic organizational development, but the most famous is perhaps the Plan-Do-Check-Act (PDCA) cycle (Meiling, Sandberg, & Johnsson, 2014; Tortorella, Viana, & Fettermann, 2015; Deming, 1986). In the *Plan* phase, the current situation and solutions for improvement are discovered. In the *Do* phase, the solutions are tested before they are evaluated in the *Check* phase. If the solutions offered improvements they should become new best practices in the *Act* phase. One of the main reasons why the PDCA process fails, is that organizations fail to institutionalize the new best practices and redefine the system (Medinilla, 2014), which is similar to the organizational disorder of amnesia in the learning process described by Snyder and Cummings (1998). Both the learning process and the PDCA process is a continuous cycle which seeks to redefine the system and change the organizational memory, or the institutional stabilizers. According to institutional theory, the previous changes will affect the subsequent changes (Glosvik, 2002), and organizational learning is thus a path-dependent process. The process of systematic organizational development differs from Lewin's (1947) "unfreeze-move-refreeze"-model, in that it is a cyclical change process without a defined start and end date. Lewin's model is often interpreted as a linear process, as the refreeze stage implies a defined end of the process. However, it could be used as a basis for describing one revolution in the cycle, where the plan phase coincides with the unfreezing stage, and the refreezing stage coincides with the institutionalization. The learning processes described by Deming (1986), Argyris and Schön (1978) and Flores et al. (2012), and the connection between them are described in figure 2.1 below. From this figure, it could be observed that the learning process consists of two main phases; one in which knowledge is generated, and one in which knowledge is institutionalized in the organizational memory.
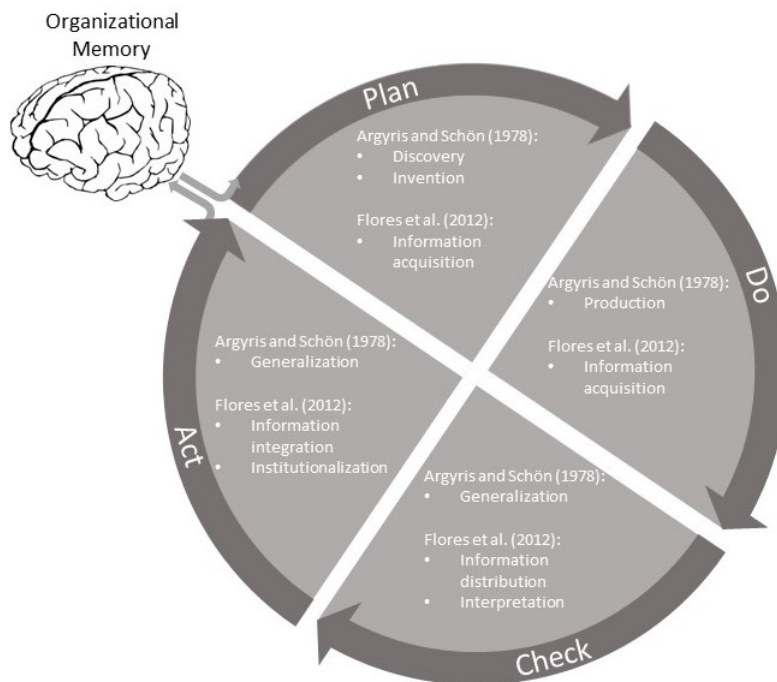
Figure 2.1: The learning process seen through the PDCA cycle.

2.3 An analytical framework

This section will relate some of the key considerations previously addressed in section 2.1 and 2.2, and will be concluded with the presentation of an analytical framework. This framework will address how project-based organizations can manage the learning process, and how the subcontractor relations will affect the joint learning process.

Key considerations from change management literature

In section 2.2.3 it was argued that organizational development should be understood as an organizational learning process. There are many perspectives on how this process unfolds, but all considers the process to consist of two main phases: the first is the knowledge generation phase, and the second, the institutionalization phase (see figure 2.1). We will therefore use these two phases as a basis for addressing the underlying factors affecting the organizational learning process. we will now briefly address the two main phases, and the respective underlying factors.

In the first phase there are three underlying factors that are seemingly contributing to the generation of knowledge: Information sharing, employee participation decision-making and strategic focus. According to Nonaka (1994), information should be effectively directed to the relevant persons or areas within an organization in order to achieve organizational learning. This requires appropriate information-sharing channels - both for acquiring the generated information, and for the subsequent distribution of the generated knowledge. Information generation is a prerequisite for organizational knowledge (Flores et al., 2012; Deming, 1986), and researchers suggest that the organization should facilitate forums and platforms where the employees are included (Levin et al., 2012; Nevis et al., 1995). By enabling employee-participation, the generated information is likely to be more accurate, and the solutions more appropriate, which will make subsequent institutionalization easier (D. I. Jacobsen, 2012; Gioia & Chittipeddi, 1991). Lastly, in order to systematize and provide direction for the knowledge generation process, researcher such as Conger (2000) and D. I. Jacobsen (2012) argue that management should provide enabling structures. Flores et al. (2012) further argue that by providing such structures, management is providing tranformational leadership, which contributes to a learning orientation among the employees. These managerial tasks all fall under the collective term of strategic focus.

In the second phase, there seems to be four underlying factors or elements contributing to the effectiveness of the institutionalization of the generated knowledge. These are the four institutional knowledge carriers described by Scott (1995), which are all possible ways of changing the organizational memory (Glosvik, 2002). The institutional knowledge carriers are all described in detail in section 2.2.3, and will not be repeated here.

Key considerations from supply chain management literature

In section 2.1, the literature emphasizes that in order to enter into joint problem-solving and a responsive contractor-subcontractor relationship, the relationships should be close and strategic (Roh et al., 2014). In order for the relationships to become close and strategic, Mentzer et al. (2001) and Sukati et al. (2012) argue that they have to be long-term. The general tendency in the project industry is however project-specific contracts and short term relations with subcontractors (Vrijhoef & Koskela, 2000), which seems to be conflicting with the objective of joint organizational development. Mcivor and Mchugh (2000) argues that the changing nature of the buyer-supplier relationship acts as a very powerful force for change, as the competition fosters innovation and increased cost-efficiency. He do however state that in order to effect successful organizational development, "it is essential that the approach adopted by organizations involved exhibit features of integration whereby the structures and processes required to support a specified strategy will inform and enable the organizations to more effectively address the challenges presented by the operating

environments"(p. 223). In order to address these challenges, and successfully coordinate activities to support a specified strategy, Phelps, Smith, and Hoenes (2004) suggests that the development of the future-state must be a group process involving all the relevant stakeholders. The goals of the development activities should be shared and jointly agreed upon, in order to decide what internal and joint efforts they can undertake towards the common objective. It therefore seems as the subcontractors should become embedded in the project-specific sub-organization of the contractor (De Wit & Meyer, 2014) in order to achieve the objective of joint organizational development. It seems however that there is prevalent mistrust in the project industry (Hicks et al., 2000), which further seems to undermine the embedded perspective on organizations. It would therefore be interesting to examine how the project-based organizations are dealing with this paradox, and how it affects joint organizational development.

Corporate compatibility is identified as one of the most important factors for determining the effectiveness of the contractor-subcontractor collaboration on projects (Al-Mutawah, 2009; Mentzer et al., 2001). Corporate compatibility emphasizes similarities in vision and goals, and according to Brown and Blackmon (2005) and Chopra and Meindl (2016), a company should develop it's capabilities with these in mind. Scott (1995) and Glosvik (2002) view the organizational memory as a recording of the organizations' historical development. This suggests that the vision and goals, and therefore the corporate compatibility, could be visible through the change history of the organization. Since previous changes will affect both an organization's structure and culture, it further seems likely that the structure and culture of an organization also could predicate the corporate compatibility. The change history, together with an organizations culture and structure, thus seem to predict corporate compatibility, and could serve as an an indicator for the effectiveness of the collaboration.

The short-term relationships are built around project-specific contracts (Vrijhoef & Koskela, 2000). According to Ross and Williams (2012), there are three main contract types used in the project industry: lump sum contracts; re-measurement contracts; and reimbursement contracts. Each of these contracts seems to have different pros and cons, an the lump sum contracts also seems to give an incentive for the subcontractors to internally develop their operations - as they have the possibility to affect their own profit through achieving a higher productivity. The contracts proposed by Chan et al. (2011) also gives the contractor an incentive for helping the subcontractor achieve a higher productivity, as they will save costs. There seems however to be few direct incentives for the subcontractor to enter into joint organizational development, and thus this becomes an interesting topic to investigate.

Analytical framework

In order to answer the research questions presented in section 1, we have on the basis of the key considerations presented above, developed an analytical framework. This framework will be used to structure the analyzes in chapter 5.

In order to answer the first research question, we will use the key considerations from the change management literature. These considerations are represented by the house in figure 2.2, and illustrates the internal learning process of the project-based organization. In order to answer the second research question, we will examine how the key considerations from the supply chain management literature are affecting the joint organizational learning process. These key considerations are illustrated by the box named 'Subcontractor' in the figure.
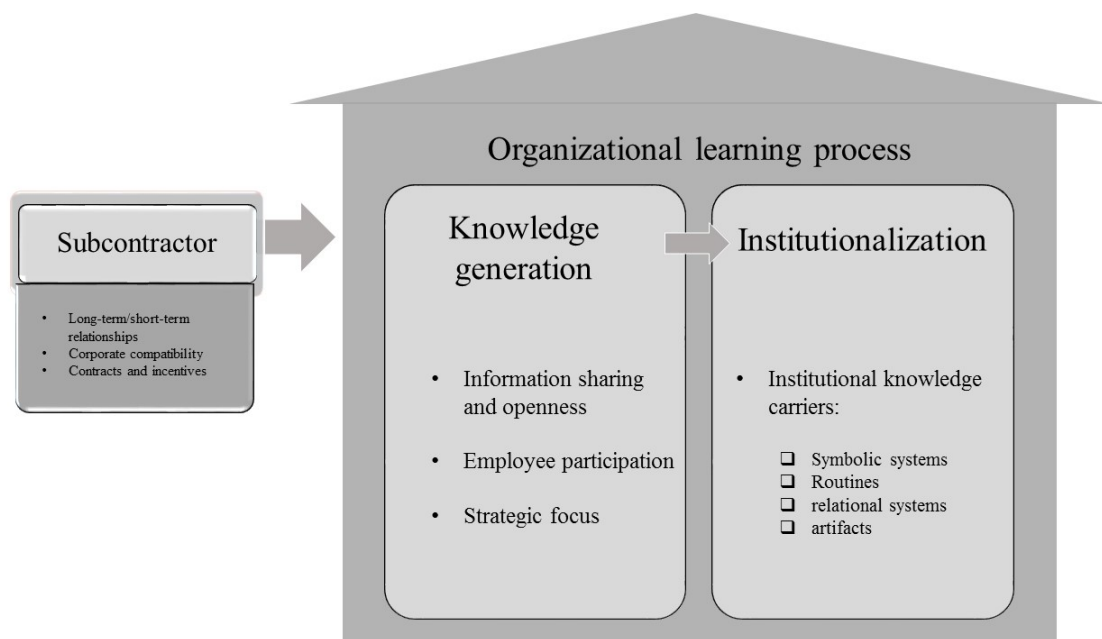
Figure 2.2: Analytical framework for organizational learning in the project industry.

Chapter 3

Research Method

In this thesis, we have asked the question: How do project-based organizations manage organizational development in collaboration with their subcontractors? This is a relatively new area of research, which is illustrated by the little amount of existing literature in the field. Because of the scarce material, we are using an inductive approach in our research in order to contribute to a more thorough understanding of the intersection between supply chain management and change management. Implied in the question of the thesis, is also the need to understand the social relations and processes where organizational development take place in project-based organizations. Here, we take the epistemological position that we need to understand the issue by examining the participants interpretation of the social world they are embedded in. The question further assumes that these processes and social relations can be managed somehow, to achieve the desired outcome of organizational development. Here, we take the ontological position that individuals have the ability to affect their surroundings, and that social properties are outcomes of interaction between individuals. Both the inductive approach to create new theory on the basis of research, and the need to understand organizational development as an outcome of interaction between individuals, are trademarks of the qualitative research method (Bryman, 2012) - both epistemological and ontological.

Within the qualitative research method, Yin (2014) suggests that the choice of research design should be based on: the nature of the research question; requirements for behavioral control; and focus on contemporary events. Because we are trying to understand the processes of organizational development in the business environment, we are not able to control the behaviours of the participants involved, or the conditions of the contemporary process. When we are not able to control external factors affecting the participants behavior, we have to investigate and understand the phenomenon in its real life context. For this

purpose, Yin (2014) suggests the case study as a preferred research design.

Yin (2014) argues that a multiple case study increases the chances of conducting better case studies, as the single-case study is vulnerable to the fact that you will "put all your eggs in one basket" (p. 64). The analytical benefits of having two or more cases is related to the potential for replication across cases, which will further strengthen the external validity of the research.

In our thesis we are performing a multiple-case study, where we will address three different project-based organizations' approach to organizational development. Because these organizations are all in the process of developing a system for organizational development, which is a relatively new concept within this business configuration, there is little existing literature on the topic. In order to reveal which elements that are likely to affect the potential for organizational development, we must understand the world-view of the individuals in these different contexts - through their experiences related to the various topics we believe are relevant, based on the literature study. We have therefore found semi-structured interviews appropriate for this purpose, and will in the next sections provide our detailed approach on how the interview guide was developed, and which sample strategy was used. We will also include an ethical perspective on how these interviews have been performed, and how the information acquired has been used in our thesis. To conclude this chapter we will make a quality assessment of the research, our procedure, method and execution.

3.1 Research design

Semi-structured interview
The most widespread method for gathering empirical data within qualitative research is to perform semi-structured interviews. The aim of the semi-structured interview is to have a conversation with an informant around some specific topics predetermined by the researcher. By creating a relaxed atmosphere, the informants can reflect on their own experiences and believes related to the topics of the research (Tjora, 2010). Kvale (1997) states that in order to create a relaxed atmosphere, where the informants are willing to share their perspectives and stories, the researchers should provide the informants with the context for the interview. We did this by informing about the purpose of the research, and how the interviews were going to be used.

The benefit of the semi-structured interview is that the researcher decides how the questions are formulated and the order of them, which enables the researcher to adapt to the specific context of the interview-setting. Because the interview process is flexible, the informant

is given leeway in how to reply. The researcher can then address these viewpoints, and ask questions that are not included in the interview guide, as he picks up on things said by the informants (Kvale, 1997). Semi-structured interviews are in other words preoccupied with the world-view of the informants, and what they view as important in explaining and understanding events, patterns and forms of behaviour (Bryman, 2012; Tjora, 2010).

Sampling of informants

According to Bryman (2012), *purposive sampling* is the preferred way to sample informants in qualitative research. The research questions provide a basis for determining what categories of people, or other units of analyses, that need attention. The sampling is purposive as one samples participants with the sole purpose of answering the research questions.

Bryman (2012) further states that sampling in qualitative research often takes place at two levels; sampling of context and sampling of participants. First the researcher must sample contexts, or cases, to illuminate the research questions. The cases are often sampled through the extreme case, typical case or critical case approach. For a multiple case study, it is common to ensure both heterogeneity and homogeneity across the cases; heterogeneity in order to bring somewhat different perspectives to the table, and homogeneity in order to have a basis for comparison. The three approaches are chosen to investigate unusual cases, exemplifying cases and cases that are critical to test a theory, respectively. According to Yin (2014), a multiple case study should follow a replication logic, rather than a sampling logic. By this, he means that a multiple case study should not seek to address a representative sample of cases, but rather a sample of similar cases through which the researcher can shed light on the problem he or she seeks to investigate.

In our thesis, we have chosen to use the typical case approach, with three exemplifying cases, as we want to investigate the project industry in general. Our cases are both from the offshore industry and the construction industry, which are subject to the project industry. By ensuring homogeneity and heterogeneity across our cases, we thus enable ourselves to draw on both similarities and nuances in the context of the industry in focus.

In our research we have used the snowball sampling approach in order to contact both organizations and participants. In this approach, the researcher start out with an initial sample, which later evolves as the researcher finds new participants (Bryman, 2012). We used our contacts at SINTEF to get in touch with organizations, and the initial participants in these organizations subsequently suggested other participants and subcontractors of potential interest to us. This approach became our preferred approach, because we had easy access to the contact network of the researchers at SINTEF. After our initial contact with the companies, they further suggested other relevant informants.

Yin (2014) emphasizes the importance of both defining and bounding the case in a case study. Bounding the case is equally important, as it is necessary to limit the scope of research in order for the researcher not to fall pray to fatigue in the analysis. It should here be noted that this thesis is a continuation of a project-paper written by us last fall, and that we already then were in contact with one of the case-companies in this thesis. We wrote a purely theoretical paper based on issues we discovered through interviews at a company visit in the autumn. This process helped us to both define and bind our case for this master's thesis. We therefore argue that we also have used elements of theoretical sampling, as described by Bryman (2012), in the sampling of cases and participants.

Ethical considerations

Aside from avoiding bias in the research, a researcher performing a case study has a responsibility to protect the human subjects involved. According to Yin (2014) the protection of the subject should involve gaining an informed consent, avoiding harm and deception, and protecting privacy and confidentiality. Tjora (2010) states that the focus on avoiding harm and deception applies to the interview situation itself, while the protection of privacy and confidentiality applies to the published research. The informants can be made anonymous, and the citations can be sent to the informants for approval before publication. Yin (2014) further states that a formal approval of research design should come from an institutional review board (IRB), which is "charged with reviewing and approving all human subjects research before such research can proceed" (p. 78), before the research proceeds.

In order to gain an informed consent from the participants, we gave a short introduction to our research topic, and asked to record the conversation. In addition, to include a brief introduction of the topic of our thesis before the interviews started, we also delivered an information flyer to each participant. The flyer contained information about the background for our thesis, the treatment of information generated through the interviews, and the possibility for withdrawal of the interview at any given time, in addition to our contact information (See Appendix E). We have chosen to anonymize the organizations and the individual participants, both in the thesis and in our archives for collected data, in order to protect the privacy and confidentiality of our participants.

In order to get approval for our research design, we reported our research design to the Norwegian Centre For Research Data. The report form and the approval is enclosed in Appendix A and Appendix B, respectively.

3.2 The interviews - Planning and execution

Literature search and research questions

As previously mentioned, this thesis is a continuation of a project paper written last fall. This paper was a theoretical study of the concept of change management extended to the supply chain, and formed the basis for the literature review in this thesis. We started the search for literature broadly, as the research questions were not clearly defined, and got acquainted with literature from a broad specter of theories within network level strategy, supply chain management, change management and the Engineer-to-order industry.

The process of finding relevant literature has to a certain degree been an iterative process. In the project paper we had conversations with several people in one of the case companies, both via Skype and during a company visit during the fall. These conversations both enabled us to narrow our focus of our literature review, and have been an inspiration for our subsequent work in this thesis. Our focus on organizational learning has for instance largely been influenced by these conversations. We have also conducted three expert interviews with professors and researchers at SINTEF, with expert knowledge within the fields of project based industry and organizational learning. These interviews has mainly been exploratory, where we have investigated areas and ideas for further search for literature.

The research questions of the thesis were initially quite open ended, and were meant as a way for us to structure our focus - both for the literature review and for the development of the interview guides. These research questions have gradually been developed, as we have received empirical data from our informants. Both the formulation of research questions and the development of the literature study, have therefore been iterative processes to a certain degree. This has enabled us to address what the informants viewed as important in answering the interview questions.

Development of the interview guides

The development of the interview guide have been centered around our initial research questions and topics from the literature study we believed were important in order to address them. The objective of this guide was both to provide us with comparable data between the different case companies, and also to facilitate the informants to elaborate upon them. The structuring of the different sections and the phrasing of the different questions, were therefore important to us.

In order to succeed with these objectives we have structured the guides in six sections: Introduction, Market, Process, Relations to subcontractors/contractor, Development initia-

tives and Conclusion. By following this structure we are moving from the general to the particular, with regard to the order of the sections. We have also structured the individual sections in this fashion, where we start by asking semi open-ended questions, followed up by specifying questions, probing questions or follow-up questions. These sub-questions are also included in the guides, and serve as a checklist of topics we would like to address during the interviews, for the different questions (Kvale, 1997). It is here important to note that we are neither bound by the open ended questions nor the sub-questions in the different sections. They will merely serve as a way for us to structure the conversation throughout the interview. If the informants are deviating from our predetermined topics, we will encourage them to answer the semi open-ended questions without interference. We will then ask follow-up questions and ask them to further concretize their answers, if new topics of interest should arise. In order to be able to do so, we have made priorities for the different predetermined questions and topics within each section. This prioritization ensures that we have sufficient time to address the core of the research questions.

In order to address the most important topics, we have also developed two different interview guides - one for the contractors (Appendix C), and one for the subcontractors (Appendix D). By having two distinct interview guides we argue that we are better able to focus the interviews, for both the contractors and the subcontractors, within the stipulated time-frame given to us. There are also some topics where we are interested in getting more detailed information from the contractor, and rather spend more time on other topics with subcontractors. The production process is such a topic, and we found it reasonable to ask more sub-questions and follow-up questions from contractors on this topic, as they are responsible for this process. The guide for the subcontractors are generally more focused on the subcontractor's role in this process. The contractor and the subcontractor have different roles and responsibilities in projects, and we needed more time with the contractor to investigate their relations with their different subcontractors. On the basis of these interview guides, we estimated that the interviews would take approximately two hours for the contractors, and one and a half hours for the subcontractors.

Conducting the interviews

We chose to conduct the interviews at the locations of the case-companies, because we recognized the importance of creating a relaxed atmosphere as emphasized by Tjora (2010) and Kvale (1997). All the case-companies were willing to provide closed and undisturbed venues, where we could achieve this atmosphere. For some of the case-companies, we travelled back and forth on the same day. This was feasible due to shorter geographical distance, and was the most convenient option for us. For other case-companies, where the geographical distances were greater, we wanted to travel and spend several nights in the

local community and at the camps along with the employees of the companies. This gave us the opportunity to get a more complete impression of the working environment and meet other people in addition to the informants.

In order to keep our focus on the informants, and the interview itself, we chose to record the interviews, using a recorder. In this way, we did not have to focus on writing down the informants' answers, but instead we could focus on details emerging in the interviews and provide follow-up questions.

During the interviews, we used our interview guides as a list of topic for the conversations. We found that the interview guides somewhat helped us structure the interviews, but we often deviated from them, as interesting details and stories frequently emerged during the conversations. The informants were encouraged to elaborate and speak freely. This increased the duration of the interviews, but gave us more nuanced and interesting data. According to Bryman (2012), there is a danger for exhausting the informants when the interview lasts for too long. A common experience for researchers, is that the informants begin limiting their answers in order to escape. Therefore, we tried to keep the duration of the interviews under two hours, and made room for breaks halfway, in order to not exhaust the informants and ourselves.

We interviewed two informants simultaneously on five occasions. We allowed two informants, whenever we thought they could provide more detailed answers together, than separate. However, we conducted separate interviews if the informants had too different backgrounds and positions. We also chose to keep interviews with focal companies and subcontractors separate. Our rationale for this, was to create a more relaxed atmosphere, and prevent limited and cautious answers in fear of being perceived as disloyal to a manager or customer. In two of our interviews we experienced a difference in talkativeness between the informants, but this seemed to level out as the conversation topics changed.

Tjora (2010) argues that using a recorder can make informants restrain themselves in some situations. However, this was not our experience during these interviews. In most cases the informants were more than happy to share information, and they gave the impression of trusting us as a neutral third party. There was only one interview in which we were met with skepticism from our informants. We made the mistake of wearing the customers visitation cards very visibly, and they were therefore concerned about what we were going to do with the recording. After we insured them that we were external researchers, and that everything said during the interview would be treated confidential and anonymized in the thesis, the interview carried on. In the aftermath we sent these informants detailed citations, and received approval for usage in this thesis.

The interviews were conducted over a months period, from early March to early April. The interview period was short and hectic and we conducted 15 interviews across the three cases. A list of interviews conducted in this period and informants is shown in table 3.1.

Company	Position	Duration
Contractor A	CEO and Operations Manager	1h 58min
Contractor A	Project Manager	1h 9min
Subcontractor A1	CEO and Project Manager	1h 36min
Subcontractor A2	Project Engineer	1h 29min
Contractor B	Procurement Manager and Contract Manager	2h 6min
Contractor B	XPS Manager	1h 12min
Subcontractor B1	Project Manager	1h 34min
Subcontractor B2	Production Supervisor	1h 44min
Contractor C	HSE Manager	1h 32min
Contractor C	ISS Site Leader and Contract Manager ISS	1h 17 min
Contractor C	Quality Manager and Installation Manager	1h 1min
Contractor C	Planning Manager	1h 3min
Subcontractor C1	Project Manager and Production Supervisor	1h 34min
Subcontractor C2	Quality Manager	35min

Table 3.1: A list of interviews and informants.

In addition to these interviews and informants we also conducted some initial and informal interviews last fall, during our visit at Contractor C's yard. These interviews were conducted in order to gather background information about Contractor C, and to gain insight into the complexity of the project industry. These interviews will be used in this thesis to provide background information. The informants involved in these interviews are listed below:

- Contract Manager 1
- Contract Manager 2
- Construction Manager
- HR Manager

3.3 Analysis

In order to analyze the empirical data, we have developed an analytical framework (see figure 2.2), where the categories are based on both empirical findings and literature on

supply chain management and change management. Kvale (1997) states that "categories can either be developed in advance, or they can arise during the analysis. They can emerge from theory or terminology, or they can emerge from the informants' vocabulary" (p. 125). We have prepared these categories on the basis of our literature study on supply chain management and change management, and used them to develop our interview guides. This has however been an iterative process, as we have included relevant literature as new aspects was revealed during the course of the data collection process. Both our initial literature study, the interview process and the inclusion of new theories, has influenced our choice of dimensions and subcategories.

Kvale (1997) suggests that the coded answers could be presented in a table showing the frequency of occurrence for the categories. We have chosen not to do so, since the overlapping answers were difficult to code unambiguously, and we believe this approach will not show the nuances in the answers for each category. Therefore, we have instead chosen to present the analysis as a discussion around the categories as themes. We have structured all of the four analyzes in two parts, each addressing one of the two research questions from chapter 1. These parts are further structured according to the analytical framework presented in chapter 2.3. In part one we will examine the contractors' knowledge generation processes, followed by their institutionalization processes. For this purpose, we will use the categories derived from change management theory, and more specifically the organizational learning process. In part two we will follow the same structure, but we will here investigate how the characteristics of the project-process, and the relational factors, affect the subcontractors ability to contribute to joint organizational development. For this purpose, we will apply the categories derived from supply chain management theory, in order to examine how these are influencing the joint learning process.

According to Yin (2014), the prevailing way of presenting a multiple case study, is to present the individual case descriptions, each with a distinct single case analysis, followed by a cross case analysis. We have chosen to conduct three single-case analyzes before the cross-case analysis. By doing so we are able to investigate each case in depth, and substantiate our reasoning before we elevate it to a higher level of generalization in the cross-case analysis.

3.4 Quality of research

The first thing to consider when evaluating or assessing the credibility of any research, is that you need to have some criteria for what good research is. The empirical data in qualitative research is based on subjective descriptions of the social environments the research subjects are embedded in. It is therefore quite impossible to make a valid numerical assessment of

the quality of the research. This makes it important to address the quality and the credibility of the qualitative research in other ways. Researchers have suggested numerous ways of doing so, from adopting the quantitative criteria to adapting them in various ways.

While some researchers suggest using criteria similar to those used in quantitative research (Yin, 2014; LeCompte & Goetz, 1982; Tjora, 2010), others suggest to rethink these criteria for qualitative research (Guba & Lincoln, 1989; Thagaard, 1998). Guba and Lincoln (1989) argue that qualitative researchers should be focusing on demonstrating the trustworthiness and authenticity of their research. They further suggest that trustworthiness can be measured by assessing the criteria: credibility, dependability, transferability and confirmability. To demonstrate the authenticity of the research, it is important to give fair representations of the different view points in the social setting in which the research takes place. By giving a fair representation, the researchers contribute to a better understanding of the social milieu. This provides both members of that milieu, and practitioners in general, an opportunity to appreciate the different view points, and take actions to change their circumstances.

Credibility refers to the degree of certainty with which we can claim that our findings are in line with the social reality we are seeking to describe. This is the equivalent of the internal validity criteria used in quantitative research. This is recognized as a strength in qualitative research because of its explorative nature, where the researcher's objective is to understand the social reality of the informants. The qualitative researcher is therefore more likely to be able to draw correct inferences between an action and the outcome of that action (Bryman, 2012).

In order to increase the credibility of our research we have applied the strategy of triangulation, both in the analysis of the empirical data and in the literature study. In our thesis we have sought to understand the relations between contractors and some of their subcontractors, as we believe this relation to be important to organizational development in project-based organizations. We have therefore found it appropriate to include informants from both parties to reflect the various perspectives on these relations. By doing so we are able to make a richer description of the relations, which is more likely to reflect the social reality, and strengthen our findings. In our literature study we have also used researchers from various theoretical stances to provide multiple perspectives on the same phenomena. This has enabled us to identify elements that are likely to affect the process of organizational development with greater certainty.

To assess the quality of the interview guides we had different professors with experience in development of interview guides read them over. These professors have various fields of expertise, and were mainly focusing on the logical structure of the guide, and the number and phrasings of questions. We also received feedback from our supervisor on the content

of these guides, to increase the probability of getting both accurate and relevant information to answer the research questions.

In order to preserve the quality of our data, we recorded and transcribed all interviews in their original form and meaning. By storing the transcribed interviews in their original form, we avoided the risk of loosing information and the context in which the answers were given. The fact that we were two researchers further reduced the risk for misunderstandings, both in the interview setting, and in the analysis process. Because we were two, we were able to discuss each others' perceptions of the same transpired events. This is what LeCompte and Goetz (1982) refers to as inter-observer consistency. In order to ensure that our citations and understanding of the social context were accurate, we also sent some of the informants a copy of our transcribed material to get respondent validation, which further increases the credibility of our empirical data.

Furthermore, we have interviewed informants with roles that are tightly linked to the subcontractor/contractor relationships. This is important in order to acquire valuable and reliable empirical data, and will better enable us to make inferences about the social context. The positions and roles of the informants enables them to express subjective opinions and views about the relations. This increases the credibility of the data material, it will at the same time reduce the transferability of the findings to other social contexts.

Transferability refers to the degree of which the findings holds for other similar contexts at a different point in time. This is the equivalent of the external validity criteria in quantitative research, and is recognized as a limitation of the qualitative research method (Bryman, 2012). By applying a multiple case study we are able to increase the transferability between different social contexts, as our findings is a product of a cross-case analysis. This is what Yin (2014) calls replication-logic. Because our sample of case-companies represent typical project-based organizations in Norway, we can with greater certainty infer our findings for other similar organizations, with a similar social construct. It is however important to note that we can not make any inferences to organizations outside our sample. Because it is almost impossible to replicate the social context in which the interviews took place, we have focused on providing rich and detailed descriptions of the case companies and the informants' point of view (see section 4), which Bryman (2012) refers to as thick description. By providing thick description we are better able to substantiate our findings, which makes it easier for any reader to assess whether or not our findings are transferable to different contexts.

Dependability refers to the research process, and should provide the reader with the necessary insight for understanding how the researcher arrived at the results. This is the equivalent of reliability in quantitative research (Bryman, 2012). This chapter is an attempt to show the

reader how we have proceeded in our research, and provide a full description of our applied research design and collection and handling of data. Then it is up to the reader to decide whether our approach is in line with good research practice or not. In order to address the dependability of our research we have furthermore consulted with our supervisors, and tested our research design and thoughts on them, during the entire process.

Confirmability is also concerned with addressing the reader's faith in the research, and equals the objectivity of quantitative research (Bryman, 2012). In order to address the confirmability of our research, we have chosen to use citations from our informants in our presentation of the empirical data in chapter 4. The reader can thus observe what has been said during the interviews, who said it and how we have interpreted the statements of the informants. This will hopefully show the reader, that our interpretations and conclusions are logical. In this way, confirmability is tightly connected to credibility.

To conclude the assessment of the quality of our research, the *authenticity* should also be evaluated. The authenticity emphasises fair inclusion of all existing viewpoints, and the impact of the research (Yardley, 2000). The impact would be very difficult for us as researchers to address at the time of writing this thesis. However, by addressing a topic that is not currently prevalent in the existing literature, we hope to contribute to the existing literature and inspire future research, in the intersection between change management and supply chain management. The topic of organizational development in the project industry is, as shown in the introduction to this thesis, of great organizational and societal importance, and our hope is that this thesis will motivate further research on related topics.

Chapter 4

Case-companies - an empirical description

In this chapter we will present the three cases in the thesis. We will for each case present the project-based organization together with two of their subcontractors. We will then give a thick empirical description of the project-process. The project-process is a product of the contractor's methodology, and will therefore be presented from their perspective. The descriptions will therefore also deviate slightly based on their methodology. The subcontractors viewpoints are here included in order to provide a more accurate description of the process. Last, we will describe the companies' approaches to organizational development, and their joint development efforts.

4.1   Case A: The local construction company

This case is about a Norwegian construction company and two of its subcontractors, supplying workforce and services on-site. The two subcontractors have supplied plumbing and electrical services to one of the construction company's recent projects. The informants' formal positions in their respective companies are described in table 4.1 below.

Contractor A	- CEO - Operations Manager - Project Manager
Subcontractor A1	- CEO - Project Manager
Subcontractor A2	Project Engineer

Table 4.1: The formal positions of the informants in case A.

4.1.1   Presentation of the case-companies

Contractor A

The contractor is a local construction company in Norway, with a broad product portfolio. This includes both small and large construction projects, from private houses to governmental or privately owned commercial buildings. The focal company, hereafter referred to as contractor A, has 200 employees at their disposal, and is one of the largest construction companies in their local market. These are skilled employees distributed among four disciplines; concrete workers (74), carpenters (105), tinsmiths (6) and roofers (6). Contractor A thus possess both large capacity and broad expertise. Compared to the local divisions of the national contractors, the CEO also states that Contractor A have a relatively small management group, which enables them to offer competitive prices.

In recent years, most of Contractor A's projects have been apartment-projects for the private market, where the investors are capital intensive, and locally based. Each year they undertake approximately 20 projects of considerable size, and 100 in total. The main competitors are the local entrepreneurs, as the projects in the county are usually too small for the national contractors to make a profit. However, in some of the larger projects, the national contractors

have been increasingly represented. There is a fierce price-competition with competitors in order to win projects, which in turn leads to low profit margins. Contractor A has a total profit margin of approximately 3.8%[1] on their projects, according to the CEO.

The local construction market is constantly shifting, and is indirectly affected by the oil-price and the financial situation of other local companies. In order to mitigate the risks associated with a fluctuating market, the CEO states that Contractor A follow the market closely, and focus on having a diversified project portfolio as part of their competitive strategy. In addition to their market-position in apartment projects for property developers, the company have undertaken governmental projects as a part of this strategy. Due to contractor A's superior market-reach compared to many of the local competitors, they are better able to exploit locally shifting construction activities, which is recognized as a competitive advantage by the CEO.

Subcontractor A1

Subcontractor A1 is a medium-sized plumbing company, with two branch offices in the local market. The company has about 50 employees, and delivers plumbing services for the private market and for larger construction projects. The main customers in the construction segment, are the local builders and entrepreneurs, and national entrepreneurs only on occasion. Construction projects represents 70 % of Subcontractor A1's total revenues, of which Contractor A make up between 60-70 % according to the CEO of Subcontractor A1. The profit margin on construction projects for Subcontractor A1 is around 4-6 %, which is representative for the construction industry. Margins are relatively small, and minor mistakes may endanger the profit on projects.

The main competitors of Subcontractor A1 have historically been two similar-sized local plumbing companies. In recent years there has however been an emergence of many smaller plumbing companies, competing for market-share in the private market. The competition on smaller projects has thus become accordingly tougher according to the CEO. A competitive advantage for Subcontractor A1 is their size, which enables them to take on larger projects than several of their competitors. Their relative size also provides greater capacity and flexibility compared to many of their competitors, which opens for the possibility to transfer plumbers between concurrent projects, as the activity levels on different projects fluctuate.

Subcontractor A2

Subcontractor A2 is a large electrician company, with 55 employees in multiple branch

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[1]The average profit margin for the construction industry in Norway was in 2015 approximately 3.6% (Brekkhus, 2016)

offices. They are primarily operating in the same market as Contractor A. On larger projects however, where the contractors often operates nationwide, they deploy operators at various construction-locations all over the country. Approximately 60 % of their business stems from construction-projects, and the average profit-margin on these project-deliveries, are approximately 8 %. This is however project-dependent, and is very volatile due to the many factors that can affect the overall profitability. According to the Project Engineer, most of these factors is beyond the control of Subcontractor A2, and the degree to which they affect the overall profitability is very much dependent on the contractor, and especially the client. These uncertainties makes it hard to estimate the profit margins for individual projects, which is illustrated by the mismatch between budgeted and actual returns on many of their projects.

The customers of Subcontractor A2 are usually local contractors, such as Contractor A. Currently they do however have three large ongoing projects with a national contractor, which requires most of their capacity. The content of these projects are modular buildings, and differ from the apartment projects that Subcontractor A2 have previously had with Contractor A, in terms of methodology, routines and procedures. Subcontractor A2 also experience a difference in terms of the degree of formalities required in the ongoing projects, where both the contractor and their client require large amounts of forms and verifications.

> *"The profit-margin depends on our partners. Some enable us to use only six operators, while others require us to use 12. We don't know when we make the offer. (...) We have missed Contractor A on these projects. They are less rigid in terms of formalities - we don't have to make thousands of, in our opinion, unnecessary forms. It's a form-hell from another dimension."*

> - Project Engineer at Subcontractor A2

Subcontractor A2 have joined in coalitions with Contractor A, and another large contractor. The Project Engineer stated that by working together with the same contractors on many projects, they are able to realize synergies in terms of work processes, which increases the efficiency of project-executions. A strategic goal of Subcontractor A2 is to develop their capabilities in collaboration with their contractors, in order to increase the overall performance, and create a reputable rennomé in the market. Both renommé and customer satisfaction are believed to be critical in order to win future projects, both with existing and new customers. Subcontractor A2 have implemented different test routines and practices in order to minimize the amount of rework, and deliver high quality products and services. They are also currently in the process of developing a service department, which is an investment believed to increase customer-satisfaction and further strengthen their market-position.

> *"When we have established such coalitions, it's important not to get too comfortable - then you won't get the next project. You have to think of each job as the first, for each customer (...) That's the most important to us - the end customer. The word of mouth travels fast, and that's how we get new jobs. (...) We generally receive few complaints."*

- Project Engineer at Subcontractor A2

Subcontractor A2 are not affected as much by market fluctuations and project variations, as they have multiple projects within different markets. Furthermore, the market is sufficiently big, and they have a high activity-level. During the five last years they have seen a 200 % increase in turnover, from 40 to 120 million NOK. In order to maintain a high activity-level, they are communicating with actors in the local construction industry. This is not a systematic approach, but rather a sporadic activity enabled by the short geographic distance, according to the Project Engineer.

4.1.2 Project-process and collaboration

Tendering phase

The process from acquiring new projects to the finalization of the buildings, depends on the customer segment. A typical invitation for tendering for governmental projects are posted on a web-based selection system called Doffin. These projects often have a comprehensive list of requirements, where an architect have made detailed specifications for the delivery. Contractor A then provide prices for all the requirements, and the expected time of delivery. Private customers typically only invite a few contractors to the tendering process, or approach one specific contractor. This process often includes a pre-qualifier round, where the client evaluates the contractor's experience and project history. These projects are often less specified, which requires Contractor A to hire both consultants and architects themselves. The contractor that is able to deliver the best solution to the client-request, in terms of design and price, wins the project.

> *"If you have completed a somewhat decent job on previous projects, they usually initiate a collaborative arrangement."*

- CEO of Contractor A

Before the project can start, Contractor A sign an agreement with the customer, and start collecting price offers from possible subcontractors. Which subcontractors that are required, depends on the specific project and the technical advancement of the building. However,

most projects require groundwork in terms of excavation and blasting, and technical disciplines, such as electricity, plumbing and ventilation. Painters and bricklayers are also involved in many of Contractor A's projects. These disciplines are not available in-house, and must be sourced for every project. Furthermore, they have several suppliers of materials, such as windows, aluminium and timber.

> *"When we are awarded a contract, our routines state that we're going to have an internal start-up meeting involving the project manager, the safety representatives and the group leaders on our in-house disciplines. Here we agree on what to do. There are many similarities from one project to the next."*

> > - Project manager at Contractor A

Contractor A rotate between it's subcontractors, both because the requirements for each project often differs, and to ensure price- and quality competition among the subcontractors. According to the CEO most subcontractors are within an acceptable price-range, which makes personal chemistry, work-climate and cultural fit the most important selection criteria. They have a small number of subcontractors within the different disciplines, which they use regularly. This pooling of subcontractors is based on previous experience, which reduces the risk of collaborative issues. As the subcontractors are familiar with contractor A's methodology, procedures and systems, the risk of quality issues are also reduced.

> *"We strive to standardize our methodology, and it probably deviates from that of our subcontractors. If we use completely new subcontractors, it takes a while before they get it, and are able to use it."*

> > - Operations Manager at Contractor A

> *"We usually use local subcontractors, both because we know what we get, their values, and because the milieu is sufficiently small so that we know the people. They know how we do things, we know how they do things. (...) A challenge is that the subcontractors can get too comfortable - that they forget who is customer and who is subcontractor. That's why we rotate between them. If they know they're in competition with others, they know they have to deliver quality. In my experience the quality is sinking if they get too comfortable."*

> > - Project Manager at Contractor A

Contractor A primarily operates with turnkey subcontractors, which means that the subcontractors are legally responsible for engineering and execution within their own disciplines. These contracts refer to a specific project, and include quality requirements on delivered

product or service, HSE-requirements and an obligation to adhere to Contractor A's planning regime. The subcontractors are also required to have a group leader[2] present on the construction site. The Project Engineer at Subcontractor A2 states that these requirements are variable from project to project, depending on the contractor.

> *"Processes, routines and cultures are variable, and the degree of cultures depends on whom you're dealing with. The HSE requirements are especially variable, it's a huge difference! The national contractors are very strict on these requirements because they're part of a corporation that has a great focus on it. (...) If you fall down from a ladder because it was unstable, you would rather have it stable the next time - If you have learned a lesson you have higher standards. There are large differences between contractors."*

> - Project Engineer at Subcontractor A2

Engineering and construction phases

On contractor A's projects there are many different disciplines present, which may cause friction, and disrupt the flow of the project activities. After the tendering phase, Contractor A embarks on the engineering phase together with the subcontractors, where the construction drawings are made on the basis of the architectural design. The construction drawings must reflect the expertise both of the subcontractors, and the in-house disciplines of Contractor A. This process is typically concurrent with the construction phase, which means that detailed drawings are not completed before the building process begins. Contractor A have a lot of focus on planning, both in the engineering and construction phase, in order to ensure project progress.

> *"There's a lot of focus on planning and progress. That's the main focus in our industry: progress, progress, progress! It's a tough industry in terms of time-constraints."*

> - Project Manager at Contractor A

> *"There are so many dependencies! The scope of the Engineering process differs between the disciplines, and is done concurrently with the construction phase...Which is both fortunate and unfortunate. There are often more than enough parallel processes."*

> - CEO of Contractor A

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[2]In Norway, a group leader is regularly referred to as a "BAS".

As projects are becoming more complex, and with more technological equipment to be installed, the subcontractors become accordingly more dependent on detailed and accurate drawings. Most equipment require power access, and in order to include these detailed requirements in the engineering phase, all actors on the project need to share their requirements to a larger extent. The biggest challenge for both Subcontractor A1 and A2 is to receive thoroughly detailed work descriptions. The Project Engineer at Subcontractor A2 states that this has improved significantly with Contractor A because they are included at an early stage in the engineering phase.

> *"The drawings are too general, which makes the job much bigger for the guys outside. In addition to performing the job, we have to do a lot of engineering, when really it should be a discipline of it's own. This is a general problem for the entire construction industry, and it's getting worse. (...) The technical disciplines we're using aren't included until we get the job from Contractor A. They should be included at an earlier stage in order to provide a more accurate price on the project. (...) I would like to have a pre-engineering meeting with the group leaders as they know what works and what doesn't."*

> - CEO of Subcontractor A1

> *"We're setting requirements related to what needs to be in place in the engineering phase. A contractor only thinks so far ahead, and we've influenced the process by stating our requirements so that we're engineering relative to the end-product. We're dependent on having correct drawings, which was nonexistent before I started. This is a process that has improved considerably because we're involved at an early stage together with both contractor A and their technical advisers. (...) If we're not dealt all the cards, we're not able to do a good job. There's no point in playing 5-cards, if I'm dealt only two - If you're going to change tires on a car, and don't have the right tools, you're not able to do it."*

> - Project Engineer at Subcontractor A2

In the engineering phase, a rough plan for progress is made. This plan is revised on a weekly basis by the group leaders, to ensure project progress. Contractor A differs from many of the national contractors in that they have their project leaders situated at a base-station, rather than on construction site. A consequence of organizing in this fashion, is that the group leaders receive more responsibility on construction site, and are to a greater extent responsible for project progress, and delivery within the time frame of the contract. This transfer of responsibilities is enabled by Contractor A's flat organizational structure.

> *"As opposed to other medium-sized contractors, we have less administrative functions on-site. We use group leaders to manage on-site activities. We don't have 15 officers on our projects - we have group leaders, two supervisors and a project manager - That's the norm. The group leaders coordinate the different activities, and make sure the projects run smoothly. The group leaders are the key - If you have competent group leaders, everything fall into place."*

> \- Operations Manager at Contractor A

Contractor A require that all subcontractors have a group leader on their projects, as they recognize the importance of the group leader to the overall efficiency of project-execution. The group leaders are going to regular construction-meetings, and make the necessary clarifications so that the project can move forward. Previously they have had operators going to these meetings, which fragmented the daily operations and caused project-delays. Due to the importance of the group leaders, they have great impact on the profit-margins of projects. If the group leaders from Contractor A and their subcontractors lack personal chemistry, the profit-margin suffers. According to the project Engineer at subcontractor A2 there are always both inter-disciplinary and interpersonal challenges in a project, which makes personal chemistry and experience so important.

> *"It's extremely important to know the subcontractors, for the group leaders to know each other, and for the group leaders to know the systems. It's actually really simple - If we have worked with them before, and they have the same group leaders, things move smoothly. They almost don't need construction-meetings, it happens automatically. On new projects however, where the personal chemistry is lacking, it's much more demanding to get people to coordinate. (...) If the personal chemistry on-site doesn't work, it doesn't matter how cheap they are, or how nice logo they have."*

> \- Operations Manager at Contractor A

> *"It's all about coordinating activities and practice together. This became obvious to us during the apartment projects with Contractor A, where the group leaders knew each other. It was moving faster and faster, and the results got better and better because we discovered each others dependencies. I'm a supporter of developing together with the contractor in a project context - with the same people. Practice and improving together, that's what it's all about!"*

> \- Project Engineer at Subcontractor A2

The Project Manager of Subcontractor A1 adds that the competence of Contractor A's

group leaders, historically has been subject to variation, but that they now more open for suggestions from their subcontractors.

> *"In the more recent projects we've had with Contractor A, their group leaders have been very good. Earlier there were some that were not willing to collaborate at all. (...) They are listening more to us, instead of going entirely in their own direction. It has gotten a lot better!"*

> - Project Manager at subcontractor A1

In order to create a good work-climate internally, Contractor A are focusing on treating the different disciplines the same, in terms of pay and working conditions. They have a performance-based payroll system, and every discipline and individual has the same baseline conditions. If a discipline has a low-activity level in any of the project phases, they also facilitate job-rotation between disciplines, as part of the performance-based payroll system. They recognize the payroll system as a success in terms of creating a good working-climate.

> *"I believe there is little frictions between our employees because we have worked very intensely with pay- and working-conditions. They are treated the same, with the same base salary, the same everything. They are also working on a performance-based payroll, so any wage difference is due to the individual performance. This is important for the working environment. We have an agreement with the union that employees can aid their buddies on other disciplines, if they have low activity on their own disciplines. I think that's a key."*

> - CEO of Contractor A

The CEO states that they are sending out all relevant information to its employees and subcontractors. Subcontractors receive thorough information of Contractor A's methodology, and how the projects will be carried out. They also train them in the methodology, and the planning regime. They do however not share information about internal processes and strategies. Information is shared in the initial project-meetings in the engineering phase, and in weekly group-leader meetings throughout the project. The reports from these meetings are open to everyone who is interested. They also have a private Facebook group, which is used to share internal information of all kinds. Operators are however calling for more information throughout the projects, and want a more structured form of the received information.

> *"They say it's insufficient! They never receive enough information. (...) That's one of the things we have not succeeded 100% at. There are no secrets here, and we share the information we've got, but they call for more structured forms.*

That being said, they don't read the mails we send out, so we don't know quite how to do it."

- Operations Manager at Contractor A

"It's actually quite interesting. We have a private Facebook group, where it's registered how many who've seen seen it. There is also many questions about things that they've obviously been informed of. Information is a discipline on its own - it should be the right amount and in the right form. The receiver is probably also affected by which leg he woke up on."

- CEO of Contractor A

Completion phase

According to the CEO, Contractor A generally has little focus on evaluating completed projects, both because of the time-constraints imposed on them by project dead-lines, and because they have overlapping projects in order to keep a high activity-level. The Project Managers also often have other concurrent projects, and it is extremely rare to have any idle-time in between projects.

"We have a clear intention of evaluating projects from time to time, but this is a work in progress. Some of the challenges of running a project-based organization is that everything has an end. We don't have a 10-year contract that secures continuous operations, we are always looking for new projects. This has a tendency to affect the evaluation-part. We will rather have overlapping projects than idle-time...I mean, we are 200 guys here. In a perfect world there would be a gap between projects...This is however never the case. We have a job to do, in order to find suitable routines for it."

- CEO of Contractor A

According to the Project Manager at Contractor A more and more projects are being evaluated internally, where they gather key personnel and assess the economy, progress, staffing and collaboration. They do however not have a distinct system for evaluations, but rather use a word-of-mouth method. They have also had evaluations with subcontractors in the past, but struggled then to get any meaningful information out of them. The Project Engineer at subcontractor A2 also states that these evaluations did not work, and that continuous evaluations during projects are more appropriate. It is currently not being allocated resources to evaluation-activities with subcontractors.

"It's being done more and more, where we gather key people internally to evaluate projects. We've also tried to evaluate projects together with subcontractors, but it has never come any good out of it. Everyone is sitting around the table thinking: "we're going to work with Contractor A on projects in the future, so we have to say this went well". I feel that they're not 100 % honest after the projects are completed - things are being smoothed over. We learn more from the internal evaluations, where we have the Project Manager, Foreman, Group leaders and safety representatives. (...) The group leaders are often tossed from one project to the next, and they rarely receive other feedback than from the client. I think they appreciate these internal evaluations we've decided to do."

- Project Manager at Contractor A

"We communicate, and adjust as we go. On apartment projects with Contractor A, I usually let them know what I think they should do. It's a continuous process - In order for me to do this, you have to do that. We've also had evaluations in the aftermath of projects, but I feel they were mostly used to find flaws in one another, rather than also pointing out what went well."

- Project Engineer at subcontractor A2

"There should definitely be a joint evaluation with Contractor A! We have so many projects together, so I think that would be brilliant; Where did we succeed, where did we fail? Is it in an early phase or a late phase? Then we could avoid doing the same mistakes over and over. (...) I think there's greatest potential in the engineering phase, where we should be included earlier. Joint evaluations would be beneficial as a reference point for such pre-engineering meetings. I'm not thinking of writing a ten-page thing - it should be something really simple, and it should be the same elements for each evaluation. Then it would be easy to recollect the information."

- CEO of subcontractor A1

4.1.3 Approaches to organizational development

Contractor A

Contractor A has developed a two-part governing logic for the production process, hereafter referred to as A-Standard. The first part of A-Standard is a set of standards for specific work activities, e.g. standards for prefabrication of stairs, and for isolation of windows. These

standards for work activities reduce variation between projects and employees, and ensures high quality. The second part of A-Standard deals with Lean construction, the production methodology, and speaks to the way things are done at Contractor A.

> *"Internally we have a couple of "A-standards", which we use in order to get the details right. The methodology should be the same for every project execution. We are not at 100% yet, but about 80% of our projects are executed the same way. Our procedures should be the same across the board - we use the same people, and the same methodology for everything."*

> - Operations Manager at Contractor A

Contractor A must comply with statutory rules and regulations, imposed by the authorities, which means that all standards in A-standard must at least be within the framework of these rules and regulations. Within this framework however, there are countless ways to operate, and the development of A-Standard five years ago was a response to the high variety in work-practices among employees and subcontractors.

> *"If a mistake should occur, we at least know what has been done, which would not be the case if the individual craftsman had his own favourite way of doing things. Then it would be just as exciting every time to open a wall, and see what has been done this time."*

> - CEO at Contractor A

A-Standard was first implemented for the Carpenter discipline, before it was developed for the Concrete discipline. Today it is implemented throughout all disciplines at Contractor A, and is continuously evolving through feedback from skilled employees and group leaders. Employees are encouraged to contribute to development of existing routines, and there is a low threshold for making suggestions. Most suggestions are made in person, in group-leader meetings and in the hallway. If the suggestions are reasonable, they are implemented. They have also tried formal channels for feedback such as mailboxes, but have experienced that their employees prefer to make suggestions in person.

> *"I think participation is key. That they get to feel that their input and suggestions are taken seriously by us inside, and that it's not swept under the rug. (...) I think it's important to be part of a team that's valued by the organization - that's how you create loyalty. (...) People take initiative, and are happily contributing to solutions. It's rarely any written suggestions, because this is after all operators who don't like to write. These suggestions are brought to us by the foremen that are on-site, or by the word-of-mouth method. I usually say that the construction*

industry is more like a sewing-circle, than sewing-circles themselves. There is much gossip around and between - things are easily shared."

- Project Manager at Contractor A

"New apprentices are told that they are welcome to make suggestions, so that's been communicated. People tell us that they've done this and that, and ask us to test it out because it worked so well. If it's reasonable, and makes a good fit, we adopt it. (...) We're not the smart heads. The methodology, and the solutions come from employees at the construction site. This is the cornerstone - It's the employees who actually perform the tasks, who has the right solutions."

- Operations manager at Contractor A

According to the CEO everyone is contributing to the development of the A-standard, which is enabled by their flat organizational structure, and the support from the owners. The size of the company is also recognized as important, as they can be more responsive than larger organizations. The Project Manager also states that the organizational structure enables communication and collaboration between different projects.

"Everyone takes initiative, and we're not afraid of trying new things. (...) The organization is quite flat, and the owners have central positions in the operations. We're not a listed company with complex reporting loops, and it's a short distance from my office to the guy's outside. Improvement suggestions, critique and praise are easily shared."

- CEO of Contractor A

"The Project Managers are usually sitting in the base-office[3], and we get to hear if something is not working. It's often loud discussions, and we share experiences - things rarely pass us by. If things isn't working we're talking in the hallway, and over lunch."

- Project Manager at Contractor A

The ability to deliver products within the time frame stipulated in the contracts is of the utmost importance for Contractor A. In an industry that operates with small margins, every delay in the production process will inevitably reduce the profitability of the entire project. The development of the second part of the A-Standard, the methodology of Lean Construction, was a response to the increased pressure for profitability by an earlier partner.

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[3]Project Management office (PMO)

The second part of A-Standard acts as a planning regime, and seeks to systematically coordinate activities throughout the project cycle, in order to minimize delays, and ensure project progress. In a preliminary development phase they had contract researchers from SINTEF over for guidance, which provided a basis for the planning regime. This has been developed over time, as they have gotten more experience with it.

> *"We had an entire day with SINTEF, where they lined up different speakers that held short presentations about lean-methodology and different principles. I don't think it's possible to implement lean, period. We have to be a bit more precise, it needs to be adapted. If we had implemented Toyota Production System we would be producing cars instead of buildings."*

> - CEO of Contractor A

> *"We saw the benefits of it, and jumped straight in. This is being developed all the time. Just the feeling of control and progress makes you more focused on what you need to do - this is where we are today, and this is what we need to do for the next two weeks...We need this many people...and that day the plumber doesn't have to be there, and so on."*

> - Project Manager at Contractor A

A challenge related to the organizational development activities is that they lack appropriate systems for it. A Project Manager stated that the main challenge is to develop systems and routines with the time-constraints they face on projects.

> *"We lack the appropriate systems, which means we have to learn as we go. The main challenge is to develop the systems and routines sufficiently. We're working on it, but it takes more time than we would prefer. Our goal is to standardize most of what we're doing, but someone actually has to do it. Much of what we're doing is in our heads, and we have to make the forms and checklists, and get it on paper. This is however not prioritized when the projects are hectic."*

> - Project Manager at Contractor A

The A-Standard was developed five years ago, and is now implemented across all disciplines. Contractor A is now in the development process of an XPS. While the A-Standard is about construction details and methodology, the XPS will include all functions of the organization. The objective of the XPS is to provide a system for development initiatives, and a supporting frame for the A-Standard. This is supposed to enable Contractor A to work systematically with continuous organizational development throughout the entire

organization. The company have assigned 30 employees to six groups, which have received mandate to work with different internal themes; e.g. HSE[4] and Lean Construction. The development of the XPS is concurrent with daily operations, and the participants are engaged in the project alongside their regular jobs. The groups consist of both experienced and less experienced employees.

These improvement groups generate feedback and make prioritized improvement suggestions. A critical success factor that has been identified, is to confine the scope of deployment of new solutions and standards. The suggestions are prioritized according to criteria such as scope, potential effect, how quickly the effects can be realized, and investment costs. If the suggestions are regulatory feasible, and economically sensible, the standards are included or revised in A-Standard.

> *"While the A-standard is concerned with details and standardization of the construction process, the XPS is involving the entire organization - you're supposed to know how things are done in all parts of the business. (...) The improvement groups must consist of group leaders from the different disciplines and apprentices that have fresh viewpoints. We also need to include someone that's always critical to the things we do. This is important, because if they know they've been included in developing the details, it's more likely that they will be loyal to them."*

> - Project Manager at Contractor A

> *"We lack some structure, but we definitely have something going. (...) It's a continuous process - Today we received several suggestions for things to implement in the A-standard. We make quick decisions..[he knocks on the table]..Then we do it! Finished. Then it's just to implement it, and get it out there."*

> - Operations manager at Contractor A

A-standard is recognized as a success by the top-management of Contractor A. Even though they still see some variations in the work-procedures of their operators, the experiences from various improvement activities creates discussions, which according to the Operations Manager drives innovation. The employees are contributing to organizational development in addition to their daily operations, and provide feedback for continuous assessments of the improvement activities. They also use project-results to measure the effects of different improvement initiatives, and make adjustments as they go. In order to formalize these

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[4]Health, Safety and Environment

assessments and create a structure for the organizational development activities, they are in the process of hiring a Development Manager. By allocating specific resources to the organizational development activities, they want to show commitment and support for the XPS, and create employee-loyalty. Furthermore, they want to develop a better platform for communicating information about the various improvement activities to the operators on-site, which has been identified as an area for improvement.

> *"It's been very successful. The methodology, the mindset and the decisions has been a huge success. We do however not have 100% loyalty from those outside yet, and there's still someone deviating from the standards. (...) We have started a discussion, and we get more feedback now than before. Instead of there being discontent among the employees outside, which we would never get to hear, input are to a greater degree coming in. The A-standard has made it easier to provide feedback."*

> - Operations manager at Contractor A

> *"There is much enthusiasm among the people that are included. It is however a challenge to find the time to work on it. When there are 30 people included in improvement groups, and you take two-three operators from a work-team that's supposed to finish next week, the progress is a challenge. We're pressed on time and have insufficient staffing as it is. It's not allocated enough time to work on it. It is however positively perceived, and I think people enjoy being a part of it. (...) I don't think we have evaluated it yet - we just feel how it's working, the enthusiasm."*

> - Project Manager at Contractor A

> *"Evaluations is on the list of things we could improve. (...) If it's a full rebellion outside, that's certainly an evaluation criteria. We don't have a good system for evaluations to be very frank. [...] We're in the process of defining the A-standard as a project, and are going to hire a project manager. We're doing this in order to get things into system. Improvement work is currently something everyone is doing, which we will continue to do, but by hiring a project manager we'll have someone to keep track, and do follow-up to a greater degree"*

> - CEO of Contractor A

The CEO states that the lack of an effective communication platform makes it hard to do improvement processes with employees and subcontractors. People are rarely gathered at the same construction-site, and they are often working in different project-phases. They

recognize this as an inherent challenge in the project-based industry, and have experienced difficulties of communicating information about new best practices in the A-standard. When introducing new standards they primarily use the formal communication-lines - sometimes combined with mails, or posts in the internal Facebook group.

> *"If we were 200 employees in a production-hall, I'm convinced it would be much easier to manage the improvement activities. Then the people would be gathered, and you could stop the production and say: "Listen up for a moment", and you could easily follow the production-line and monitor that things were done. In the Project-based industry people are scattered, and there is seldom more than ten people at the same location. They are also in different phases of the project, and when you introduce a new standard for whatever, it'll only be relevant for the five people actually doing it. (...) That's a challenge, and will continue to be a challenge for as long as people are scattered geographically. (...) You can obviously send mails, but you have no guaranty that it'll be read, or that everyone understand the content the same. If the receiver think I'm the biggest moron on the face of the earth, he'll interpret everything I say accordingly. (...) We can be frustrated that people fail to do as they're told, and the people outside can be frustrated about the lack of information. This is a recurrent topic."*

> - CEO of Contractor A

Subcontractor A1

Subcontractor A1 have a flat organizational structure, where the employees have easy access to both project managers and the CEO. The employees are encouraged to suggest improvements to processes, in order to increase the overall efficiency of the company. In order to do so, the employees are regularly getting relevant courses on new technologies and processes in the industry. The company engage in improvement initiatives on a case-by-case basis, and have little experience with systematic improvement work. They have however started to develop better structures for the different processes, and have invested in an IT-system in order to digitize documents and employee time-sheets.

> *"We have invested in IT lately, and are looking into developing IT-systems which are going be beneficial for the company. Everything should move a little faster, and the time spent unproductively should be reduced as much as possible - that is the goal."*

> - CEO of Subcontractor A1

An improvement area as recognized by subcontractor A1 is the transference of experiences and solutions from each project. They have no systematic approach for transferring experiences or new solutions between projects, but rather rely on experienced Project Managers and group leaders. They do however have informal talks continuously between project managers both within and between the two branch offices, and formal meetings 4-5 times a year, where they discuss difficulties and opportunities. The rotation of their operators between branch offices is also seen as a key in order to transfer knowledge, and find new solutions.

"The problem, as I see it, is that if our experienced Project Managers had quit, we wouldn't be able to bring their experience to the next project. If they have discovered clever solutions on a project, and then decide to quit, we would lose their experience and capabilities to the next project. We lack routines for transferring this knowledge to other Project Managers. We should have some sort of a knowledge bank. This is really something we should look into."

- CEO of Subcontractor A1

"The plumbers are working better together because we're rotating more. They often pick up methods from each other, which wasn't the case earlier - it was shut."

- Project Manager at Subcontractor A1

In order to facilitate transfer experiences and solutions from each project, they also recognize the importance of performing evaluations in the aftermath of projects. Currently they do however not have any routines for doing so, but are in the process of developing a more structured form of evaluations.

"We don't have any routines for evaluating, but we want to get better at it. Currently we're looking at the project accounts, but we're not able to determine what went well and what didn't for each project. We've started working on it. (...) We are continuously evaluating though. Project Managers with experience are able to recognize what needs to be done when they're inspecting. On away-projects we are however to a large degree dependent on our group leaders on-site, many of which are lacking the sufficient experience - We're still a young organization."

- CEO of Subcontractor A1

Subcontractor A2

Subcontractor A2 have developed routines and standards for production-details referred to as A2-norm, which is similar to the first part of A-standard. According to the Project Engineer the implementation of the A2-norm was a response to their focus on customer-satisfaction, and they are working intensely to create a culture for quality. The A2-norm is constantly evolving through feedback from employees, and employee participation is regarded as the key to develop a culture for quality. They are also rotating their operators between various types of projects in order to give them experience.

"We're trying to develop a culture for how things are done, and everyone should strive to adapt to it. You have to have a culture for it, else it's dependent on the individual. We're going to deliver quality so we don't get complaints - we're going to do a proper job, and we're going to do it once. If you don't, the group leaders request the same individual to do it over - we're developing a culture for quality. (...) The solutions should be the same, independent of which operator is performing the task. You do however see differences between people - we're not at an assembly line after all. (...) If the operators has suggestions of solutions or alternative equipment, we listen to them and adjust the course continuously. If we force solutions and equipment on them, they spend an hour a day criticizing it - no one is served by that. By including them, they take pride in their work. If you force them, you don't achieve the same loyalty - you're just doing it because the boss said so. We'll have none of that - you're going to do it because you think it's fun, and because you take pride in the quality of the product you're delivering."

Subcontractor A2 have no systematic approach to improvement work. However, improvement of processes and solutions happen continuously. The routines and best practices is under constant development, as the employees are encouraged to suggest improvement initiatives. Subcontractor A2 have a flat organizational structure, which enables a high level of employee participation in these processes. Employees frequently suggest new products and practices, and the management evaluates whether the product or practice should be tested and eventually made standard. Most of the company's improvement work is based on experience, which gives the improvement initiatives practical value.

> *"We are generally not very good when it comes to forms and systematics - We neither got the time, nor do we see the benefits of it. If we had, we would of course do it, but it's the daily communication that brings us forward. Everything is in constant motion you know, you can't be static over time - then you're lost. You need to have a constant development of products and solutions, because even though something worked perfectly on one project, it's not necessarily*

working on the next project. (...) In order to see the potential for improvement, you have to see the solution from a practical point of view. "How did it go? What can we do better?" This can only be seen from the practical execution, not on a drawing board.

- Project Manager, Subcontractor A2

Joint organizational development with subcontractors

Contractor A have not engaged in systematic improvement initiatives in cooperation with subcontractors in the past. They are making the terms for the improvement activities, and experience that their subcontractors are willing to adhere to new practices as soon as they discover how it benefits themselves. They do however have regular meetings with subcontractors as part of the planning-regime, where there have been sporadic conversations about minor improvements to details and new available technology, within the subcontractors domain. Contractor A recognize the importance of the technical subcontractors to the progress of the construction process. They have limited knowledge about these disciplines, and have here identified a potential for improvement. By engaging in improvement activities in collaboration with these subcontractors, Contractor A believe that it is possible to achieve increased efficiency and profit margins.

"We make the terms, and the subcontractors do their best to keep up. If they don't want to, they can choose someone else. We have little experience of running processes with them where we discuss how to do it together, we rather just do it. After a while they experience that it benefits them as well. That's what's necessary when you change the way you do projects, or the sequence of activities. If it benefits the subcontractors as well, it's much easier - Less screaming an shouting, more planned, more control and more predictability. The same is true for the A-standard! Initially there were some that were very negative to it because it represented a new way of doing things. Then they discovered: 'wow, this is practical for us as well'."

- CEO of Contractor A

"That's true, they quickly saw the effects of it. They got to see when they should complete everything. Earlier the electrician needed at least two weeks...now they are able to do it in three days. They discovered that they were able to save huge amounts of time if they could complete everything at once, and then move on to the next apartment. (...) when they complete everything at once, we are able to do the same, and the plumber can do his job. Earlier we had to

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do things twice, and the plumber would have to have access to the same areas five-six times before he could finish. That's an enormous time-thief, and it's been done for a hundred years up until now. We've been told that we receive an extra discount when they work with us compared to competitors. That's a clear message that what we're doing is working for them as well. This is true for all the technical disciplines!"

- Operations Manager at Contractor A

Due to the many dependencies in a project, it is important that each actor performs their activities as planned. The CEO states that it is sufficient that only one subcontractor in the chain fails to complete their activities according to plan, before the entire project misses its target. It is therefore important to Contractor A that every subcontractor adheres to A-standard, both the job-standards and the planning regime. He further states that the construction industry is not known to be innovative, but that they need to start thinking of better ways of doing things.

"If they follow the planning-regime, and that's where they sin the most, they are supposed to make continuous plans for the next two weeks. They are also supposed to do evaluations each week in order to take the correct actions, and stay on top of the plan. I'm not sure if they always evaluate these plans before they make a new one. (...) It's all about change-readiness! A normal response to change is: "This is the way we've always done it". Yes, but maybe there is a cleverer way of doing it. There's a security in doing the same things we've always done, because then at least we know it'll work out. The fear of failure is why people stick to tradition, which is the challenge for both our subcontractors and us. (...) Change is incredible hard...to get people to change their way of doing things. Most people associate it with a certain degree of anxiety."

- CEO of Contractor A

The plumbers and the technical disciplines represent approximately 35% of Contractor A's turnover according to the CEO, and have been identified as the areas where joint improvement work has the greatest potential. These disciplines are engaged in all phases of production, and make up a large portion of the overall project-economy. They have a long history of working together with subcontractor A1, and have initiated talks with their new CEO of finding an area for improvement in collaboration. The Project Manager at Contractor A also states that there is great potential for improvement with these subcontractors not only in the process, but also in the types of products they are using.

"We have worked together with subcontractor A1 for as long as I can remember, they are the largest plumbing company around here after all. We have been talking about the possibility with their CEO, of finding an area, and identify opportunities for joint development. (...) By making better plans we could do more prefabrication, which would reduce the scope of work on site. A prerequisite is that we would still have the same business relationship - that we don't need to use them on every project. Their new CEO is more enthusiastic about the prospect than the previous one."

- CEO of Contractor A

"It has been discussions of developing a joint project management program for the group leaders. Then the group leaders would have the same knowledge, which would make it easier to collaborate on site. We have initiated talks, but we don't have anything concrete yet."

- CEO of subcontractor A1

"I don't think we know all the products that are out there. I think there's great potential in using alternative products and solutions from the technical disciplines, but we're not able to identify their impact on the process unless they tell us. (...) When the subcontractors deliver their tender-offers they're competing on price, and they're not using their premium products to set the price, even though this could have contributed to a more efficient process."

- Project Manager at Contractor A

According to the Project Manager at contractor A it is easier to do joint organizational development with subcontractors that are solution-oriented, and that are loyal to Contractor A's methodology. She further states that a holistic approach to the project-process is necessary in order to achieve the best results, and that the subcontractors that have this focus are potential candidates for joint development work.

"The ones that are positive and solution-oriented, that have an attitude that everything is possible as long as we work together. They need to be loyal to the Lean construction methodology we're using, and loyal to us as the contractor. I know that in certain milieus in the construction industry, there is a rough tone between the contractor and their subcontractors. I don't believe in that way of doing business - I think the quality and results suffers from it. (...) The farther south we go to pick up subcontractors, the more cynical they are. I think the subcontractors are treated rougher in the large cities than they are here, and

get used to it. Luckily we're not there yet."

- Project Manager at Contractor A

Both Subcontractor A1 and A2 are more than willing to contribute to improving the project processes, but states that Contractor A need to be the initiator. The Project Engineer at Subcontractor A2 recognizes that there is potential for improving the planning regime of Contractor A, and would like to have these plans evaluated continuously in order to keep a more stable staffing throughout the project.

"I think everybody is served by developing a good process, especially the contractor. They are in the driver's seat, and the rest of us are just coming along - If they turn right, we have to do the same. Even though things are pretty good, I think there is room for improvement - both in terms of their own production, inclusion of subcontractors and suppliers. (...) I think the planning-regime of Contractor A works to a certain degree, but you have to actually follow the plans. Checking of in a box, and stating that this is what we're going to do, is one thing, but do we actually evaluate how things are going? We're making new plans continuously, and we're not able to evaluate whether or not we're on schedule. (...) We have succeeded in stabilizing the staffing on the apartment projects with Contractor A because we've been able to communicate what's important to us throughout the entire process, not only in a sub-set of the process."

- Project Engineer at Subcontractor A2

"I would find it impossible to make improvements without including the technical disciplines. If you only look at your own disciplines, there are huge restrictions in terms of what you can do. It's so important, and it's a big part of the projects! (...) The technical disciplines are operating inside the buildings most of the time, the electricians and the plumbers. This is time-demanding, and I think there's a huge potential. (...) The first thing that should be done is to make the information channels between the different disciplines more efficient so that we are better able to coordinate our activities - this would have great impact on production speed. It would be really interesting to take part in something like that - maybe we could adopt some of it."

- CEO of Subcontractor A1

4.2 Case B: The offshore workshop

This case is about a Norwegian offshore yard and two of its subcontractors, supplying workforce and services on-site. The two subcontractors supply surface treatment in terms of painting and rubber to one of the yard's current projects. The informants' formal positions in their respective companies are described in table 4.2 below.

Contractor B	• Procurement Manager • Contract Manager • XPS Manager
Subcontractor B1	• Project Manager
Subcontractor C2	• Production Supervisor

Table 4.2: The formal positions of the informants in case B.

It should be noted that Subcontractor B1 and Subcontractor C1 are the same company. They will however be treated as separate organizations in this thesis, as they supply different services with a very different complexity to their respective customers (i.e. Contractor B and Contractor C). The general description of the company itself and their history of internal organizational development will only be presented in this case.

4.2.1 Presentation of the case-companies

Contractor B

Contractor B is an offshore yard located Norway, producing steel frames and large steel structures, for the oil industry. In order to comply with the strategic goal of being an assembly workshop on large steel structures, the company has incorporated departments such as; Engineering, Finance, HSE, HR, Quality management, Planning, Procurement and Fabrication. The only disciplines that are sourced to subcontractors are ISS-disciplines[5] such as painting and rubber coating, destructive testing and the electro discipline. Contractor B thus has the capabilities to perform engineering, procurement and construction in-house[6].

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[5]i.e. Insulation, Surface treatment and Scaffolding
[6]Regularly referred to as an EPC-company

Contractor B has completed many projects for both national and international companies in the oil and gas industry. In 2014 they completed two major projects for a French oil company. They have previously also had a wide range of customers on wind mill projects. Currently they have three ongoing projects for one of Norway's largest oil and gas companies. The customer requirements for the different projects varies, but are usually under the Norwegian standards for the petroleum industry[7].

The main competitors of contractor B are European offshore yards operating in Spain, Italy and the Netherlands. The main competitive advantage of Contractor B is the large area at their disposal, and their large crane capacity. On large projects, which demands large capacity, they face relatively low competition from actors in Europe. The fact that contractor B have stable relations with a handful of their subcontractors, and that the Engineering department is integrated in the company, enables them to deliver high quality, on time and on budget. This differentiates contractor B from many of its international competitors.

The demand from the oil industry have however been in decline the recent years, which has made it more difficult for contractor B to remain profitable, and keep a stable staff. In order to respond to the fluctuating market for steel constructions, contractor B has developed a strategy for diversification of their project portfolio. One of the Contract Managers[8] stated that in order to realize this strategy, and make use of their prefabrication areas, they are currently looking into industries and areas such as MMO[9]. They are also performing a consequence analysis for every project phase, in order to assess whether to outsource some of the production to subcontractors or not. Another challenge is that the market is demanding smaller steel constructions, where the international competition is tougher. In order to stay competitive the company acknowledge that they must standardize their work processes, which is a challenge due to the size of the organization.

Subcontractor B1

Subcontractor B1 is a subcontractor and supplier within the ISS disciplines for the offshore and oil and gas industry in Norway. They operate at offshore yards and oil and gas plants along the entire Norwegian coast, and about 50 % of their total revenue is related to projects in the Norwegian offshore industry. Subcontractor B1 is also involved in MMO, subsea and especially developed niche products abroad.

They deliver services and products mainly for the offshore industry; oil and gas companies, offshore yards and refineries. They supply surface treatment, such as painting and Passive

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[7]The NORSOK standard
[8]Responsible for subcontractors on site.
[9]Maintenance, Modification and Operations

Fire Protection (PFP), for Contractor B. Often, the customers have company-specific requirements that exceed the NORSOK standard, but as a minimum they deliver according to the NORSOK standard M501[10]. The company also has procedures that often exceed the customer's requirements in terms of safety and quality.

Subcontractor B1 has two major competitors in offshore surface treatment. They differentiate themselves from their competitors by operating only with fixed prices on projects. When operating with a fixed price, they make an offer based on inspections of the state of the entire site. This is more efficient for them and the customer, as incremental repairs are more expensive over time. Subcontractor B1 has a slightly larger market share than the other two actors, as the company operates in a wider segment of the oil and gas industry.

> *"We think that this [fixed prices] gives the customer a more predictable cost,*
> *and it makes it necessary for us to be more efficient in order to make a profit.*
> *It's a win-win situation."*

> - Project Manager at Subcontractor B1

According to another Project Manager[11], the company also have a vision and company values they seek to live by. The vision is "Beyond expectations", and Subcontractor B1 focuses on being involving, innovative and responsible in order to perform beyond expectations. That is, they practice employee participation, product and process research, and a strict HSE regime in order to differentiate themselves from their competitors.

Because of the development in the petroleum industry in the later years, the market is characterized by tough competition, as many projects are put on hold. Subcontractor B1 has an advantage in that they have secured a fair share of long term contracts, which reduces the risk associated with relying solely on project-based contracts. However, the company is dependent on new contracts in order to maintain the current activity level and avoid downsizing of the company.

Subcontractor B2

Subcontractor B2 is a project company, primarily delivering rubber-coating services and products such as rubber-based corrosion protection, thermal insulation for pipes and PFP. The company is part of a larger Scandinavian group, and is based in Norway. They have about 250 employees, and operate all over the world within the offshore industry. Approximately

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[10]The NORSOK M501 emphasizes surface preparation and protective coating

[11]Project Manager at Subcontractor C1 (B1 and B2 are the same company, but we have chosen to treat them as separate companies as they deliver different services to Contractor B and Contractor C). See section 4.3.

95% of subcontractor B2's operations are related to the oil- and gas industry. The remaining 5% are related to deliveries of components to windmills, and insulation services for other industries.

Subcontractor B2 has customers all over the world. They currently have large ongoing projects in Korea with some of the major actors in the offshore industry, and in Norway with Contractor B for a riser-jacket[12]. The company here supplies insulation services for the riser-pipes. Subcontractor B2 have a framework agreement with a major Norwegian oil company, and are a preferred supplier for insulation products and services on their projects. The ongoing projects in Korea and for Contractor B is part of this agreement.

Their main competitors are operating within all the same market segments, and are often outperforming them on price. This is because they have adopted a cheaper silicon-based product in their insulation products, and a different methodology. Subcontractor B2 are however not considering cheaper materials, as they believe the rubber-based products yield higher quality, which is in demand by the customers.

Their competitive advantage has traditionally been their high quality products, and their international reach. The industry has however been in decline the recent years, and price has become of greater importance in order to win contracts. Subcontractor B2 has implemented measures to increase their production efficiency, in order to respond to the market development. They have also had to downsize some of their operations in order to remain competitive. The company do however have strong financial backing from the parent company, which enables them to withstand the hardships of a market in decline. As the Production Supervisor stated:

> *"The market has fallen straight down the drain, to speak bluntly. It has dropped like a rock."*

> - Production Supervisor at Subcontractor B2

4.2.2 Project-process and collaboration

The Procurement Manager of Contractor B states that they have a project execution model to help them manage the projects:

> *"We have a project execution model to help us manage the project. It consists of the concept phase, the tendering phase, the planning phase, the fabrication*

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[12]Extention of the oil-well to the surface

phase and the completion phase."

<div align="right">- Procurement Manager at Contractor B</div>

The concept and tendering phase

The Procurement manager says, that in the concept phase, Engineering defines the initial Scope of Work (SOW), and creates a jacket design which is to be used in the tendering phase, in order to win the contract. In the tendering phase, Procurement approaches a few suppliers or subcontractors within each procurement category (e.g. painting, steel, etc.) in order to calculate the total value and price of the project. This is the first time that Procurement and suppliers are involved in the project. The time span from the beginning of the concept phase until the offer is submitted, is usually limited to 6-8 weeks.

> *"This is very little time. Engineering is going to do their job in the concept phase, before we in Procurement can do ours. We lay the foundation for carrying out a project within a short span of time - This is the greatest challenge."*

<div align="right">- Procurement Manager at Contractor B</div>

> *"This also applies for the subsequent processes after the contract is won. The time-span for setting up subcontractors is also hectic. We must ensure that we have good Scope of Work, drawings and specifications."*

<div align="right">- Contract Manager at Contractor B</div>

While the Procurement department is involved in the tendering phase, the Procurement Manager states that it could be beneficial to involve the department as early in the concept phase.

> *"By involving Procurement in the concept phase - somewhat earlier than usual - Procurement could have given input on materials available, lead time and price. Some of the requirements introduced by Engineering are cost drivers. Is it possible to reduce these requirements? I think that it is."*

<div align="right">- Procurement Manager at Contractor B</div>

The planning phase

According to the Procurement Manager and Contract Manager, a more detailed design is created in the planning phase, after the contract is won. The SOW is sharpened in order to approach suppliers and subcontractors for the second time. Since the SOW is

significantly sharper in this phase, the prices collected from suppliers and subcontractors are more realistic, than in the concept and tendering phase. In this phase Subcontractor B invites several suppliers and subcontractors within each procurement category to tendering for project contracts.

The Project Manager of Subcontractor B1 states that the SOW presented for the subcontractors in the tendering phase often deviates from the actual SOW when the engineering is roughly concluded. The parties then assess whether any deviations will be the basis for invoking monetary claims in a Variation Order Request (VOR). Therefore, it is important to gain as much information about the SOW as possible in order to offer an accurate price in the tendering phase. The subcontractor offering the lowest price wins the contract.

> "It's said that HSE is the most important factor, but in the end the price is the decisive factor. That's just the way it is! We have an excellent HSE record, so we have an advantage there. At least we think so. I hope that it has a positive influence on deciding who wins the contract."

> - Project Manager at Subcontractor B1

According to the Contract Manager of Contractor B, the suppliers and subcontractors that are invited to tender for Contractor B, are normally already audited and approved through a corporate evaluation system. Because the suppliers are already approved, they compete mainly on prices. It is important that the suppliers are carefully evaluated, as choosing the wrong supplier can have catastrophic consequences.

The Procurement Manager says that on one of the jacket projects they had recently, they found a subcontractor in Europe that could deliver the clusters (feet) for the jacket at a very good price. The subcontractor was not approved up front by Contractor B. However, they chose to use the offer in their own tendering offer, as they faced great international competition and needed to win the contract. They won the contract and sent out a new invitation to tendering to subcontractors - this time with a sharper SOW. The subcontractor doubled their price, which had a great impact on Contractor B's potential profits.

> "We have discussed this problem internally. We are organized as a heavy project-based organization, with a small Project Management Office (PMO). We don't have time to benchmark our suppliers and subcontractors. We have to do this outside of projects. (...) The process is time consuming if you are going to do it the right way with verifications and audits. (...) The consequences of choosing the wrong supplier can be 40-100 millions[13] in pure losses."

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[13]NOK

- Contract Manager at Contractor B

"Approval of suppliers and subcontractors should be something for the PMO...We feel like we don't have a PMO that takes care of the continuous process."

- Procurement Manager at Contractor B

The Procurement Manager and the Contract Manager further state that Contractor B used to operate with "royal warrants of appointments"[14] within some procurement categories. However, they have forsaken this purchasing strategy, for the benefit of a more competitive focus. They also point to the fact that getting too comfortable in a supplier relationship has certain drawbacks.

"There is a danger to becoming too much "buddies". I think that it complicates addressing difficult issues. At the same time, a good relationship is necessary in order to create a climate for addressing these issues. There are difficulties related to having both too good and too bad supplier relations. It's all about balance!"

- Procurement Manager at Contractor B

Contractor B have framework agreements with suppliers and subcontractors within some procurement categories. This means, that they have a small collection of suppliers they invite to tendering within each category, and they mainly compete on prices[15]. The framework agreements runs over several years and projects, but project specific contracts are drawn up for each project, where the specific terms for the project are agreed upon. Contractor B use framework contracts for steel suppliers and painting subcontractors (e.g. Subcontractor B1) , among others. According to the Contract Manager, between 50% and 70% of the total project cost is deliveries from suppliers and subcontractors, and steel and painting constitutes more than 50% of the total project cost.

The fabrication phase

After the procurement department have assigned contracts to suppliers and subcontractors, and the plans have taken form, Contractor B embarks on the fabrication phase. In the fabrication phase, modules are built and prepared for assembly in the completion phase. The building and preparation of modules are done in the fabrication halls or at the sites of their subcontractors. The Procurement Manager states that subcontractors and suppliers

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[14]A regular supplier or subcontractor with no framework agreement, which are automatically chosen for every project.

[15]This strategy is sometimes referred to as "pooling".

receive training in both their HSE requirements and their project execution model after the contracts have been signed. It is important for Contractor B that the suppliers understand their work methodology, and deliver the services or products in a specific sequence, at the right time.

> *"Getting deliveries on pipes too early, is not preferable. We have to store it somewhere. We have had a problem with getting the correct deliveries on the current project, and we've had to store it outside on the yard. As a supplier you may think that the customer will be better off getting the delivery early. That is not always the case."*

>   - Procurement Manager at Contractor B

According to the Project Manager of Subcontractor B1, they start the fabrication phase by establishing routines together with Contractor B, and make adjustments in their existing systems accordingly. These routines can involve anything from steel controls and flow controls of a painted product, to scheduling of meetings. Most of the operators from Subcontractor B1 have worked with the main company before, and require less training as they are familiar with the routines. For new operators however, they require testing on-site in order to prove that they can handle the work activities. Procedures, routines and general information are sent from the HSE department of Contractor B. Information about HSE numbers, such as near misses, are continuously forwarded from the HSE department throughout the project to ensure that the subcontractors comply with Contractor B's requirements.

The Production Supervisor of Subcontractor B2 states that once the contract is signed, their factory starts preparations for the project, and they begin with engineering and detailed specifications of the scope of work. During this phase, operators from Production are involved in order to address the feasibility of the solutions to be used. The factory prefabricates rubber and gaskets from raw materials according to their own production friendly design, before it is shipped of and installed at the yard. He further adds that before they may be granted permission to work on the yard of Contractor B, they must pass extensive training in HSE, as this is a great focus area for Contractor B.

The process of application and vulcanization of the rubber requires specific temperature and humidity conditions, in order to be efficient. The Production Supervisor of Subcontractor B2 says, that at the yard of Contractor B, they execute processes inside halls with the correct climatic conditions. However, some operations must be performed outdoors, in conjunction with jacket assembly. Other customers are not always able provide the required climatic conditions, and this have implications for efficiency and lead time.

The completion phase

The final assembly is done outside on the yard using the massive crane capacity. In the completion phase, employees and subcontractors from several disciplines work together in assembly and touch-up of the jacket. When assembled, the jackets are transported by sea to be installed together with the top-side offshore. The Contract Manager emphasizes that the fabrication and completion phases are complex and require extensive planning and preparations. Many of the activities are interdependent and there often is a critical order in which they have to be performed. The Procurement Manager states that all the actors on the yard are dependent on each other.

> *"For Subcontractor B1 to do their job, they are dependent on the deliveries of steel from another supplier. We want our subcontractors and suppliers to succeed, earn their profit and deliver according to the contract. They are supposed to fulfill our requirements."*

> - Procurement Manager at Contractor B

> *"The same goes for the loading and unloading of the shipments. The parts must be loaded and unloaded in a specific order, so that the painters can move the correct parts into the painting hall and make the best use of the area available. If it's loaded in the wrong order, this complicates the process and then we have it going! Then there will be a discussion about price. An order change like that is costly for them."*

> - Contract Manager at Contractor B

The Contract Manager further states that Subcontractor B1 and Subcontractor B2 are on a lump sum contract[16]. This is challenging, as any deviation from the original plan or design imposes extra costs on the subcontractors. Therefore, Contractor B must deliver plans, drawings and materials to subcontractors according to the agreement, in order for them to make a profit.

According to the Project Manager of Subcontractor B1, they regularly experience delays in Contractor B's deliveries and plan achievements. As a consequence they have to follow up on Contractor B's prefabrication and change their own plans accordingly. The greatest challenge related to these delays are the difficulties in planning for staffing on the painting activities, both in the painting hall and out on the yard during assembly.

> *"They have a crane-plan for when components are to be lifted into place and installed. However, they have no plan for when a weld is supposed to be*

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[16]Fixed price

completed, controlled and ready for touch-up painting. This is challenging because we're not able to make accurate plans for staffing. As a consequence we have told them that we cannot plan for assembly, and that we will simply have to transfer the necessary staffing from another concurrent activity on site. In turn there will be delays in our own deliveries. But they have said they can live with that."

- Project Manager at Subcontractor B1

The Production Supervisor of Subcontractor B2 states they are not only dependent on climatic conditions, but also on other disciplines performing work on the piping and jackets. As the pipes need to be welded and sandblasted, Subcontractor B2 is dependent on the welders and painters, and therefore have regular contact with both Contractor B and Subcontractor B1. The welding, painting and rubber coating have different lead times, causing Subcontractor B2 to adjust staffing on site during the project. As a consequence of this, Subcontractor B2 are operating in heats of 4-6 weeks throughout the project.

During the final phase of a project, Contractor B typically embark on the next project. As the project-specific sub-organization is downsized, the project organization of the next project is assembled. This overlap in projects enables Contractor B to keep the workload at a high level, prevent idleness and increase efficiency. The Procurement Manager states that they usually summarize lessons learned by evaluating projects in the completion phase. The Contract Manager adds that they register improvements or experiences in a collective system during the other phases of the projects as well.

"I see some challenges related to evaluation of projects. We experience things during a project, and believe that we are going to remember everything at the end. We introduced a system during the current project, where everyone can add lessons learned as they emerge (...) people are utilizing this system in various degrees. We also have a system for quality deviations. This system is messy though, because we've had too much emphasis on quantity rather than quality of the experiences saved there."

- Procurement Manager at Contractor B

When embarking on a new project, everyone is supposed to go through the reports from the previous project in order to draw on lessons learned. The Procurement Manager states however that it is a challenge to transfer experiences from previous projects, and that it is dependent on individuals. The Contract Manager adds that it is tempting to skip this process when closing down a project and starting up another, as the start up period of a new project

is hectic.

> *"We are many and we are different. We all have different experiences and our own ideas of what is the best routine. I'm responsible for Procurement on this project, but on the next project, someone else could be responsible. It's imperative that we develop good routines for experience transfer, so that it doesn't depend on individuals. We have to make sure that I transfer my experiences to the next Procurement Manager. That is a challenge, as we are easily swallowed up in the next project. We let go of our experiences focus on the future. (...) I think that we have many excellent systems and routines, but it's all about compliance!"*

> - Procurement Manager at Contractor B

Both of the subcontractors state that they do not have formal evaluations together with Contractor B, but rather have internal practices. The Project Manager of Subcontractor B1 states that he is responsible for writing a project report to his own superiors. This report is written right after project conclusion, and involves the viewpoints of operators and other functions within Subcontractor B1's team on site.

> *"The report points to what went wrong, but also what went well. We have a base for experience transfer, both on higher levels and lower levels. My report will be for project managers and the top management of Subcontractor B1. Foremen and supervisors also write their own reports, which will be handled by me and the other project managers."*

> - Project Manager at Subcontractor B1

The Production Supervisor of Subcontractor B2 states that there is supposed to be an evaluation after every project. In reality it is not always so, but if a project has been characterized by hick-ups, a report is almost always written in order to find out what went wrong, and what can be done differently the next time.

> *"I think it's dependent on the Project Managers themselves. Someone do, someone don't. It's possible that some Project Managers feel like they haven't got time for it."*

> - Production Supervisor at Subcontractor B2

4.2.3 Approaches to organizational development

Contractor B

According to the Procurement Manager, Contractor B has initiated an HSE-project called *SnapUp*. SnapUp was initiated by the HSE Manager because he recognized a trend of an increasing number of smaller HSE incidents. The client was also a strong driving force behind the SnapUp project, as HSE practices were an important topic to them. An important part of the project was a thorough review of existing routines and procedures, in order to identify potential problems.

> *"Suddenly we could have had a major accident! We want our people to get home after work in one piece, but we also need to keep the number of incidents low in order to win new projects. We see that we have several routines and procedures for HSE, but there is a lack of compliance to these routines. We took a few shortcuts, and we had to increase the focus on the HSE routines."*

> - Procurement Manager at Contractor B

The Procurement Manager further states that while SnapUp started out as an HSE-project, it has now developed into a quality project as well. They recognize a correlation between quality and HSE-incidents, and by increasing the quality in the production process, they expect the number of incidents to decrease. One part of the project was concerned with the identification of improvement areas, within internal departments. The welding department for instance identified the number of welding repairs to be an area of concern, and the quality in the production process here refers to the amount of rework. Each department is committed to these improvement activities, and one area that many departments identified as a challenge, was compliance to existing procedures and routines. Also, the evaluation of projects, and the follow-up of plans, was identified as improvement areas.

> *"It could be something as banal as compliance to existing routines and procedures, described in the manual. It's easy to take it for granted, but there were many who made the realization of non-compliance"*

> - Procurement Manager at Contractor B

The Procurement Manager states that in order to follow up on the improvement activities, the project management group has made it part of their regular agenda to address them in meetings. They use statistics and reports to evaluate the progress, and SnapUp is regarded as a successful project with regard to HSE incidents, which is in decline. The quality has also recently improved, illustrated by the declining amount of rework in the welding department.

The declining amount of rework also indicates that the quality in the production process prior to welding is improving.

> *"We were absolutely going to do this, and get our hands dirty. (...) Not everything is easy to measure in terms of progress, but I think that the attention the project gets in project management meetings is important. The massive support from management was probably partly due to the large focus of the client - it put a knife to our throats."*

> - Procurement Manager at Contractor B

According to the Procurement Manager, Contractor B started developing an XPS in 2015, where SnapUp has been incorporated as part of the development work. The development is undertaken by six groups of approximately seven employees, where each group has responsibility for one area within the XPS. Each of the groups have initiated minor projects, so even if there are only six areas, there are 30 projects in total.

The Procurement Manager further elaborates upon the replacement of the steel supplier on one of the recent projects. The supplier did not deliver the products they were supposed to at the right time, and there were many hick-ups related to changing the plans in order to enable the supplier to succeed. She states that they only partially succeeded because the Procurement department were the only contributor in the process of changing plans. She reported a proposal for improvement, and Contractor B established a group responsible for mapping the entire value flow on projects. This project is one of the six main projects of the XPS. The Procurement Manager states the following:

> *"I also volunteered for this group. The whole value chain is represented in the group. We began working in October last year, and we are supposed to deliver our suggestion within the next 14 days to the XPS. We have established a flow chart for the entire process, which will visualize all the interfaces and departments affected by a VN-order[17] - who should be involved and who should receive information about it. I think that we've almost been too many in one group. It has been a challenge to gather everyone at the same time."*

> - Procurement Manager at Contractor B

The Contract Manager further states, that a result of the development initiative proposed by the Procurement Manager, is a mini-project related to the painting discipline.

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[17]Variation Notification Order: A change in design or shipment from suppliers. (...) We have broad involvement in these groups, all areas are represented.

"This has also resulted in a concrete mini-project within the painting discipline. Washing is part of the painting process, and instead of moving the objects from the painting hall for washing, the objects are washed where they are. We save hundreds of thousands!"

- Contract Manager at Contractor B

The Procurement Manager states that while paticipating i development work has been an educational experience, it has also been a challenge, as the improvement work is concurrent with daily operations. She recognizes that this is an effect of the project organization of the company.

"I've been in this company for 25 years, but I've learned so much in this process. Just to understand the challenges of other departments and the broader consequences of my decisions as Procurement Manager. How it affects others - it has been incredibly educational. I think this goes for everyone involved in this group. (...) When we say that things must be followed up by the PMO, it's actually we in the projects that must take care of it. We view this as a challenge, as it can be difficult to manage both the project and the improvement activities at the same time. That being said, it's we who are in the project that actually knows what the issues are. There's both advantages and disadvantages."

- Procurement Manager at Contractor B

"There are many initiatives which have a great potential, that just die [because they are not followed up by the PMO]."

- Contract Manager at Contractor B

The Contract Manager further states that Contractor B has hired an XPS Manager, who will be responsible for following up the XPS and the organizational development activities.

The XPS Manager states that the XPS is about developing the working methodology on projects, and that they have adapted elements of Lean thinking to fit their needs. The original focus of the XPS was mainly related to six areas in the construction area, but is now to a larger degree involving improvement activities across the entire organization.

"It is important to have a system that extracts ideas, and the XPS will decide whether to go through with them or not. (...) We encourage everyone to bring ideas to the table."

- XPS Manager at Contractor B

The Contract Manager states that they have suggestion boxes, where the operators can bring suggestions for improvement. The Procurement Manager argues that even though they have good systems for collecting suggestions, they have a long way to go when it comes to implementation. However, she thinks the XPS has improved the follow-up process.

> *"I think it's good that so many operators are engaged and come up with suggestions. I think it's very positive that the people performing the work can contribute. (...) The suggestion box is run by a group which prioritize the suggestions coming in. Good suggestions are rewarded with giftcards. (...) I think we have become much better at follow-up after we started up the XPS."*

> - Procurement Manager at Contractor B

The XPS Manager also states that if the XPS decides to go through with the improvement initiative, they create a project group for the specific initiative. The group will evaluate the costs and benefits from implementing the solution, and at the end, the actual result from the initiative is recorded. The XPS have a system for all initiatives which are under implementation, and earlier implemented initiatives. There are 45 initiatives which have been implemented and 17 initiatives which are currently being implemented. Every single initiative have their own records in the system, which includes the purpose, mandate, responsible persons, costs, benefits, concrete solutions and the actual benefits after implementation.

> *"We have earned a cost reduction of 30 millions[18] on the already implemented initiatives, and from the ongoing initiatives we have a potential of 23 millions. All the projects will cost us around 9 millions to implement."*

> - XPS Manager at Contractor B

One of the recent initiatives emphasizes four clusters (legs) which are to be built in one of the fabrication halls on the yard. The XPS Manager states that the original process was designed to build the four clusters at the same time, and move and store them twice during the process.

> *"This movement and storing adds absolutely no value to the product. Therefore we are going to build them one after the other. In this way, we're not only going to save us the trouble of moving and storing the clusters, but if something goes wrong the first time, we have the possibility of correcting the mistakes on the other three."*

> - XPS Manager at Contractor B

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[18]NOK

While the XPS now fathoms the entire organization, the subcontractors are not involved in this development work. The Procurement Manager states the following:

> *"The subcontractors are not involved in out development work. But we do however have a great dialog with them and we focus on their success. If they succeed, we will succeed. It's all connected. (...) But they are also very careful in demanding things from us, I think. I think they could be better at that."*

> - Procurement Manager at Contractor B

Subcontractor B1 [19]

According to the Project Manager of Subcontractor C1, Subcontractor B1 started implementing Lean in 2009, and it is an ongoing process. They started out with the more basic tools, like 5S, stand-up meetings, and KPI boards. He states that they are currently conducting a value stream mapping for their production facilities. The Production Supervisor of Subcontractor C1 argues that implementing Lean in a company like Subcontractor B1, which has projects spread across a huge geographical area, is a challenge in itself. The Project Manager further states that in the beginning, the improvement work was based on enthusiastic department leaders, but in the later years the company have hired an expert on lean, and the company board have decided to make lean a company policy.

> *"It's mainly at our production facilities. It's easier to implement Lean there. We have however begun adapting certain Lean-tools for use in projects with a predetermined start and end date. When we are on projects, we are in the house of the customer, and we are to a great extent governed by the customers way of managing a project - Here we're not masters in our own house."*

> - Project Manager at Subcontractor C1

> *"It [to bring lean into projects] has been very successful. In one of our projects we used the same principles to reduce the workforce on the project warehouse, from six to three FTE's [20]. This is less waste!"*

> - Production Supervisor at Subcontractor C1

The Production Supervisor further states that one of the most important factors for successfully implementing Lean in their company was anchoring the change in the top and middle management. Since the leaders are spread across different projects, it is however

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[19]The information in this section is from the interview with Subcontractor C1, as the Production Supervisor of Subcontractor B1 had little information on the topic of internal development activities.

[20]Full-time Equivalents

a challenge to create a sustainable change of the culture around development work. The Project Manager further states that they initially also had problems with some department leaders not engaging in the change initiatives.

> *"When the consultant at 1500 NOK an hour is standing by the copy machine and laminating plastic signs, because the leaders can't change the culture, it's hopeless. There must be a change of culture - it's almost religious. (...) I think this will change however, when it becomes a company policy. Each leader will be measured on their contribution to Lean-work, both in terms of progress and quality."*

> > - Project Manager at Subcontractor C1

Subcontractor B2

Three-four years ago, Subcontractor B2 conducted a survey interview on all of their operators about leadership in the company. The Production Supervisor of Subcontractor B2 was part of the group conducting these interviews, and stated that the results indicated that management had tendencies of silo thinking and that they were treating employees unfairly. As a consequence of the report from the interviews, the company underwent a fundamental restructuring and an extensive leader development program. The silo thinking caused local optimization within departments of the company, and resulted in a suboptimal use of company resources. The intention of the development program was both to redirect the strategic focus to the company as a whole, and to change the leadership's attitude towards the employees.

> *"The organization had developed in the wrong direction. Our CEO saw that. (...) There was a "divide and conquer"-mentality among the leaders that made the whole thing. They got scolded!"*

> > - Production Supervisor at Subcontractor B2

They now have an increased focus on employee participation, and have more systematic documentations of production processes. Employees are now involved in product development and in the engineering phase of projects, which enables the company to address the feasibility and practical challenges of new solutions and products. The documentation of production processes enables both the identification and implementation of new best practices. The best practices are retained in the company's database, and provide a work description for the production processes. These are distributed to the relevant employees when needed. A more systematic documentation of optimal production processes and routines,

has reduced the amount of repairs and rework.

> *"In order to find the best way to do things, you have to do it in practice. Theory and practice is not always the same. It is very exciting to be part of the development of both products and procedures. (...) We have gotten much better on documentation. Earlier someone learned something, and we risked losing the gained knowledge whenever someone left the company. (...) Now we have a system which saves all the gained knowledge. Of course we have to try and fail several times, but once we get it right, we document it."*

> - Production Supervisor at Subcontractor B2

Joint organizational development with subcontractors

The Contract Manager of Contractor B states, that in order to include subcontractors in development work, Contractor B hold weekly meetings where all the subcontractors on site are involved. The agenda for these meetings are to identify areas in which the operations could be improved. The results are smaller incremental initiatives that continuously develop processes.

> *"The development work is continuous with weekly meetings. Things that don't work is discussed. 'Why can't we do that?'. Then we do that. It works perfectly well, but we're not good enough at evaluation and follow up."*

> - Contract Manager at Contractor B

In addition to building good relations to subcontractors on site, on several levels of their organizations, Contractor B also have a focus on building relations with the subcontractors' managements. It is important for Contractor B, that the subcontractors and suppliers succeed in delivering on Contractor B's requirements, and they seek to enable this success through collaboration. The Procurement Manager states the following:

> *"It is of course important to involve the subcontractors in our development work, as we are not capable of seeing the entire picture. They have the prerequisites to say what we can do to make them better, and vice versa."*

> - Procurement Manager at Contractor B

Subcontractor B1 participate in the weekly meetings with Contractor B on how to improve processes. The Project Manager of Subcontractor B1 states that one result of this is that

they have come up with a new process to save energy in the painting halls in terms of heating of the premises. One of the initiatives implemented involves reusing the heat from compressors in order to heat up the painting halls.

> *"We have regular meetings were we discuss what we can do separately, and together, in order to reduce costs and make the yard more cost efficient and competitive. Contractor B came to us and proposed a collaboration on development activities."*

> — Project Manager at Subcontractor B1

The Project Manager of Subcontractor B1 further states that he thinks the most important factor in a collaboration about development activities is that both parties have something to gain.

> *"I believe that's the most important. I have to be that honest. If we don't have something to gain from it, we don't work our asses off for it either. That's the way it is.(...) Of course, if I'm going to have any work here on future projects, I'm dependent on Contractor B to win new contracts. It's not out of the question to work for reducing costs, even if I don't directly gain anything from it. It's not that black and white - it goes both ways."*

> — Project Manager at Subcontractor B1

The Production Supervisor of Subcontractor B2 states that prior to start-up, Subcontractor B2 presents the requirements for their optimal processes for Contractor B. While Contractor B understand and acknowledge the importance of these requirements, the degree of accommodation of these requirements from customers in general, is subject to variation. Contractor B have provided facilities indoors, where climatic conditions can be controlled. This improvement is a direct result of the discussions around improvements between Contractor B and Subcontractor B2. Also, Contractor B have somewhat streamlined their production and assembly process, so that more of Subcontractor B2's work may be performed on the ground.

> *"On the previous project, we had to perform a substantial part of the work up in the air, outside on the assembly space. This [more work on the ground] has made the processes of both Contractor B and Subcontractor B2 safer and more efficient."*

> — Production Supervisor at Subcontractor B2

The Production Supervisor further states that he has regular meetings with Contractor B, where they evaluate the progress of the work, what has been done well and what could have been done differently. He recognizes that a good dialog between subcontractor and customer is an important factor for a successful relationship.

> *"If you can play for the same team, you will get the best of two worlds. Contractor B is very good at being a team player. They do everything to satisfy our needs and requirements. (...) Some things could of course always get better. We could develop a better flow in the project. However, we work in fabrication halls with other actors, and it's easier said than done. I will say that this particular project has in general been very successful."*

> *- Production Supervisor at Subcontractor B2*

4.3   Case C: The offshore yard

This case is about a second Norwegian offshore yard and two of its subcontractors, supplying workforce and services on-site. The first subcontractor supplies ISS-disciplines on a gas plant expansion project, and the other delivers an EPC contract[21] for a larger module to a topside project. The informants' formal positions in their respective companies are described in table 4.3 below. In addition, information from the initial background interviews are used in this case (see section 3.2).

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[21]A contract for Engineering, Procurement and Construction.

Contractor C	- Contract Manager 1 - Contract Manager 2 - ISS Site Leader - ISS Contract Manager - HSE Manager - Installation Manager - Quality Manager
Subcontractor C1	- Project Manager - Production Supervisor
Subcontractor C2	Quality Controller

Table 4.3: The formal positions of the informants in case C.

It should be noted that Subcontractor C1 and Subcontractor B1 are the same company, as stated earlier in section 4.2. The general description of the company itself and their history of internal organizational development is presented in the previous case in section 4.2, and will not be repeated in this section. Instead, a short description of the services delivered to Contractor C will be given in section 4.3.1

4.3.1 Presentation of the case-companies

Contractor C
Contractor C delivers products for the offshore industry. They are also performing maintenance work, and expansions on already operational platforms and plants. In addition to the permanent employees, they also have the ability to use an external workforce due to their strategic partnerships with subcontractors and suppliers. Contractor C has five different supplier categories, which they use on most of their projects: Discipline Subcontractors, Staffing agencies, Module Subcontractors, Engineering, and equipment suppliers.

Contractor C's main customers are large oil and gas companies operating in Norway, producing both on- and offshore. Depending on the type of project, they are serving these clients either from their own offshore yard, or at the location of the client. At the current time they have ongoing projects for two different clients, each with different requirements.

Subcontractor C1 delivers ISS[22] services in one of these projects.

The other ongoing project, is an EPC contract for a larger modular product for a Norwegian oil and gas company. This means that Contractor C will receive complete modules from the various subcontractors, and that the final assembly will happen at their own production facilities at their yard. Subcontractor C2 delivers a module for this product.

Contractor C compete both at home and abroad, and have in the recent years seen increasingly tougher competition from several of the large Asian shipyards. These shipyards are competing on price, as opposed to Contractor C, whose competitive advantages historically have been perceived to be high quality and their on-time deliveries. The customers are however currently choosing less expensive solutions, and are willing to incur delays.

In order to respond to the customer requirements, Contractor C have according to Contract Manager 2 evaluated different strategies for cutting costs. Today they are sourcing production to low-cost, labour intensive countries such as Korea, Poland and Dubai, in order to provide competitive prices. They do however see some challenges regarding the uncertainty of using numerous suppliers from various countries, and are looking to reduce the number of suppliers, in order to develop more stable relations.

> *"Our search for new subcontractors on every single project makes us look like wandering chickens from the outside. Reducing the number of subcontractors could drastically decrease the uncertainty. (...) The customers are not necessarily very happy for using subcontractors on projects, and long-term relations with Asian yards are inhibited by our customers. They make it difficult."*

> - Contract Manager 2 at Contractor C

Subcontractor C1

Subcontractor C1 currently delivers insulation, surface treatment and scaffolding services to Contractor C. Scaffolding services emphasizes creating access and providing provisional shelter for painting and insulation workers performing work outdoors. The contract for scaffolding is a reimbursable contract, which means they are paid for elapsed materials and hours. Subcontractor C1 have provided this service during the entire project..

The second discipline is surface treatment, which includes PFP[23]. This discipline had a lump sum contract, but because of discontinuity in the project, and limited opportunities for work flow, the contract has been changed to a reimbursable contract.

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[22]Insulation, Surface treatment and Scaffolding
[23]Passive Fire Protection

The third discipline is insulation, and is according to the Project Manager of Subcontractor C1, an activity which is reserved for the end of the project. The contract for this discipline is a reimbursable contract, but as the time frame for insulation activities is limited, this leaves no room for changes in the scope of work if they are going to earn a profit.

Subcontractor C2

Subcontractor C2 designs, engineers and manufactures products primarily to the offshore oil and gas sector. They manufacture aluminium based products and modules, based on standardized components. They are involved throughout the lifecycle of their products through studies, FEEDS, EPC deliveries, modifications, upgrades and maintenance projects.

Subcontractor C2 is a sub-unit of a larger corporation operating in the Norwegian on- and offshore sector. The corporation, with their sub-units, has the capabilities of undertaking EPCI-projects, which means that they have the know-how and ability to execute projects from engineering to installation, in-house. They also perform maintenance work and modifications within the same segment. Many of these sub-units are making deliveries and perform services for Subcontractor C2.

The customers of Subcontractor C2 are primarily Norwegian oil- and gas-companies, and the suppliers of these companies, such as Contractor C. The current contract for Contractor C is the largest contract Subcontractor C2 has ever received, and both Contractor C and the client has representatives on-site, from a wide range of disciplines, in order to monitor the process.

The main competitors of Subcontractor C2 are based in Asia and Holland, and operate within the same markets and product-segments as Subcontractor C2. The greatest differentiator between them is that Subcontractor C2 manufacture aluminum based products and modules, whereas their competitors use steel. They believe that this is a competitive advantage due to the reduced weight and ease of maintenance, which simplifies the project execution and minimizes maintenance costs.

The development of the Norwegian offshore market has been in decline, and Subcontractor C2 have not received new projects in the offshore sector since 2015, i.e the EPC contract Contractor C. This has led to an increased focus on winning projects abroad. They are currently in a tendering process for a project in Brazil, where the client is a Norwegian oil company. This project fits their current project portfolio, and their soon available capacity in their Engineering department.

> *"The project would fit (...) It would fit Engineering very well, where the workload*

has decreased. There will probably be quite many layoffs in the near future."

- Quality Controller at Subcontractor C2

In addition to evaluating their current project portfolio they have a market department scouting for opportunities. They are currently looking for opportunities within the offshore MMO[24] segments.

4.3.2 Project-process and collaboration

A HR Manager states that Contractor C uses a project execution model to help managing the projects. The project execution model is based on the EPCI-process and includes the concept and tendering phase, the planning and procurement phase, the fabrication phase and the assembly phase. The Engineering process is concurrent with the procurement, construction and installation process.

The concept and tendering phase
In the concept and tendering phase, Contractor C make an offer on the existing FEED[25], which provides a basis for the project in question. According to the HR Manager, the concept and tendering phase includes creating a detailed design for the project and deliver the offer to the customer within the deadline. According to Contract Manager 2, Contractor C delivers on time and quality, but struggles with offering competitive prices.

> *"We compete with Asian yards, and we're not competitive on price. Our competitive advantage is that we deliver high quality to the deadline, and we've almost never had any delays. The customers often choose the same offshore yards time after time only because they offer a much lower price, even if the projects often are delayed up to two years!"*

- Contract Manager 2 at Contractor C

The Installation Manager and the Quality Manager states the suppliers and subcontractors are included in this phase in order to create a better design and execution plan for the project.

> *"The first thing we do, is that we include our suppliers and subcontractors. By including them from the start, they are able to give a more accurate price to bring to the client. If we don't include them, we retain a lot of risk on our own*

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[24]maintenance, modification and operations
[25]Front End Engineering and Design.

account."

- Installation Manager at Contractor C

"It is also about creating a better concept. It is often a good execution plan that sells a project to the client. Then you need to have good relations to the subcontractors early in the project. For example, the subcontractors were locked in long before I entered the project."

- Quality Manager at Contractor C

The Project Manager of Subcontractor C1 states that they often are allowed to suggest solutions for the project, if they have better solutions than in the original scope of work. When Subcontractor C1 received the invitation to tendering from Contractor C on the current project, some of the products to be used were already specified in the contract. Subcontractor C1 got the opportunity to offer some alternative solutions, which they did.

> *"We receive a contract with some proposed solutions. The subcontractor, i.e. we, often get the opportunity to suggest alternative solutions. On this project, we have done exactly that. Our products can be installed faster, and then there is the lifecycle cost. The client approved, and the project now includes our products and solutions, which was not the case in the initial phase."*

- Project Manager at Subcontractor C1

The planning and procurement phase

In the planning and procurement phase, the last subcontractors and suppliers are locked with contracts. All subcontractors must be approved in a corporate supplier approval system, before they can win a contract for Contractor C. According to Contract Manger 2, they are audited on HSE, ISO-certifications, financial situation and customer evaluations. Contract Manager 2 states that the requirements for supplier pre-qualification are comprehensive:

> *"Our requirements for the subcontractors are comprehensive, and we conduct audits according to routines and procedures. Sometimes we even interview former customers of the subcontractors. The system is comprehensive, because our clients require thorough documentation on all suppliers and subcontractors."*

- Contract Manager 2 at Contractor C

"The customers have a huge influence on our suppliers and subcontractors, especially when it comes to the larger deliveries. We cannot choose freely. The

customers can potentially block suppliers, but this practically never happen."

<div align="right">- Contract Manager 1 at Contractor C</div>

The Project Manager Subcontractor C1 states that they have a strict focus on HSE because it's necessary in order to even be evaluated as a potential subcontractor.

> *"We have our own requirements for HSE, and these are supposed to always exceed the customers' requirements. If you're going to operate in our industry, you have to have world class HSE, or else you won't even get to the negotiation table. "*

<div align="right">- Project Manager at Subcontractor C1</div>

The fabrication phase

In the fabrication phase, the construction process begins. On of the current projects are undertaken at the customers production site on the Norwegian coast. The ISS Site Leader and the HSE Manager states that one of the biggest challenges with this project was that the production site was operational during the project.

> *"The plant is operational, and requires a stability in it production. This means that both the operators on the plant and us on the project need to cooperate. There are so many limitations in comparison to operate a project at our own yard."*

<div align="right">- HSE Manager at Contractor C</div>

> *"At the yard, we don't have these limitations, we don't need working permits. Here we need working permits for everything. (...) In addition we are more prone to the weather conditions. If it rains, we need cover for insulation and painting. That is a challenge we don't face back at the yard. "*

<div align="right">- ISS Site Leader at Contractor C</div>

The HSE Manager states that they have had challenges with the customer on the site, as they have high requirements to HSE routines. The customer's rules were stricter than Norwegian law on some areas, and the rules differed from what Contractor C was used to. The customer even required prefabrication for the project back at the yard to follow the same procedures. They thought they at least could be masters in their own house back at the yard. However, the customer invested heavily in welfare, food and accommodations for the workers at the site. Even though they had a rough start, the HSE Manager means that Contractor C have

learned a lot, as the customer has challenged them and driven them forward. One of the challenges connected to these requirements was to persuade the subcontractors to comply to the rules. The HSE Manager states the following:

> *"The subcontractors were instructed to follow the new requirements. Of course, whenever something infers costs on the subcontractors, which are not per contract, you will have discussions about who should pay for it."*

<div align="right">- HSE Manager at Contractor C</div>

The ISS Site Leader states that they have a mixed contract with Subcontractor C1, where some products and services have a lump sum contract or a reimbursable contract. Then they are dependent on their productivity to earn a profit. He further acknowledges that being on a lump sum contract can be a challenge on a project where there is a strict regime with working permits on a hot plant.

> *"When you have this permit-to-work system, and you cannot open the permits fast enough. . . you wait for the permits every morning, and you cannot assign the work to your operators before you receive the permits. . . then you will have conflicts, as the barriers prevent them from proceeding forward."*

<div align="right">- ISS Site Leader at Contractor C</div>

He further states that for Subcontractor C1 to do their job, they are dependent on Contractor C to deliver what they are supposed to. If there are hick-ups, there will be commercial clarifications in the aftermath. He further states that the entire project process is built up in "TIPS"[26], where every activity is described in sequence. However, according to the ISS Contract Manager, it varies how much training the subcontractors get in working with TIPS.

> *"It is essential for the project that the system works as intended. Someone have worked with it before, but for someone, the system is new and complex. We should improve the training and follow-up on TIPS. That is beyond doubt an area for improvement!"*

<div align="right">- ISS Contract Manager at Contractor C</div>

The ISS Site Leader states that it is imperative that the subcontractors are competent in the use of TIPS, as it describes the sequential activities. When one activity on e.g. a pipe is completed, the pipe should be handed over to another party for the subsequent activities. The pipe is handed over when it is released for the next activity in the system. Information

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[26]Project management tool of Contractor C.

about progress must therefore be updated in the system for the project to proceed according to plan. He further states that the information from TIPS is open for everyone, including Subcontractor C1. Therefore they also have information about all the work releases as well. However, there has been a problem with the release-system for Subcontractor C1 as a consequence of inadequate updating of the system. According to the HSE Manager, there have also been problems with getting Subcontractor C1 to update the system in a correct manner. He states that this is due to a misunderstanding about the contract.

> *"They have allowed themselves to complete activities, and not document it. When I ask for documentation, they refer to the Quality Engineer, who is paid by the hour by us. They say that if I want their documentation to pick up the pace, we must pay for additional manpower. The discussion takes a commercial turn. (...) They are very preoccupied with the contract, to the point where they win the battle, but lose the war. They make the situation very stressful instead of being solution-oriented."*

> - HSE Manager at Contractor C

The Production Supervisor of Subcontractor C1 states that the differences in organization between Contractor C and Subcontractor C1 is a challenge. While Contractor C has separated the operational and commercial functions of their organization, Subcontractor C1 has not.

> *"They have organized in a totally different way, and they could have been clearer on that. They have separated their operations from their commercial functions. Their Operations function seek to complete the project, while someone else handles the contracts. We're not organized in the same fashion."*

> - Production Supervisor at Subcontractor C1

> *"Subcontractor C1 is very commercially organized, and getting things done is hard."*

> - ISS Site Leader at Contractor C

According to the Project Manager of Subcontractor C1, they have experienced a large increase in Scope of Work on the project the last year. Meanwhile, the time frame has not increased, and the company must thus increase manpower in order to complete the contract in time for delivery. He further states that they have tried to warn Contractor C about this increase in Scope of Work, but as the Production Supervisor adds, they have not listened.

"The time window has become too small, and the scope of work too big. It has been problematic to achieve flow and continuity in the work process. (...) We have to use more manpower, which have implications for the productivity. Since we have a lump sum contract, we are the one who suffers economically from this. We have tried to warn them."

- Project Manager at Subcontractor C1

"Contractor C isn't that preoccupied with our productivity, as we are on a lump sum contract. They are more preoccupied with their own milestones, and there we have a conflict of interests. (...) We have are the professional party within ISS, and we think they should have listened more to our concerns."

- Production Supervisor at Subcontractor C1

According to the Project Manager, Subcontractor C1 have experienced difficulties in using TIPS. According to the Production Supervisor of Subcontractor C1, TIPS was not always updated, and sometimes it had even released unavailable work. This resulted in problems for Subcontractor C1, as it is difficult to know whether work is actually available or not.

"We monitored the amount of available work...We were of course shot at, and accused of not delivering. We made our own list over hours available according to TIPS, and the hours available in reality - We got several releases for jobs, and we could walk down on-site and see that the pipe wasn't assembled!"

- Production Supervisor at Subcontractor C1

While both the Production Supervisor and Project Manager at Subcontractor C1 argue that TIPS was not working, the Installation Manager of Contractor C argues that Subcontractor C1 had enough work releases.

"I worked closely with the contract-people, and was responsible for finding numbers in TIPS to prove that Subcontractor C1 had received releases for work. They wished of course to keep their staffing to a minimum, while my job was to show the exact opposite. Then the contract-people had a case to bring to the contract-meetings. I found it hilarious, but Subcontractor C1 had it rough at times."

- Installation Manager at Contractor C

After a long time of frustrations from both Subcontractor C1 and Contractor C, they came up with a different system that was easier to update and read from. The new system has made

it easier to monitor available work, which is important in order to plan for manpower. If there is too little available work, the productivity suffers, as Subcontractor C1 must allocate the excess manpower to already staffed activities. The Production Supervisor and Project Manager states the following:

> *"If an activity isn't released, we have to relocate the workforce assigned for that activity. Then we have two options: We can send the men back to the barracks, which is unfortunate, or we overstaff our already staffed activities If it takes one man 100 hours to complete the work, it doesn't take one hour to do the same with 100 men. Sometimes people think so."*

> *- Production Supervisor at Subcontractor C1*

> *"You cannot put 9 men on a woman and expect a baby in one month!"*

> *- Project Manager at Subcontractor C1*

The Project Manager of Subcontractor C1 further states that he would wish that Contractor C would focus more on training their subcontractors in using TIPS. He recognizes that they have had too little knowledge about the systems and working methodology of the customer. He further states that Contractor C also needs to increase the understanding amongst their own on how they should treat a subcontractor on a lump sum contract.

> *"While Contractor C bring their tools from project to project, they should be better at training us on their way of running a project from the very beginning. Things move very fast, and they have full control on their tools and systems. In the beginning we struggled with understanding these. (...) They should also increase the understanding amongst their own on how to treat a subcontractor on a lump sum contract. In the beginning they tried to govern us as they saw fit, and we weren't fast enough to say 'stop!'. We need the prerequisites to work productively."*

> *- Project Manager at Subcontractor C1*

The Project Manager further states that Contractor C shares plenty of information with Subcontractor C1, but suggests that they should focus on working more integrated with their subcontractors. The Production Supervisor adds that they are to a greater extent integrated with Contractor C, than on earlier projects, as they now are situated in the same barracks as Contractor C. The Project Manager adds:

> *"Maybe that's part of the challenge. We're integrated while we're on a lump sum*

contract. It would perhaps be better if we were situated at separate barracks so that we were more in control of our operations. Every time we talk about plans, they tell us that we're integrated with their planner. However, they are the ones who own the plan. We have no real influence. (...) I think this is unacceptable when we're on a lump sum contract. There has been too many withdrawals of working permits and too much discontinuity."

- Project Manager at Subcontractor C1

"And that gives us a challenge. If we cannot begin in the right sequence, it will have a great impact on staffing, access to work and the end product."

- Production Supervisor at Subcontractor C1

The ISS Site Leader of Contractor C acknowledges that the integration of Subcontractor C1 has been challenging, and that they have not achieved the degree of integration they wished for.

"They [Subcontractor C1] are supposed to be integrated with us, but this is difficult to achieve. There are many at Contractor C who don't want to integrate them the way they should be. It is an attitude-related issue, where it often is like 'that's their problem, not ours'. They are pushed aside because they're not Contractor C. This is not okey when they're on an integrated lump sum contract."

- ISS Site Leader at Contractor C

As a consequence of this situation, Contractor C is going to build competences within the ISS-discipline themselves, as this will give them more control on future projects. The Installation Manager stated the following:

"I'm not sure if we're going to use them again at first. We're going to do more of the ISS-installations ourselves. We already have competences within painting and scaffolding. But we've never done any installation of insulation before. But we're training our own people now, and have already started to deliver for another project.(...) It has always been so, that we have little control on what's going on with our subcontractors' disciplines. But we don't train our people to do everything ourselves, it's just for gaining more control."

- Installation Manager at Contractor C

According to Contract Manager 2, Contractor C have employees situated on-site with all of

their module-subcontractors. This is because these deliveries are making them vulnerable to delays, and subsequent costs. Contractor C have another project back at the yard, and they have outsourced an entire EPC contract[27] for a module to Subcontractor C2. An Installation Manager of Contractor C, currently situated at Subcontractor C2's premises states the following:

> *"The project is split in two. We [Contractor C] are building the utility part, and they [Subcontractor C2] are building the module here. We are situated here to follow up on Subcontractor C2's part of the project, and make sure it's according to the specifications of the contract. I'm also a link between Subcontractor C2 and our client."*

> - Installation Manager at Contractor C

The Installation Manager states that it is because of earlier experience, that Contractor C have decided to have their own people situated at the premises of Subcontractor C2. The Quality Manager states that on earlier projects they have received complaints for tenths of millions NOK from the client, and they wish to avoid complaints on the current project.

> *"Because this is anonymous, I can tell it like it is - at least from my viewpoint. We've had far to few people to do follow-up of the subcontractors' disciplines on-site in the past. We on Installation have always felt that way."*

> - Installation Manager at Contractor C

> *"It's a learning curve, that's why we are more people her now. We're sitting her physically, and have more people and resources to maneuver. On the previous project with subcontractor C2 we had 30 MNOK in losses due to warranty issues, which we couldn't have happen again on this project - which is four times the size."*

> - Quality Manager at Contractor C

The Quality Controller of Subcontractor C2 states that both Contractor C and the client have increased the follow-up in this project, and that it is has been much more verifications than usual. However, he recognizes the benefits as it gives Subcontractor C2 the opportunity to improve their processes and quality during the project.

> *"There has been an extraordinary verification-program on this project. It is a bit unusual, but it's ok, because we get to improve ourselves as we go. It takes*

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[27]A contract where the subcontractor is responsible for the Engineering, Procurement and Construction of a component.

a lot of time, but I think it's useful. (...) I think it's because they don't have the same knowledge about building this type of module as we do. I also think that they are more preoccupied with the process itself, and that they sometimes miss the target. However, we have a great relationship, and that we collaborate well."

- Quality Controller at Subcontractor C2

The Planning Manager states that there have been some challenges associated with the fact that Contractor C and Subcontractor C2 operates with two different project management tools.

"Subcontractor C2 have their own systems, also for planning. There are two different systems on this project, and they don't communicate. We also have two separate plans in this project, which is quite rare. It's challenging, but not problematic. Since there are two different projects within the same project, there can be separate plans. However, I have to make sure the interfaces between the plans are in order. That is the greatest challenge. (...) They have of course planned for this type of module before, but this one is four times as big. They are also going to be at our yard for installation and integrate their module with ours. We cannot have any surprises there!"

- Planning Manager at Contractor C

The Planning Manager further states that the client also have their own system, which both Contractor C's and Subcontractor C2's systems communicate with. This way, they are able to access information from the subcontractor's system, via the system of the client. According to the Installation Manager, Subcontractor C2 is familiar with the type of installation, but the reason for the follow-up is that the contract is four times the size of the contracts they usually undertake. Therefore, the follow-up is connected to staffing and progress. The Planning Manager further states that Contractor C have the experience with planning for over 70.000 activities in one project plan, and that this experience can be used to verify that all plans work together.

It has been difficult for Subcontractor C2 to become accustomed to the increased presence of Contractor C, as they are used to work alone. The Quality Controller of Subcontractor C2 states that the practice of manned offices at their site is out of the ordinary.

"They came here quite early on in the project. They have been involved on earlier projects also, but never with manned offices like now. Of course, we also had weekly meetings then, but now they have a huge staff here."

<div align="right">- Quality Controller at Subcontractor C2</div>

In order to ease the transition into the new practice, Contractor C have focused on being supportive and consulting, rather than controlling. The Quality Manager and the Installation manager state the following:

> *"When I first got here I was told that they didn't sit together with the customer, and I actually had to leave. I didn't feel very welcome, but they have come around. (...) My tactic has always been to present myself as a coworker to the Quality Controller at subcontractor C2 - I don't work towards him, but rather I'm working with him. It's all about deciding things at the lowest possible level, and avoid reporting upwards if it's possible. When we disagree, we agree to disagree, and let someone higher up take the quarrel so that me and him can focus on the other tasks at hand. This has worked very well, and I believe it has reduced the time spent on sending mails and everything else upwards through the system."*

<div align="right">- Quality Manager at Contractor C</div>

> *"Our approach is to be supportive. I'm not going to be the English consultant always pointing at things that are wrong. It is important for us that they deliver a great product to the time, and we are going to enable them. It feels like it's going according to plan."*

<div align="right">- Installation Manager at Contractor C</div>

The Quality Controller of Subcontractor C2 believes that the approach of Contractor C have contributed to a better climate for collaboration. He states the following:

> *"I think it's been very positive. It's easy to keep a good dialogue. I think he [The Quality Manager at Contractor C] is very solution-oriented, and he's not exactly slowing down the project, to say it bluntly. You could risk meeting people who slow things down, but he's been really great! (...) We feel like we're all pulling in the same direction."*

<div align="right">- Quality Controller at Subcontractor C2</div>

The Quality Manager states that one should be careful not to become too much involved and start giving orders. It is easy to forget that they are not back at Contractor C's yard, where they are the masters. At the premises of Subcontractor C2, they are the customer, and they have to know the difference. The Installation Manager says that giving orders will create

additional monetary claims.

> *"There could come VN orders*[28] *back to us. If we go out there and order something, there could easily come a VN order to our Contract Manager, saying we have instructed them and should pay for the extra work. Of course, they're on a lump sum contract and should we have something extra, we should pay for it. Therefore, we try to suggest different approaches, rather than instructing them."*

> - Quality Manager at Contractor C

> *"It also affects their sense of ownership. If they solve their own problems it's way better!"*

> - Quality Manager at Contractor C

The Quality Controller of Subcontractor C2 states that they attempt to help each other during the process, as it is important that everything goes according to plan when the product is to be assembled at Contractor C's yard.

> *"We feel that we're all pulling in the same direction. After all, we will have a situation where we need to collaborate well when we are supposed to bring the modules to Contractor C's yard. We're going to assemble the modules on top of the frame and bottom modules that Contractor C will provide. We need to collaborate, or else we'll fail. It's going to be a close race in 2018."*

> - Quality Controller at Subcontractor C2

The completion phase

In the completion phase, Contractor C strive for conducting comprehensive project audits and evaluations. Contract Manager 2 recognizes the importance of conducting such evaluations, but also underlines the importance of anchoring the experiences made in governing documents. He has several examples of new best practices, e.g. a technical fastening solution for a component, which was not brought into the next project. One of the Construction Managers adds the following:

> *"The implementation of new best practices is a challenge. The same things go wrong every time, and we use a lot of resources on making up for lost time."*

> - Construction Manager at Contractor C

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[28]Verification Notification order – monetary claim for work not specified in the contract.

"We have good routines for project evaluations, but implementation is a challenge. We work on systematizing and improving implementation. We have to a certain degree succeeded on this in connection to HSE, but we have a long way to go when it comes to quality issues."

- Contract Manager 1 at Contractor C

The HSE Manager states that there are evaluations of projects and processes, but he questions if the evaluations are used later on.

"I don't know if we're very good at picking up the reports when starting up new projects. I think we're good at writing reports, but were not good at using them. (...) You know, it's like beginning in another job each time. We're a few thousand employees and the teams change from project to project. I get a new supervisor, and a new team for me to manage. We share a few experiences, and then we begin working. When you're at the starting line and the shot is fired, you better start running!"

- HSE Manager at Contractor C

The Planning Manager states that the experience transfer in the beginning of projects are too coincidental and that there needs to be a standardized method both for writing project reports and using the lessons learned on the next project.

"I think that there needs to be a standardized procedure for experience transfer could be a good thing. There's a lot of experience which disappears when the project-specific sub-organizations are downscaled. We should try to capture this. (...) The PMO back home owns the procedures, rules and work instructions. The experience transfer needs to have its foundation there. We cannot allow every single project to come up with their own systems."

- Planning Manager at Contractor C

The Installation Manager states that they have no joint project evaluation with subcontractors. It is usually only the project managers and higher positions within Contractor C's project-specific sub-organizations that are involved in writing the reports. The HSE Manager further states that the lessons learned and project reports are now stored systematically and has become easier to access.

"I think there has been an increased focus on systematization from the top management back at the headquarters – these best practices and learning

across projects. There exists a lot out there, and it's important to systematize it. (...) When it comes to learning within HSE, it's not more than four-five months ago that the PMO put a focus on it. It's about prioritizing it...put it on the agenda!"

- HSE Manager at Contractor C

There are no joint evaluations at the end of projects between Contractor C and the sub-contractors. The HSE Manager of Contractor C states that there are however weekly and daily meetings with Subcontractor C1, where different issues are resolved. The meetings are informal and with no regular agenda.

"We have daily meetings in the so-called operation room, and a more informal meeting at the end of the day. 'How did it go today? What obstacles did we run into?' And then we fix the problems as we go. We update each other on several issues and I think it works well. We have no fixed agenda, and there is enough room for both criticism and praise. We trust each other enough to say what we have to say."

- HSE Manager at Contractor C

"Subcontractor C1 gives us mostly negative feedback; 'Now you have inhibited us from doing this, and now you have inhibited us from doing that! You're not finished with this, so we cannot begin on that.' I think we've never heard: 'Today you did a good job. Thanks for the help.' The feedback has often a negative angle. That goes both ways I think. It's easier to criticize, than to praise each other."

- HSE Manager at Contractor C

Subcontractor C1 calls for more structure, as well as reports from the meetings. As a consequence, they have begun to write their own reports as they want to have a record of what was said during the meetings.

"The most important I have noticed is that I have been to many meetings with Contractor C, and there's only been reports written from a couple of them. It's also never a fixed agenda. (...) And if there comes a report, I have noticed that we have been wrongly quoted."

- Production Supervisor at Subcontractor C1

"You have to be awake in order to work with Contractor C. We used the first

year to get to know them, and they're like a train running a maximum speed. We write our own reports now, and send it to them. It's very rare that they respond at all, but at least we've written them."

- Project Manager at Subcontractor C1

The Quality Manager of Subcontractor C2 states that they also have no other evaluation with Contractor C besides the weekly meetings where solutions and progress is discussed and verified. However, both Subcontractor C1 and Subcontractor C2 believes that a joint evaluation could be beneficial for all parties.

"We should absolutely have had joint evaluation meetings. We have some quarterly meetings, where we discuss some bigger issues. This project is so huge for both us and Contractor C, that our CEO comes to the plant on a weekly basis."

- Project Manager at Subcontractor C1

"But that is on a higher level, which doesn't have much effect on me. Those meetings doesn't emphasise the issues I want to go into detail on. (...) I think that if we had evaluation meetings - if not monthly, at least quarterly - we could have resolved a lot of issues during the progress of the project."

- Production Supervisor at Subcontractor C1

"We have no joint evaluation with Contractor C. But I think it might happen in this project. (...) I think it would be beneficial, if we're going to develop a long-term relationship. We've actually cooperated a good deal through the times - we have built things for them, borrowed and lent workforce. That part I think has gone well so far."

- Quality Controller at Subcontractor C2

However, both Subcontractors have their own internal evaluations. The Project Manager of Subcontractor C2 state that they usually conduct a thorough evaluation at the end of every project.

"We conduct an evaluation at the end of every project. (...) We share experiences both continuously and at the end, where we write reports and keep meetings. We have had a seminar with our subsidiary, which delivers our materials, a couple of months ago. There we told them about our experiences throughout this project which we both should bring with us into our next project."

- Project Manager at Subcontractor C1

The Quality Controller at Subcontractor C2 states that they collect experiences and try to transfer experiences made between projects.

> *"We collect experiences, store them, and try to transfer them between projects - both what went well, and what we have to improve. I feel like we're moving forward all the time. (...) I think that we're getting better at the evaluations, but I also think that we have a potential for improvement. At least, our project execution model is more or less pinned down now - how we do things."*

- Quality Controller at Subcontractor C2

4.3.3 Approaches to organizational development

Contractor C

According to the ISS Site leader, all employees has a responsibility for organizational development of Contractor C. Employees are contributing to organizational development by providing feedback and suggestions for solutions in the daily operations, which is used to establish lessons learned and new best practices. Contractor C also have an organizational development department, where the employees are focused on developing and working on various improvement projects. This department is responsible for developing processes to make them cost effective, and have among other things adopted the lean-principle 5S in various parts of the organization, and established service-towers on projects undertaken on customer-site to increase productivity throughout projects.

The HR manager stated that Contractor C have implemented the lean principle 5S in the material and tool storage, in order to improve the handling of equipment and material. The initiative was implemented because they saw that many employees were not returning tools to their original places, and they are now required to register loan of tools with a personal card. As part of the 5S implementation they have also streamlined the tool system, and now use an automated tool storage instead of a traditional shelf-system. According to the HR manager, this initiative yielded large benefits in terms of released capacity, and all employees affected by the new system were retrained. He do however state that this is an ongoing and continuous process, and that in order for the initiative to stick it must be anchored throughout the entire organization.

> *"Anchoring changes in governing documents is especially important. Additionally it's important to highlight that the change has led to improvements by*

using screens and the intranet, and so on. (...) When we introduced the new automated tool system, we held a celebration to make the change visible for every one."

- HR Manager at Contractor C

After the improvement initiatives have been implemented in the base-organization, they are according to the HSE Manager supposed to become a natural part of the project process independent of project location. The Planning Manager do however state that there were some trouble in the initial phase of the 5S implementation, and that people should have been involved to a greater degree. Both the Planning Manager, the ISS site leader and the HSE Manager, are currently situated on customer-site, and state that it is difficult to realize the potential of 5S and other heavy improvement processes because of the surrounding conditions on these projects. The ISS site leader further question the benefits of the 5S implementation.

"There has previously been a tradition for not informing every one of what's going on, and not involving those that should be involved. It has been a bit turbulent in the past, especially in the initial phase of the continuous improvement work [refers to the 5S initiative]. It's important that the right personnel are involved. Sometimes they just take a person who's not very articulate. It has become better, and more people are involved."

- Planning Manager at Contractor C

"It may not be popular to say that it hasn't been successful, but my question then becomes: can anyone document that it has actually resulted in cost reductions? And can anyone claim that 5S has resulted in savings of 100 mill, 200 mill for contractor C? I don't think I should say everything I'm thinking. I just think that it very often just becomes good visions and many nice Power-Points, and then you're not able to realize it outside. This is my viewpoint seen from the sideline. I haven't been very involved."

- ISS Site leader at Contractor C

"I'm sure the project [5S] has it's value, and that those who've been stationary at home have worked very well with it, and achieved good results. (...) I have to admit that we who've been traveling, and built organizations and culture where we go, haven't achieved the same results. Definitely not. We're able to do minor improvements, but not the heavy processes and improvements they have managed at home. Some call it excuses - I call it frame conditions."

- HSE Manager at Contractor C

On the same topic both the Planning Manager and the ISS site leader further state that employees that are away on projects receive little information about internal improvement activities, new routines and procedures, and that each individual has a responsibility of getting up to speed when they get back.

> *"We who are working on project's are not that involved. You could be out of the house for three years at a time, where you're not inside the gates a single time. When you're outside the house, you're not able to keep up to speed. (...) If there are new routines and procedures for how things are done, we have to try to figure out what's new. We don't have a joint review of course, as people are moving in and out of the organization on projects all the time. They have gotten better at informing in the recent years though, and they are using a lot more information screens and things are frequently communicated on the intranet. People are better able to update themselves."*

- Planning Manager at Contractor C

> *"I've been here [on the customer's project-site] the entire time, and it's difficult to feel what's going on because I'm not close enough to the process. I'm not able to see that things are suddenly getting better in this or that way, or if a new processes is making things much faster."*

- ISS Site leader at Contractor C

The HSE Manager states that in order to implement improvement initiatives on the individual projects, it has to be a focus area from management, and that sufficient resources must be allocated to it.

> *"I don't see any challenges, except that it's coming on top of everything else - other tasks, meetings and this and that. The human mind is so built that you have a sense of what should be prioritized first and last, and the 5S thing hasn't been raised as a priority. We have been running to keep up with the train, and at times we've been far behind. You've been working from early morning to late in the evening, and you're thinking about 5S...but not today. Then the weeks go by, and the month."*

- HSE Manager at Contractor C

The Installation Manager and Quality Manager also thinks that a focus from the project

management office is important.

> *"Now, 5S has been a focus, and on the last project, we were thold that the project was supposed to follow the 5S standard...no questions asked! Then we took it on from the start, because it was anchored in the PMO."*

> - Installation Manager at Contractor C

> *"My recommendation would be to anchor a focus in the PMO, if we want to increase quality or efficiency. The projects are like running trains, and there is little room for working on improvements for the next project. The only thing you have is your own experiences and a evaluation report at the end of the project. We are far too few, and the structure of the company is based on a project-organization. "*

> - Quality Manager at Contractor C

The ISS Site leader states that in order to change routines or procedures, employees can contact the owner of the procedure and make suggestions. He further states that it is the employees who are deciding the methodology in the individual projects, and that employees are encouraged to suggest improvements, new best practices and lessons learned, based on experience from previous projects. According to the HSE Manager there are several channels where employees can contribute to organizational development throughout the project.

> *"If someone has done something very well, they make a best practice - just a slide or two - which is distributed to the relevant disciplines. It could be a well executed painting job, or set-up job, where you get it [the best practice] out to construction. (...) Lessons learned refer to possible risk-elements, what was done, how should it be done, and how could it be avoided. This is distributed a bit broader [than the best practices] in the organization."*

> - ISS Site leader at Contractor C

> *"You can choose the closest supervisor as the receiver of whatever, or you can choose to bring it to the health and safety representatives, or to the elected representatives. You have several channels for serving the things you wish to address. To be honest, the way things are addressed and processed depends on the skill and enthusiasm among the representatives. We've here been blessed with extremely competent and enthusiastic people, with courage and guts to stand up for the operators outside."*

The HSE Manager states that the management has invested in developing the Health and Service department, which represents the operators in the various parts of the project-site. The health and safety representatives have regular meetings, and provide feedback to the project-team located in the Project Management Office.

"The Health and Service representatives have regular meetings, and are responsible for the observation system [Suggestion boxes] where the employees can report on positive and negative things...We receive mostly negative feedback like, 'the bus went early, so I had to walk'. The initial idea was, 'bring improvement suggestions', and there are more an more who have discovered that it can be used for that as well. (...) The representatives are excellent, and bring us [the project-team at the Project Management Office] concrete feedback about the conditions on-site."

- HSE Manager at Contractor C

The Health and Service representatives are according to the HSE-Manager actively participating in the forming new standards, where they are especially focusing on the improvement of HSE-procedures.

"They have about 25-30 representatives, distributed across the various parts of the site, and then you have a person on top coordinating them. When we were big [the project-organization, in an earlier phase of the project], this was a full-time position. He has meetings with the representatives outside, and spend a lot of time on-site. He receive ideas and improvement suggestions, and observations - both good and bad. (...) We're using them in publications, and on TV-screens to develop a safety-culture - It's a coworker talking to a coworker, not a superior talking to a subordinate."

- HSE Manager at Contractor C

According to the HSE Manager there is no improvement-campaign on the current project, or large machinery used to identify improvements, and he states that most improvements are incremental, and happens on a daily basis. He illustrates this point by the forming of a new routine as a result of a near accident:

"We recently experienced a truck catching on fire due to a oil-leak, and that the breaks got overheated. (...) Then one of the guys said, 'We have a washing-station right over here, why don't we wash the vehicles twice a week?'. We

> *implemented this as a standard - the vehicles are washed and cleaned twice a*
> *week. It's a very simple routine, but it's definitely preventing incidents like the*
> *fire."*

<div align="right">- HSE Manager at Contractor C</div>

The HSE Manager states that when the employees have ownership of the routines, they are more likely to follow them. He also states that they have a great focus on follow-up of HSE practices, and everyone is expected to follow them. The ISS Site leader further states that once they have agreed upon a best practice, they are trying to proceed accordingly. He do however state that it takes time to make new practices stick, and that the results are sometimes not as intended.

> *"These are actions the boys have initiated themselves, and it's therefore their*
> *cause. It's not me telling them to wash the vehicles, it's them telling me, 'I*
> *think we should wash them'. If you receive things from the lower levels of the*
> *organization, you always receive greater enthusiasm and ownership. (...) I'm*
> *also careful to check, so the boys know that, 'we better clean, because he's*
> *going to ask'. If you ask for things, people are coming along."*

<div align="right">- HSE Manager at Contractor C</div>

> *"You are working as agreed upon, but sometimes you can get frustrated if you*
> *don't see direct results, and you do something else instead - This is something*
> *we've seen. We're starting on something, then we try it out for two months, and*
> *suddenly it's something else."*

<div align="right">- ISS Site leader at Contractor C</div>

related to the HSE-requirements, the HSE Manager further state that his superiors are demanding continuous feed back, which is why it is such a great focus area in the project:

> *"What do you base your priorities on? Well, HSE is absolute, you're confronted*
> *and requested, and you get the results every day. Repeated, repeated, repeated!*
> *You're not getting away with saying that you will look into it tomorrow."*

<div align="right">- HSE Manager at Contractor C</div>

According to the HSE Manager they have gotten a lot better at sharing information, both between employees in the project and at other projects. He states that the intranet is the most important channel to acquire and distribute information, but also highlight the importance of the discipline-forums to look for industry-standards.

"We've started picking up positive things from other projects. This is because the intranet has become more systematized - you know where to look. (...) They [employees] have their own discipline forums where we look for incidents, both internally and in the entire industry. There are extremely many competent and creative people, who in this forum dare to share their experiences, because it's a discipline forum - It's their coworkers, it's foremen, it's supervisors, it's familiar people."

- HSE Manager at Contractor C

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- HSE Manager at Contractor C

Subcontractor C2

According to the Quality Controller at Subcontractor C2 they started the implementation of Lean two projects ago, which is now implemented across the entire organization. The initiative was introduced by Management, who hired an outside consultancy to help plan the process. They now have Lean-meetings in production every day, week-goals and screens showing the project-progress and HSE-statistics. The Quality Controller further states that this is a continuous process where the main goal is to do the various activities in the right order, and to do them in the right way the first time.

"Lean-meetings are run in production every day, with every discipline. It started with the structure, then it evolved and other disciplines were included - Isolation, Plumbers, Electricians. Lean is being run all the way throughout the organization - We have screens everywhere. (...) There are many disciplines within a module, it's practically the same as building a house, and we have to do it in the right order, and do things once. Avoid tearing things down, and correct them."

- Quality Controller at Contractor C2

As part of the Lean implementation they have put together improvement groups, consisting of experienced employees from the various disciplines. These groups are continuously working with improvements, and are looking for ways to simplify and standardize the operations. They are evaluating the entire process from Engineering to Installation, and in particular they are looking for ways to reduce the time spent on welding.

"They're trying to figure out how to do things simpler, and especially ways to

reduce welding - that's the main thing. We've been able to standardize the
window panels, which was a success! We developed new profiles that enable
us to just put it together, requiring less welding."

- Quality Controller at Contractor C2

Joint organizational development with subcontractors

Contract Manager 1 at Contractor C states that the organizational development activities can be divided in three parts - what Contractor C can improve internally, what the subcontractor should improve, and what they can improve together. He states that it first and foremost is the subcontractors' responsibility to improve, but that it is important to identify the challenges that can be addresses together. This is important in order to make sure that the subcontractors are able to deliver according to specifications, and meet the various requirements set by Contractor C, such as delivery precision, HSE, Quality and the ability to complete on time. The engineering function in-house at Contractor C should have some responsibility for the product-design, Procurement should have some responsibility for the products delivered by the different subcontractors and so on.

"Contractor C have worked intensely to establish an understanding that we have
to take responsibility for what's happening around us. The base-organization
need to support the subcontractors in order to drive innovation. The base-
organization has a damned responsibility! You and me, should become us -
that's how we improve for the next project."

- Contract Manager 1 at Contractor C

Contract Manager 1 at Contractor C further states that the subcontractors are good at the technical execution in general, but that many could learn how to effectively manage projects from Contractor C. Contractor C's objective is not to fundamentally alter the production process of their subcontractors, but rather to facilitate development and improvements through effective project management, well proven control systems and work methodology. Contract Manager 2 at Contractor C state that in order to increase project productivity they are opening all of their systems to subcontractors. Subcontractors can for instance report deviations and documentations straight into TIPS.

"We are opening all of our systems, because we want to integrate with our
subcontractors on projects. We have suspected that some have taken advantage
of this in the past, but it's a chance we're willing to take because we experience
that discovering problems immediately is the most important. That's what we

live by!"

<div align="right">- Contract Manager 2 at Contractor C</div>

The Installation Manager states that subcontractor C2 are very good at 5S, but that they are a couple of years behind Contractor C when it comes to work methodology and HSE practices. According to both the Installation Manager and the Quality Manager, the current organization with increased support staffing, has contributed to the development of Subcontractor C2's HSE-routines.

> *"They are better than us on tidiness and that stuff, but are a couple of years behind on certain work methods, and HSE practices. We have here collaborated closely, and have tried to implement our HSE-experiences - slow but steady. We have also had a joint effort to develop an installation's manual, where they've been completely integrated. I think it will stick. (...) We share a lot of information, as they're not a direct competitor, and because it benefits the entire community if they are successful."*

<div align="right">- Installation Manager at Contractor C</div>

> *"When Subcontractor C2 have had challenges with a procedure that is inadequate or straight out bad, we're happy to contribute with our knowledge and resources which is just around the corner. Then they rebuild and make procedures based on the input from us. We have especially contributed to the development of procedures for cleaning of pipe-systems, both oriented towards this specific project and the base-organization. (...) They have at times stated that they think it's a bit unnecessary to go so into detail, but then they have also stated that this is something they can use on future projects also. It's incremental improvements all the time."*

<div align="right">- Quality Manager at Contractor C</div>

The HSE Manager at Contractor C states that in order to succeed with joint improvement initiatives it is necessary to develop terms of reference, decide what should be done, which resources to allocate, and the time-frame. He further states that because Subcontractor C1 have clear chains of command, they are able to effectively take corrective actions and participate in improvement work. The ISS Site leader states that because Subcontractor C1 is on a fixed price contract, they are also motivated to participate in improvement initiatives which will increase their productivity.

> *"Subcontractor C1 is easy to deal with in relation to changes and improvement*

work. They have a large Polish work force that both accept and are used to take orders. Strictly cultural they're using more orders, which is not the Norwegian style. It's not our style to give orders from one chain in the organization to the next, we communicate more, and are open to suggestions: 'what do you think of that?'. As an example, if there is far to many coming in to lunch, they are giving an order the next day. We at Contractor C say, 'There is now a bit many coming in early for lunch, can you try to correct that?'. We're doing it in a nice and polite manner, while they're knocking on the table - and often there will be consequences for coming in early to lunch. They are good at that. Which working environment they have, or what corporate culture they have, I'm not going to say. It seems very command-oriented."

- HSE Manager at Contractor C

According to the Project Manager and Production Supervisor at Subcontractor C1, TIPS is not appropriately designed for the ISO-disciplines. Because the release system was not accurately depicting the reality, Subcontractor C1 could not predict when they had access to an area. This has caused delays in their activities, and has been a recurrent topic for Subcontractor C1 throughout the project. They have not felt heard by Contractor C, and have often been accused of not delivering on time. Only recently was the problem recognized by Contractor C, and they have now together developed a compensating system in Excel.

"TIPS is controlling a lot, and among other things it controls the release-system. This system has never been completely working for the ISS-disciplines. We have pointed it out on several occasions, without getting listened to. Because we're now nearing the end, and there is plenty of work left on ISS, Contractor C recognized that the release-system didn't work as it was supposed to. To compensate for this system, we got Contractor C to understand that we needed to take different measures. It was developed an Excel-based release-system, where we have provided input - We are welcoming it. It was also nice to get the recognition that the release-system they had provided wasn't working."

- Project Manager at Subcontractor C1

"Normally this is taken care of by the release system in TIPS, but because we have received modules and supplies from various sites all over the world, the status update hasn't always been correct - If you get shit in, you get shit out. This led to decisions being made based on a status-chain that wasn't working. (...) This [New Excel system] is a management tool for making the right priorities. They're able to filter the different work descriptions down to foreman level, 'this

is now available to you as a Foreman. Now it's up to you to get the things you need out, and do the things described in the sheet'. The foreman level was included like that, and gave their support. They understood it, and it was a tool that helped them to do the correct jobs outside. (...) Previously it was much back and forth - 'how can I figure this out?, When is it my turn? - They've now got a tool providing these answers."

- HSE Manager at Contractor C

According to the Project Manager at Subcontractor C1, Contractor C was the initiator of the new system, but that they have developed the content, as they have the technical know-how. The system is transparent in that the bottlenecks are identified, and it shows when parts are actually ready for isolation. They have used this system for the past six months, which has resulted in better cooperation with Contractor C according to the Project manager at Subcontractor C1. In addition to developing the release system in Excel, they have also assembled a task force of 25 people to maintain the Excel-sheet.

"If there has ever been a time when the cooperation between us has been working, it would be in the recent months around this [The Excel-based release system]. (...) Contractor C now have a self-interest in that we're succeeding. They've been interested in that the entire time, but strictly operational they have now recognized that we are a part of their delivery, and that we have to succeed in order for them to succeed. We haven't felt that way earlier."

- Project Manager at Subcontractor C1

"After we established the operation room, and the shared document which enabled us to make priorities, it has worked splendidly. This is what Subcontractor C1 also tells me in sponsor-meetings we're having from time to time, that we're now doing the right things - we just have to do more of the right things. Hang in there, use that list, use the document, this belongs to both of us, and keep us on this course. Don't stray or start with new things - have enough stamina and use the tool."

- HSE Manager at Contractor C

The Project Manager at Subcontractor C1 states that adjusting TIPS to fit all disciplines would have been the preferred solution, but that the new release-system is a pragmatic solution, and an example of a joint improvement.

"We would prefer that TIPS was adjusted, and correctly used by everyone!

> *We're not fans of Excel-sheets, but that's what's working now. (...) It's banal,
> but the communication is faster and more correct than ever before. This is also
> a shared tool, and everybody in the industry knows how to use Excel - TIPS is
> harder."*

<div align="right">

- Project Manager at Subcontractor C1

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According to the Production Supervisor of Subcontractor C1, they are encouraged by
Contractor C to come up with suggestions for improvement. He further states that the
suggestions are welcomed if they are beneficial for Contractor C.

> *"There's a little catch. I feel like they always wonder 'What do they want now?'
> It's welcomed with open arms if it benefits them, but if it's beneficial for us, it's
> not that important."*

<div align="right">

- Production Supervisor at Subcontractor C1

</div>

> *"For example on scaffolding, which is paid by the hour... We wanted to use
> scaffolding for building cover against the weather. It's costly, yes, but it's right
> and sensible, and gives the prerequisites for painting and insulation to happen
> in a productive manner. After a lot of discussion, we finally agreed on doing
> it our way, and we can see that the productivity has increased. Our progress
> wasn't that important earlier on in the project, but when they realized that our
> progress was important to them, in connection with their own progress, it was
> suddenly interesting. Contractor C is a competent actor, but they take care of
> their business, and gladly at the cost of their partners."*

<div align="right">

- Project Manager at Subcontractor C1

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The Production Supervisor at Subcontractor C1 states that in order to succeed with joint
improvement, both Subcontractor C1 and Contractor C need to understand each others
differences and stances. The Project Manager elaborates, and states that Contractor C did
not understand the challenges associated with the fixed price contract for Subcontractor C2.
He further states that in order to learn from the problems on this project, things should be
more systematized.

> *"People are replaced, competencies disappear to other places and tasks...It's
> important to put this in a system - both for us and for Contractor C - to predict
> similar settings on future projects, and address problems early rather than late."*

<div align="right">

- Project Manager at Subcontractor C1

</div>

"Contractor C are very good at separating the commercial and the operative perspectives in the daily operations. We are living closer to the money, and all the way down to the foreman-level, we should keep an eye on the money. Contractor C are rarely talking about money in operative meetings, but then they meet us, and we're talking money - This results in a bit friction. They have an organizational culture where they have certain forums for talking money, and everything else is strictly operative."

- Project Manager at Subcontractor C1

According to the Project Manager at Subcontractor C1, they would like to contribute to implementing Lean on future projects with Contractor C. They have done so in other projects, where the Contractor had policies and focus on it. The Production Supervisor states that it was difficult for them to implement any of their internal Lean-practices in this project because Contractor C was not using it, and because they were not involved from the start. He do however state that he believes it will be required in future projects.

"The customers often want us to work within their systems, which sets limitations to what we can do. I'm sure there are many low-hanging fruits, because Lean isn't just 5S, but it's the whole value chain, and then you need to include the customer. We don't have the answer, but we're looking for it! Here it hasn't been policy, and there were other things in focus. Implementing Lean requires effort...When it has been established and the culture is set, it's much easier...but as an individual joining a project trying to implement Lean...that's heavy!"

- Project Manager at Subcontractor C1

"It has to be decided at the top, 'that is is the way we want to do all of our projects'."

- Production Supervisor at Subcontractor C1

"When there is no requirements related to Lean-implementation, I use my energy and focus on other things. (...) I know Contractor C have implemented Lean at their yard, but they haven't taken it here - I would really like it if they did. They just have to decide to do so, facilitate it - they've got to want it."

- Project Manager at Subcontractor C1

Chapter 5

Analyzes

In this chapter we will present a single-case analysis for each of the three cases, followed by a cross-case analysis. Each of these analyzes are structured in two main parts, where the first part addresses the first research question and the second part addresses the second research question. These parts are further structured according to the analytical framework, presented in chapter 2. In part one we will examine the contractors' knowledge generation processes, followed by their institutionalization processes. In part two we will follow the same structure, but we will here investigate how the characteristics of the project-process, and the relational factors, affect the subcontractors ability to contribute to joint organizational development

5.1 Case A - single case analysis

5.1.1 How do Contractor A approach organizational development?

Information sharing and openness

Contractor A have developed what they call the A-standard, for standardizing technical solutions, and providing a planning regime for projects. The management recognizes that the employees are the 'smart heads' of the organization, as they are better suited for discovering deviations between the desired and current state of the operations (Flores et al., 2012). They are therefore encouraging all employees to contribute and suggest improvements to the A-standard. In order to enable the employees to communicate suggestions, Contractor A have attempted to offer different communication channels. They have for example attempted to use suggestion boxes for this purpose, but according to empirical data, this was no success. While providing channels for employees is important for information acquisition,

they also have to be appropriate (Nonaka, 1994). The empirical data suggests that many of the operators do not like to write, and so the suggestion boxes could be regarded as an inappropriate channel.

Most suggestions are communicated in person to foremen, in group leader meetings and in the hallways of their headquarters. The informants recognize that Contractor A is characterized by a flat organizational structure, which enables employees to step into the CEO's office for discussing solutions, and project managers to communicate across projects. Suggestions are thus communicated by the word-of-mouth method, and even though the empirical data suggests that it is effective, there are risks associated with this method.

First, when suggestions are communicated via foremen and group leaders, Contractor A could risk falling prey to misinterpretation and blindness, if important parts of the information are being altered or lost (Snyder & Cummings, 1998; Levitt & March, 1988). For all the information to find its way to the management, they are dependent upon individuals to replicate the information precisely. Second, the information may also end up at different places, depending on the persons involved in the sequential communication - it might even be forgotten along the way. An appropriate channel directs the information to the right people (Nonaka, 1994), and the appropriateness of such an informal communication system is therefore debatable. However, these informal communication channels generate plenty of suggestions, which could indicate that the channels may be appropriate for Contractor A.

The empirical data suggests that Contractor A lack an effective communication channel for informing the employees about new best practices, and changes to the A-standard. Communicating the rationale behind, and progress of development activities, can help anchor the change in the organizational culture(Kotter, 1995). Contractor A has attempted to use e-mails, hierarchical communication lines and a Facebook-group for this purpose. The e-mails and the Facebook group seem to be inappropriate information channels, which is illustrated by the frequent requests for more information on topics that have already been communicated. Since employees are both scattered across several project sites, and often in different project-phases, it is difficult for Contractor A to direct relevant information to the correct people.

By using the e-mails and Facebook-groups, the information is shared with all employees, regardless of whether the information is relevant for the recipient or not. The fact that Contractor A struggle with actualization of the development initiatives, and the communication of progress, can cause potential problems in the institutionalization phase - if the changes are perceived as confusing and excessive, the indifference and resistance among employees could increase (Stensaker et al., 2002). It therefore seems as they are in the need for a system which enables them to communicate relevant information to the right people at the

right time. The hierarchical communication lines of Contractor A could do just that, as the use of these communication lines could potentially keep the operators well informed about the changes to the A-standard (Klein, 1996). This seems to underline the appropriateness of using the hierarchical communication lines, and Contractor A should therefore continue to use their project managers, group leaders and foremen to direct relevant information downwards in the organization.

Employee participation

Contractor A has established six improvement groups, consisting of approximately 30 employees, who participate in organizational development across six internal themes within the operations. These groups acquire information through their colleagues, and provide suggestions for changes to the A-standard. The empirical data suggests that Contractor A wants to establish a culture which facilitates participation and encourages experimentation (Goh & Richards, 1997). Contractor A perceive employee participation to be a key to success, and both the methodology and the solutions come from the employees on construction site. They believe that the employees are better suited for discovering the problems on production-site, and that the solutions generated by the employees are likely to be more appropriate, which is in line with D. I. Jacobsen (2012) and Levin et al. (2012). The employees' perception of the participative style of the management has implications for the change readiness of Contractor A (Coyle-Shapiro, 1999). By involving employees in these groups, the management hope to achieve compliance to the A-standard.

They have involved experienced group leaders, apprentices with new and fresh viewpoints and the usual critics. Broad involvement in these groups, which resembles cross-functional teams, could function as platforms for knowledge creation and innovation (Nevis et al., 1995). The improvement groups are further an arena for knowledge interpretation and integration, where free discussion could help achieve consensus on solutions to implement in the A-standard (Flores et al., 2012). Contractor A does wisely in including several viewpoints, as this could be regarded as an action for avoiding misinterpretation of information and faulty solutions (Levitt & March, 1988).

The empirical data does however suggest that they sample participants for the development groups, not only with the purpose of gathering differing viewpoints, but also to decrease resistance to change, taking the stand of Kuipers et al. (2014). Contractor A is an organization with several professions (e.g. concrete workers, carpenters, tinsmiths and roofers) with potentially differing priorities, which could complicate organizational development through resistance (Pavitt, 2005). By involving several viewpoints, Contractor A also facilitates a joint sensemaking process, and thus decreases the chances of resistance to change (Balogun

& Johnson, 2005; Gioia & Chittipeddi, 1991). The inclusion of critics could also be utilized as a resource for improving the solutions of the A-standard (Simoes & Esposito, 2014).

The employees are contributing to organizational development in addition to their daily operations, and even though there is a lot of enthusiasm among the employees, it is challenging as concurrent organizational development affects the progress of the projects. The informants express that it is a challenge to find the time for organizational development.

Strategic focus

Even though Contractor A have developed the A-standard, they still see some variations in the work-procedures of their operators. They are already engaging their employees through the six improvement groups, but it is equally important that management provides the necessary structures for organizational development (Nonaka, 1994; D. I. Jacobsen, 2012). In order to do so, they are currently developing an organizational development system which they expect will serve as a supporting frame for the A-Standard. By doing so, they can provide direction, and ensure strategic fit between the selected development initiatives and the organization's overall strategy (Conger, 2000; Snyder, 1996). They are also in the process of hiring a Development Manager to further formalize the structures surrounding the organizational development system. By allocating specific resources to the organizational development activities, they want to show commitment, and achieve compliance to the A-standard. If the management at Contractor A is able to focus and commit to a limited number of organizational development themes, theory suggests that the employees are also likely to commit, and engage in the organizational development activities(Weick, 1991; Flores et al., 2012).

The empirical data suggests that the experiences from various development activities have facilitated discussions, which they recognize to influence innovation (Nevis et al., 1995). The fact that they receive more feedback and suggestions for development activities after they initiated the A-standard and the improvement groups, suggests that they are beginning to see the contours of a culture for organizational development, and a learning orientation (Flores et al., 2012). There is reason to believe that this learning orientation in Contractor A will continue to increase, as the systematic approach towards organizational development is further formalized (Leavitt, 1965).

Institutionalization

It seems that Contractor A is able to generate large amounts of knowledge through the six improvement groups, where the employees are providing suggestions, and input for new practices. Flores et al. (2012) argue that in order for the generated knowledge to contribute

to organizational learning it should be spread throughout the organization. The empirical data shows that the A-standard is frequently subjected to changes, and that these changes are written down as standard operating procedures and communicated to the employees by various means. The group leaders have been identified to be the most effective communicators, as they are able to keep the operators well informed (Klein, 1996). The group leaders therefore seems to serve an important role in the institutionalization process, by making sense of the different changes (Termeer et al., 2017). The interplay between management and group leaders, and group leaders and operators, seem to form a relational system (Scott, 1995), which reinforces the standard operating procedures. The relational system, together with the standard operating procedures, constitutes the primary institutional knowledge carriers for the organizational memory (Glosvik, 2002) of Contractor A. According to it's management, 80 % of the operators are complying to the project methodology, and the standard operating procedures in the A-standard. This illustrates that Contractor A to some extent has succeeded to institutionalize the A-standard in the organizational memory.

There are however still 20 % of the operators not complying to the A-standard the way it is intended, which suggests that the institutionalization process is partially impaired. Nonaka (1994) argues, that besides appropriate communication channels, a learning organization also needs a base of knowledge, to which the employees should have easy access. It seems that while the standard operating procedures are written down in the A-standard, and changes to it are communicated in various forums, the operators do not have easy access to them on the project site - as they are frequently calling for more information. This suggests that Contractor A in reality depends on the relational system for institutionalizing new best practices, which might explain the deviations from the A-standard.

Contractor A's reliance on the relational system as an institutional knowledge carrier is evident also in the transfer of best practices between projects. They do not have a systematized approach for making evaluations of their projects, and they rarely result in written documentation. This poses a risk for the institutionalization process, as it becomes contingent upon the individuals involved to distribute the generated knowledge in their relational networks. If the generated knowledge is not further conveyed, Contractor A risk falling prey to amnesia (Snyder & Cummings, 1998), which is one of the main reasons why the learning process fails (Medinilla, 2014). It seems that the unsystematic approach towards both making these evaluations, and the later distribution of the results, are representing barriers for an efficient learning process (Bateson, 1972; Glosvik, 2002). It should however be noted that Contractor A's flat organizational structure, combined with the fact that every project manager is situated at the head quarters, seem to enable a high degree of transfer of best practices between projects through a relational system.

Contractor A's approach to organizational development

Our impression is that the channels for making suggestions are appropriate, as they seem to generate a great amount of feedback. The informal communication of suggestions are most likely enabled by the flat organizational structure of the company. The challenge for Contractor A is however to distribute information to the employees. The fact that employees are in different phases of projects, and are scattered across various project sites, seem to complicate effective distribution of knowledge. The use of middle-management, and hierarchical communication lines, could keep the operators better informed about the rationale behind, and the progress of, the development initiatives. The fact that they struggle with communicating changes to the A-standard to the employees, also seem to have an impact on the compliance to the A-standard, and the institutionalization process.

Even though Contractor A have involved employees in development work through improvement groups, they have not provided a clearly systematic approach towards organizational development. This could explain why they have only partially succeeded with the institutionalization of new best practices. There is reason to believe that the hiring of a Development Manager, could enable Contractor A to direct the focus towards organizational development, and provide transformational leadership. This could further facilitate a learning orientation among the employees, and increase the compliance to the A-standard.

5.1.2 Approach to joint organizational development

We will in this section study the relations between Contractor B and Subcontractor B1 and Subcontractor B2. We will then assess how these relations affect the knowledge generation process, and the subsequent institutionalization of the generated knowledge.

Relational factors and knowledge generation

According to the empirical data, Contractor A have little experience with organizational development in collaboration with subcontractors. The various statements suggest that Contractor A makes the terms, and that their subcontractors are expected to comply. After a while the subcontractors also see that the best practices of Contractor A benefits them as well, and this is important - that the subcontractors see how it benefits them.

Even though Contractor A and their subcontractors do not engage in joint organizational development on a systematic basis, they do have regular meetings as part of Contractor A's planning-regime. In these meetings there are sporadic conversations about minor improvements to details, and new available technology, within the subcontractors' domain. The subcontractors are also involved in the early phases of the project to discuss plans, and

create detailed drawings. Both Subcontractor A1 and Subcontractor A2 gave the impression that receiving thoroughly detailed work descriptions from Contractor A could be a challenge. While Subcontractor A1 wants to be included at an earlier stage of the project, Subcontractor A2 gave the impression that this has gotten a lot better in the recent years.

Contractor A have limited knowledge about the technical disciplines, which they do not have in-house. The empirical data suggests that the subcontractors' knowledge and experience on feasibility of solutions can contribute to the creation of complete drawings. This could result in plans of higher quality - which the empirical data furthers suggests are important for the outcome of the project. The regular meetings and the engineering meetings, are important platforms for the subcontractors to both share their knowledge, receive information, and for the parties to jointly create knowledge (Nonaka, 1994; Nevis et al., 1995). Sharing information in this way, makes the project-process of Contractor A transparent for the subcontractors (Búrca et al., 2005), and enables Contractor A and the subcontractors to enter into joint organizational development (Lorenzoni et al., 1995). When the project-process is transparent to the subcontractors, they are better equipped for suggesting development initiatives. This is important for developing the project process, and achieving a better strategic fit between the supply chain capabilities and the overall competitive strategy for Contractor A and their subcontractors (Brown & Blackmon, 2005). The involvement of the subcontractors in the early phases of the project seems appropriate. The subcontractors could then receive more information about the project, which in turn enables them to achieve a better price estimate. It also enables the creation of correct drawings, and an execution plan that is adapted to the needs and requirements of all the actors involved.

The empirical data further suggests that there is a lot of focus on project progress, and that it is therefore tempting to embark on the construction as early as possible. The engineering phase is typically concurrent with the construction phase, which means that detailed drawings are not completed before the construction begins. This is a direct consequence of the intense focus on project progress. There seems to be a paradox here. On one side, Contractor A is subject to time-constraints, and spending too much time on the engineering and planning phase impacts the progress of the project. On the other side, spending time on this phase, could facilitate better plans with fewer hick-ups, and better solutions, which could contribute to a better project progress. The subcontractors do have the opportunity to suggest development initiatives in the regular meetings as the project progresses, but this could represent a certain amount of rework (Mello et al., 2015a), and could potentially be avoided by spending enough time on planning. As there are many actors that are going to cooperate on the construction site, coordination of the supply chain is imperative for Contractor A's progress, as argued by Mello et al. (2015a).

Mentzer et al. (2001) and Al-Mutawah (2009) argue that one of the prerequisites for successful coordination is corporate compatibility. The empirical data suggests that Contractor A and both their subcontractors share several characteristics. Like Contractor A, Subcontractor A1 and Subcontractor A2 have a flat organizational structures, and emphasizes the importance of employee participation for driving organizational development (Goh & Richards, 1997; D. I. Jacobsen, 2012). The development activities undertaken by the subcontractors have not been systematic, but dependent upon enthusiastic employees for suggesting measures for development on a case-by-case basis. Subcontractor A2 have also attempted to develop a standardized methodology, in much the same way as Contractor A, but they have not provided the same system around it.

Contractor A has to a greater extent provided transformational leadership for their employees, compared to the two subcontractors. It also seems unlikely that Subcontractor A2 intend to impose a systematic approach towards organizational development on their employees, as the management do not see the point. Their rationale for an unsystematic approach is, that something that works on one project, do not necessarily work on another - they don't want it to be static, as it is under constant development. This is potentially problematic, and here is why: neither Contractor A, nor the subcontractors, have a clearly systematic approach today, they are likely to have the same lack of learning orientation (Flores et al., 2012; Weick, 1991). However, when Contractor A further formalizes their system for organizational development, they are likely to achieve a higher learning orientation than the subcontractors, which still do not have any systematic approach. This could further have negative implications for the corporate compatibility between Contractor A and their subcontractors, which Mentzer et al. (2001) emphasizes as a prerequisite for successfully coordinating the supply chain.

While it seems as the organizations are compatible on organizational structure, employee participation and to some extent their approach to organizational development - in that it is somewhat in lack of systems - it is also important to evaluate the subcontractors incentives for contributing to joint organizational development. There exist no direct monetary reward for contributing beyond the scope of the contract. The lump sum contracts only give an incentive to drive internal organizational development, as the subcontractors have the ability to affect their own profit.

The empirical data suggests that all actors are dependent upon each other to deliver (Mokhatab et al., 2014). By contributing to developing the joint operations, a subcontractor could potentially draw benefits from it, without it being the direct intention of the development initiative. Both subcontractors seem to be positive about the idea of contributing to joint development activities, as they recognize that all actors in a project are

dependent upon each other. Subcontractor A1 thinks that it is impossible for Contractor A to develop their operations without involving their subcontractors. Subcontractors deliver a considerable part of the project value (Mello & Strandhagen, 2011; Hicks et al., 2000) - in this case, the technical disciplines deliver somewhere around 35% of the project value - and Subcontractor A1 recognizes this fact. Subcontractor A2 believe that there are potential for developing the project-process, which also can benefit themselves. This suggests that the incentive for contributing to joint organizational development is rooted in the nature of project-process itself, and not in the lump sum contracts.

The lump sum contracts seem to provide the subcontractors with one additional incentive for developing their own operations. By developing internal capabilities, they could achieve a competitive advantage in the tendering phase, where they compete with other actors on winning contracts for Contractor A. As the quality and price are among the factors they are evaluated on, they have an incentive for developing capabilities that reduce costs and increase quality (Chopra & Meindl, 2016; Brown & Blackmon, 2005). As a direct consequence of the competition on price, they do not present premium products in their offers in the tendering phase, even though premium products could have a positive effect on the project progress, as discussed above. The premium products are expensive and could cause the subcontractors to lose the contracts initially. This readily shows a weakness of the project process, where the competition between subcontractors in order to win contracts, forces them to propose cheaper products and solutions. The empirical data suggests that Contractor A recognizes this fact, but that they still want to keep the competition between the subcontractors.

Contractor A's rationale for competition between subcontractors was to avoid them becoming to comfortable in the relationship, and the competition seems to act as an incentive for a focus on quality and cost efficiency(De Wit & Meyer, 2014). It seems as this strategy is an attempt to tip the power balance between Contractor A and their subcontractors in favour of Contractor A, and to remove some of the supplier risk (Kraljic, 1983). The fact that the subcontractors give the impression of Contractor A to be the dominant party - which contradicts the norm in the project industry (McGovern et al., 1999) - suggests that the strategy is successful in balancing the power.

However, competition does not seem to facilitate long-term and strategic relationships. Contractor A uses a pooling strategy for subcontractors, and the contracts and relationships are therefore fundamentally short-term and project-specific (Vrijhoef & Koskela, 2000). The empirical data does nevertheless suggest that Contractor A and their subcontractors develop a history together, which could mean that the pooling strategy functions as an approximation to long-term relationships - even though the relationships remain fundamentally short-term.

The strategy further seems reduce the risk of collaborative issues and quality issues, as the subcontractors over time become familiar with contractor A's methodology. By approximating long-term relationship characteristics in this manner, Contractor A also maintain the possibilities of entering into joint organizational development with their subcontractors (Chopra & Meindl, 2016). The fact that Contractor A and Subcontractor A1 are currently evaluating areas for joint organizational development, seems to confirm this assessment.

Since the relations between Contractor A and their subcontractors are not long-term, a question arises about how jointly developed organizational knowledge should be institutionalized. If they enter into joint organizational development and are not able to institutionalize the created knowledge, they risk falling pray to the learning disorder of amnesia, where the knowledge is lost for future projects (Snyder & Cummings, 1998).

Institutionalization

The empirical data suggests that both Contractor A and their subcontractors recognize the effect of having a history together and personal chemistry on project performance - especially the chemistry between the group leaders on site have been recognized as a key to success. As they become familiar with one another, and learn the methodology of Contractor A, the projects seem to run more smoothly. This fact suggests that the organizations rely on relational systems as a knowledge carrier for jointly created knowledge (Scott, 1995). It seems that the flat organizational structures and informal settings, which seem to permeate the organizations, together with the approximation of long-term relations, enable the jointly created knowledge and best practices to be anchored in the relational system.

Contractor A's relations to the subcontractors are however fundamentally short-term, as the contracts are project-specific (Vrijhoef & Koskela, 2000), and it could therefore be questioned whether the relational system is the appropriate knowledge carrier. Since the subcontractors involved in projects vary, it becomes difficult to institutionalize new best practices through the knowledge carriers that depends on stable relations, such as the relational systems (Scott, 1995). As Contractor A chooses to use another subcontractor on the next project, the implicit knowledge could be lost, and the organization must start over with the next subcontractor (Medinilla, 2014).

As different subcontractors enter and leave the project at different points in time, the lessons learned are perhaps best recorded as they emerge. The new best practices could be recorded as governing documents located at a database within the organization of Contractor A. These governing documents could form a foundation for new best practices (Scott, 1995), and in this way, Contractor A could prevent the best practices from being forgotten. This also enables the implicit knowledge to become explicit (Nonaka, 1994), and contribute to

organizational learning (Bateson, 1972). Artifacts such as governing documents thus seem to be the appropriate knowledge carrier for institutionalizing new best practices and routines developed through joint development activities. A source for information for governing documents could be project-evaluations. Neither Contractor A, nor their subcontractors, have much experience with performing project evaluations at the end of projects, as the focus on progress and overlap between projects seem to act as barriers. Subcontractor A2 believes in continuously addressing issues on projects, by discussing the issues with Contractor A. They believe that joint evaluations have a tendency of focusing on who is to blame for diverse hick-ups, rather than on the lessons learned. Subcontractor A1, on the other side, thinks that joint evaluations with Contractor A could be beneficial, as they could avoid doing the same mistakes on project after project. Subcontractor A1 are in general more positive to performing evaluations, as they realize the potential risk of losing knowledge through employee turnover (Flores et al., 2012). They have until now relied on rotating employees for spreading knowledge (i.e. relational systems), but they believe that a "knowledge bank" could be a potential solution.

Joint organizational development summarized

At this moment, Contractor A offers no specific platforms for discussing development initiatives, other than the regular meetings during the project, and in the engineering and planning phase of projects. The time-constraints associated with the project-process do however limit the possibilities for utilizing the engineering and planning phase for this purpose. They have further entered a discussion with one of their subcontractors on the subject, and are seeking to find an area within which joint development activities could be feasible.

Both Subcontractor A1 and Subcontractor A2 have the prerequisites for contributing to joint development work as they seem to be compatible to Contractor A - they all have limited experiences with development work and they have a flat organizational structure enabling broad employee participation. The incentives for participating in joint development work are however not routed directly in contracts, but in the project-process itself. Since many actors depend on each other in the projects, a development for one actor may result in development for another.

The rotation of subcontractors makes it difficult to institutionalize the new best practices and routines through symbolic or relational systems, even though they seem to have used the relational system so far. The most feasible knowledge carrier seems to be either a best practice or routine which also could be anchored in a database or system (i.e. artifact) located

in Contractor A's organization. Contractor A have however faced challenges related to institutionalization in their own development work, and it is therefore questionable whether an artifact is the appropriate knowledge carrier for joint organizational development.

5.2 Case B - single case analysis

5.2.1 How do Contractor B approach organizational development?

Information sharing and openness

Contractor B encourage everyone to come up with suggestions for organizational develop-ment. The operators use the suggestion boxes for suggesting development initiatives, and they come up with many suggestions for development initiatives. Contractor B believes that it is the operators that are the closest to the daily operations and are best suited for suggesting development initiatives.

According to Deming (1986), deviations between the desired and current state of the op-erations are discovered in the early phases of the learning process. Contractor B has the intentions of extracting information from where it emerges, that is, from the operators closest to the daily operations, which is in line with the philosophy of organizational development, as proclaimed by D. I. Jacobsen (2012). Nonaka (1994) further emphasizes the importance of appropriate channels for facilitating information flow across the organization. In order to extract the information from their employees, Contractor B have created suggestion boxes as a channel for communicating their observations and suggestions for solutions. Information acquisition is important to avoid the learning disorder of blindness, as described by Snyder and Cummings (1998). The frequent use and the number of incoming suggestions, indicate that the suggestion boxes are an appropriate channel for this purpose - perhaps because good suggestions are rewarded.

Contractor B has systems for evaluations at the end of projects. The Procurement Manager has however doubts about whether this is sufficient in order to capture experiences made during the early phases of the project. Contractor B has in the current project introduced a system where everyone can add experiences made during the project, and not only at the end. However, the use of this system is subject to variation between people. Another system dedicated for quality deviations is frequently used, but this system is overloaded with reports, which make it difficult to make any sense of it.

Contractor B offers many different channels for their employees in order to suggest initiatives. Nonaka (1994) emphasizes that creating channels for information flow is not enough. He also underlines the importance of the appropriateness of the channels, and that the channels should direct the right information to the right people. It seems however that the channels offered are not appropriate enough, as some are used to varying degree and some are overloaded. This suggests that the employees have too little knowledge about the first system, and that the second system do not allocate the information extracted in an appropriate

manner. The information stored should according to Nonaka (1994) be easily accessed once stored. According to the statement of the procurement manager, this is not the case. The channels for extracting information are here likely to be more appropriate, than the channels for distribution. The fact that the second system is perceived as overloaded, can to a certain extent also be said to facilitate the learning disorder called multiple personality disorder, as described by Snyder and Cummings (1998), where different parts of the organization apply different solutions to the same problem. As Contractor B is a project-based organization, with more than one ongoing project at any given time, the overload of information can cause e.g. two different project managers to apply two different methodologies to the same situation.

Employee participation

Contractor B involves their employees in the development work through six groups, each responsible for an area within fabrication. Approximately 40-50 employees are directly involved through these groups, and there are both advantages and disadvantages. While they are able to view a problem from several perspectives by broad involvement, the progress of the development work is slowed down. This was the experience of the Procurement Manager, from when she participated in one of the groups with the responsibility of mapping the project value stream, and analyzing the belonging department interfaces. Their development system now reaches across the entire organization, and they have therefore broader involvement, than these six groups only.

The suggestion boxes and encouragement to contribute gives the employees an influence over the choice of initiatives to implement. Employee participation enables organizational development, as stated by Levin et al. (2012) and Steven (1995). Contractor B facilitates broad employee participation in their development work, and it is possible for anyone to volunteer for contributing. The development groups have the responsibility for developing the suggestions extracted from e.g. the operators through the suggestion boxes, and deliver prepared solutions for the problems at hand. The employees engaged in these groups have to a great extent, a real possibility to influence the implemented solutions. The groups do not only develop prepared solutions for implementation, but they also constitute an arena for discussing the suggestions, achieve consensus and create explicit knowledge for the organization, as emphasized by Termeer et al. (2017) and Nonaka (1994). However, the broad involvement is time consuming, as a broad involvement makes it both harder to gather the people involved, and to achieve consensus (Levin & Rolfsen, 2004). However, the benefit by doing so, is the much shorter time period spent on implementation of the solutions generated (Levin et al., 2012). The group in which the Procurement Manager participated had the focus of analyzing the interfaces between departments in the project-process. By

involving people from several departments, they got more accurate information, as these people work closely to these interfaces. Broad involvement is undoubtedly an important step for avoiding misinterpretations, as Levitt and March (1988) argue is a weakness of the organizational learning process. Causalities are often determined on the basis of few observations, and it is a high probability for misinterpreting causalities. By extensive employee participation involving several viewpoints, this risk is reduced, and participation thus facilitates more appropriate solutions.

Strategic focus

While the Procurement Manager described her participation in the development work as a positive and educational experience, she also underlined that contributing in the development work was exhaustive, as the development work was concurrent with daily operations. The project-process is already hectic, and the development work adds to it. While she described it as a challenge, she also offered a reflected perspective, as she stated that it is the ones who are in the project who see the problems every day. The empirical data suggest that the project management office is not able to support the organization in their development work.

As the project-process is hectic, it is understandable that it may be perceived as an exhaustive experience to participate in the development work concurrently with the daily operations. However, it is necessary to involve the employees who work closely to the problems they are attempting to solve. As earlier stated, employee participation is imperative in organizational development activities (Levin et al., 2012; Coyle-Shapiro, 1999). Management must nevertheless provide the necessary support and structures for organizational development (Nonaka, 1994; D. I. Jacobsen, 2012), and transformational leadership, which is the second most important factor for efficient organizational learning (Flores et al., 2012). It is therefore important that the project management office is able to do just that. Without the focus of the project management office, it will also be difficult to provide direction and ensure strategic fit in the selection of development initiatives with the organization's overall strategy (Conger, 2000; Snyder, 1996). A project management office providing the appropriate focus on organizational development, is also able to facilitate the systematic process in which patterns of behavioural routines are extended and reinforced, that creates a culture for organizational development (Cummings & Worley, 2015; Weick, 1991). The project management office at Contractor B is not able to do so, which suggests that their project management office has insufficient capacity. This interpretation may be reinforced by the fact that approval of new suppliers for projects are not being done by the project management office, and that the project-specific sub-organizations do not have the capacity to do so. The further lack of follow-up on HSE and routines, also builds up this interpretation.

However, some statements also suggest that Contractor B's project management office have increased their focus on organizational development. They have increased follow-up on HSE routines and recently created a separate position for follow-up on development work.

The focus of both the management and the customer on HSE, was a decisive factor for the initiation of the SnapUp-initiative. The management delegated the responsibility of developing the HSE routines downwards to the individual departments. The management further kept track of the departments' work on these routines by addressing the progress of the HSE work on a regular basis in meetings. The initiative also developed into a quality-related project as well, as they recognized that HSE was closely related to quality. The lack of compliance to existing routines was identified as a major reason for the increase in HSE incidents, and the increased focus on routines through the SnapUp initiative has been very successful.

While incremental development work is best driven by adopting strategy O and bottom-up communication, as proclaimed by D. I. Jacobsen (2012), the management still has an important role in the development work. Management should provide a vision and facilitate participative decision making, as the management's focus on employee participation is a critical factor for the perception of the change initiative (Coyle-Shapiro, 1999). Contractor B delegated the responsibility for suggesting and implementing development initiatives in connection with the SnapUp initiative to the different departments, but the management still kept the role as a provider of vision, and followed up on the initiative. The focus on follow-up from management in the SnapUp initiative is also important, as the management more easily can see the big picture. The management can furter make sure that the plethora of solutions are suitable in light of the overall vision of the organization (Conger, 2000; Leavitt, 1965). The SnapUp initiative further revealed that the lack of focus on follow-up and compliance to routines was two of the reasons for the increase in incidents, and enabled Contractor B to take corrective actions in order to turn the situation around. The recognition of the causalities between lack of compliance and lack of follow-up has directed the focus of Contractor B towards increasing the follow-up of routines throughout the organization.

There was originally six areas of focus for the development system of Contractor B. These six areas has generated several other development initiatives throughout the organization, and the management has kept track of the cost reduction associated with the respective initiatives. By highlighting the positive effects of the changes on company performance, Contractor B may be able to anchor the changes in the organizational culture, as recommended by Kotter (1995). Highlighting of the effects, may also increase the motivation amongst employees to contribute to the organizational development of Contractor B. Contractor B focus on quantitative measures when determining the success of a development initiative. According

to Kattman (2014), there is a danger to focusing too much on quantitative measures, as quantitative changes may block qualitative changes in relationships and approaches to work, and thus also inhibit a culture for organizational development. If Contractor B wants to create a culture which facilitates organizational development, they must also focus on changes that not necessarily have directly measurable outcomes.

One of the current development initiatives emphasizes the construction of the legs for the jacket on the next project. Contractor B plan to change the order of fabrication, because they want the opportunity to draw on learning effects by fabricating the legs one by one, rather than simultaneously. The solution chosen for implementation may sound simple, but it is very interesting seen from an organizational learning perspective. The example suggests that Contractor B have a learning orientation in which they seek to learn how to learn. This is in line with the double-loop learning process, or deutero-learning, as described by (Bateson, 1972). By implementing this exact solution, Contractor B expect to learn more efficiently how to best perform the fabrication of these legs, which may reduce the amount of rework over time. The learning orientation of the organization was argued to be the third most important factor for efficient learning, as argued by Flores et al. (2012).

Institutionalization

The initial phases of projects are hectic, and there is little time to perform a thorough experience transfer in the start-up period. The experience transfer and use of earlier project reports is very dependent on individuals, and the Procurement Manager therefore calls for better routines. Contractor B has routines for performing evaluations at the end of projects. The problem however, is to pick up the reports at the beginning of a new project.

Maylor (2010) suggest that the problem with overlapping project and hectic start-ups of new projects is a prevalent challenge in the project-based industry, especially when it comes to evaluations and experience transfer. The routines for evaluation and experience transfer are present, but there is a problem related to compliance to these routines. Routines are one of the four institutional knowledge carriers described by Scott (1995), and the organizational elements through which an organization can change its routines are e.g. best practices and standard operating procedures. As long as Contractor B does not have a best practice for experience transfer in the start-up of projects, the procedure will continue to be dependent on individuals. In order for Contractor B to standardize and add directions for this procedure, they need to institutionalize the experience transfer as a standard operating procedure. Glosvik (2002) states that the institutional structures of an organization constitute the organizational memory and brings stability to the organization. Individual learning, if captured by the organization, could potentially be used to alter it. The new organizational

memory will again affect the individual learning and change in a path-dependent and iterative process (Scott, 1995). According to the argument of Glosvik (2002) and Scott (1995), one could also argue that, as long as a standardized routine for experience transfer is not part of the organizational memory of Contractor B, they are not able to alter the routine and make it more efficient, nor are they able to make the learning process between projects more efficient over time.

Another factor, which may affect the diversity of approaches to the experience transfer, is the overloaded system for experiences described above. While the channels for distribution of this information are not appropriate, the information extracted from the system may vary from project to project, and from individual to individual. While capturing experiences during the entire project, and not only at the end, seems like a good idea, the attempt fails when the channels do not allocate and distribute the information captured in an appropriate manner. The idea is to overcome the organizational learning disorder of amnesia, where experiences are forgotten (Snyder & Cummings, 1998). The lessons learned seem to disappear in an ocean of experiences, and judging by the empirical data, this is exactly what happens. The experiences are not used to synthesize and institutionalize new best practices, that could be used to change the routines (Scott, 1995), and therefore it is dependent on individuals using the system which experiences they end up drawing from. The experience transfer is dependent on individuals, because they are used to different and personal routines, which suggests that individual learning is not translated into organizational learning. As the relational system, described by Scott (1995), is frequently changing, it is hard to institutionalize knowledge through the relational system and the formal positions, as Contractor B risk losing knowledge as the system changes between projects. It could therefore be a solution to introduce best practices and standard operating procedure, as this is a more stable knowledge-carrier.

However, the organization has lately had a focus on organizational development. Their goal is to develop the working methodology in projects across the entire organization. The initiatives are both studied and further developed through participative decision making, and the system records documentation for every initiative implemented - on purpose, mandate, costs, benefits, concrete solutions and the actual benefits after implementation.

The organizational development system can potentially function as an institutional knowledge carrier (i.e. artifact) that both secures the recording of development initiatives and function as a symbol(Scott, 1995). As a symbol of development work, it can help institutionalize an organizational learning orientation through the organization's values and beliefs. The system in itself can also be used to develop routines and best practices. The development system can therefore be an important and versatile knowledge carrier for developing

the project methodology in the organizational memory if utilized appropriately.

Contractor B's approach to organizational development

Our impression is that Contractor B has many channels appropriate for employees to suggest development initiatives and to record experiences and lessons learned. They also have a great focus on employee participation. The employee participation is time consuming, but it could potentially facilitate a more rapid implementation. Contractor B struggles however with utilizing the lessons learned and create a culture for development work. It seems that the lack of focus from the project management office on organizational development has been followed by an absence of systematic approach to collect lessons learned and suggestions for development initiatives, and create best practices.

The informants' statements suggest that the project management office has insufficient capacity to follow up on the development work, and direct the organization's focus towards it. While a small project management office may reduce the short-term overhead costs, as the project management office itself do not directly contribute to project profitability, it could potentially inhibit the long-term cost savings associated with a greater focus on organizational development activities. A larger project management office can provide the appropriate focus on organizational development and facilitate a systematic process in order to extend and reinforce behavioural patterns that create a culture for organizational development, as proposed by Cummings and Worley (2015) and Weick (1991). Increasing the capacity of the project management office can therefore represent a qualitative change in order to provide transformational leadership and create a learning oriented organization. The fact that Contractor B have become aware of the importance of follow-up from the SnapUp initiative, and the fact that they have created a management position for follow-up on development work (i.e. XPS Manager), can be interpreted as an attempt to do so.

5.2.2 Approach to joint organizational development

We will in this section study the relations between Contractor B and Subcontractor B1 and Subcontractor B2. We will then assess how these relations affect the knowledge generation process, and the subsequent institutionalization of the generated knowledge.

Relational factors and knowledge generation

Contractor B holds weekly meetings with all their subcontractors in order to provide a platform where they are given the opportunity to participate in development work. The purpose of this platform is to identify areas in which the operations could be developed

through incremental initiatives. The initiative for cost efficient heating of the painting hall with Subcontractor B1 and the indoor vulcanizing arrangement with Subcontractor B2 are examples of initiatives that has been discussed in these meetings. The participation of the subcontractors is important as Contractor B recognizes that the subcontractors are able to contribute and provide valuable input.

Contractor B provide training for their subcontractors in HSE as well as their project work methodology. It is important to Contractor B that the subcontractors understand their project-process in order for deliveries to be correct and according to plan. Information sharing and process visibility is emphasized as important for openness and collaboration (Búrca et al., 2005), and it enhances the potential for joint development activities (Lorenzoni et al., 1995). By sharing information about their project-process, Contractor B enables their subcontractors to understand the project-process and suggest development initiatives. These suggestions can be used to develop the project-process and achieve a better strategic fit between the supply chains capabilities and the overall competitive strategy, yielding a competitive advantage for Contractor B and their supply chain (Brown & Blackmon, 2005).

Contractor B also have a focus on building relations to their subcontractor on several levels, also between the managements. They believe that good relations and collaboration is the key to better project performance. By developing a relationship to the subcontractors on multiple levels, they also develop multiple channels for information flow. Transformational leadership and a management providing direction and systematic approaches to reinforce behavioural patterns, is important to organizational learning and development. As this applies to any organization, it is also logical to assume that it applies to the subcontractors in this case. Therefore it is wise of Contractor B to involve the management of the subcontractors as well. If the management of the subcontractors can provide transformational leadership and focus on organizational development, there could potentially be a better corporate compatibility between Contractor B and their subcontractors, as emphasized by Al-Mutawah (2009) and Mentzer et al. (2001) as a prerequisite for successful supply chain relations. Then it will be easier to establish a learning orientation in both the contractor's and subcontractors' respective organizations, and the subcontractors will have the prerequisites for participating in Contractor B's organizational development activities.

Both Subcontractor B1 and Subcontractor B2 have in the recent years undergone organizational changes. Subcontractor B1 have increased their focus on Lean in their factories, and have even managed to implement some of the principles out on projects. Their management has gained a greater focus on the organizational development work, as they have made Lean a company policy. Subcontractor B2 has increased their focus on employee participation in development of products and daily operations, and to overcome the silo thinking which

earlier characterized their company. In order to so, they underwent an extensive leadership training program in order to redirect their management's focus. Both Subcontractor B1 and Subcontractor B2 have experience with organizational development, and a management which recognizes the importance of transformational leadership, which increases the corporate compatibility between the organizations. The experience with organizational development and strategic focus on providing transformational leadership and facilitating a learning orientation, thus further suggest that the subcontractors do have the prerequisites to participate in organizational development in collaboration with Contractor B (Al-Mutawah, 2009).

The empirical data shows that both Subcontractor B1 and Subcontractor B2 are on a lump sum contract for Contractor B. This inflicts a need for Contractor B to deliver materials and access to plans and drawings according to the agreement. The lump sum contract gives the subcontractors an incentive to develop their operations in order to secure a profit. As the lump sum contract is a fixed price contract for a certain scope of work, greater efficiency will yield a greater profit (Ross & Williams, 2012). Therefore the lump sum contract can function as an incentive to participate in organizational development together with Contractor B.

According to Ross and Williams (2012), the lump sum contract gives the subcontractor a degree of certainty in the amount of money to receive, because the quantity to be delivered is largely fixed. However, in the case of variation notification orders, which is often the rule rather than the exception, there can emerge contractual disputes. It is therefore right to assume that if the subcontractors are able to make their own process more efficient, they can increase their potential profits. However, this type of contract gives Contractor B no real economic interest in helping the subcontractor achieve a higher efficiency in the way target cost or guaranteed maximum price contract would (Chan et al., 2011). In the two latter contract types, the Contractor will be awarded part of the potential savings. The contracts of Subcontractor B1 and Subcontractor B2 gives the subcontractors an incentive to develop their operations, but they give neither Contractor B nor the subcontractors a direct interest in contributing to joint organizational development.

Even though Contractor A have no direct economic interest from it, they are still interested in giving the subcontractors the prerequisites for earning a profit. It is important to them, that the subcontractors make a decent profit, as they recognize the link between the subcontractors' profit and ability to deliver according to the requirements. This suggests that the interest of assisting the subcontractors in development of their operations is rooted in Contractor B's own interest for progress.

Subcontractor B1 faces a challenge related to planning for workforce on assembly site

because of the lack of planning for usage of the crane park. Subcontractor B2 have had challenges related to creating a work flow, because they have a shorter lead time than other actors on site on which they are dependent upon. This makes it necessary for them to work in heats of 4-6 weeks as there emerges a lack of access to work after such a period. This suggests that the all actors in the project are dependent upon each other when it comes to progress. This is a typical characteristic of the project-based industry (Mokhatab et al., 2014), and could suggest that the real interest in joint development work is routed in the parties' self-interest for own progress. The incentives for joint organizational development are thus a function of the process, and not routed in the contracts themselves. [1].

The empirical data further suggests that an important factor in a collaboration about development activities is that both parties have something to gain from it. However, the informants gave the impression that to play on the same team is imperative in making the project a success. This indicates that there exists a commitment among the parties. Commitment among partners in a supply chain is according to Lassar and Zinn (1995) an important ingredient in a long-term relationship. The fact that Subcontractor B1 has a framework agreement with Contractor B, suggests that Contractor B has the intentions of developing a long-term relationship with Subcontractor B1, which is not a prevalent phenomenon in the project-based industry (McGovern et al., 1999). According to Sukati et al. (2012) and Mentzer et al. (2001) the close and strategic relationship between Contractor B and Subcontractor B1 can be used to develop strategic capabilities, and a responsive supply chain, which is important for project-based organizations. A close relationship could therefore facilitate joint problem solving between Contractor B and Subcontractor B1 (Chopra & Meindl, 2016; Brown & Blackmon, 2005).

Contractor B believes it is necessary to develop good relations to the subcontractors, but that they also have to be careful in doing so, as it could make the relationship too comfortable. Together with the fact, that Contractor B has moved away from the strategy of "royal warrants of appointment"-suppliers, this suggests that they want a more competitive focus among their subcontractors, which according to De Wit and Meyer (2014) could facilitate innovation and development in order to win contracts. By introducing competition between potential subcontractors, Contractor B also provides the subcontractors with an incentive to focus on organizational development, simultaneously as they maintain a favorable power balance. In this way, they manage to create a long-term relationship with their subcontractors, without the subcontractors being guaranteed work in the next project. In order to win a contract for Contractor B on the next project, they still have to work for it. The framework agreements are thus an indication of committing to a more long-term relationship, a hedge against

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[1]The parties can add incentives for contributing to joint development work to the lump sum contracts. See section 5.3 for an example.

opportunistic behaviour and an incentive for organizational development.

Institutionalization

How does the fact that the subcontractors work by project-specific contracts affect the institutionalization of the jointly generated knowledge? The three companies have no joint evaluation at the end of projects even though they all have their own internal routines for doing so. Both Subcontractor B1 and Subcontractor B2 have routines for writing project reports. They do however follow these routines to a varying degree, and it is often dependent upon the project managers. The fact that the downscaling of projects makes it difficult for Contractor B to perform thorough evaluations, applies for the subcontractors as well. They may relocate from the project at different points in time, relative to the evaluation of Contractor B, which makes it even harder to gather all the experiences at the end. Therefore, joint evaluations at the end of projects may not be an appropriate way of collecting experiences and lesson learned when it comes to joint organizational development in the project-based industry.

As the scope of work and design in the project-based industry vary from project to project, and the subcontractors' contracts are project-specific, the subcontractors involved in projects may also vary (McGovern et al., 1999). Which Subcontractors that win contracts for Contractor B in the procurement phase is dependent on the tendering offers they deliver. This makes it difficult to institutionalize new best practices through the knowledge carriers that depends on stable relations, such as symbolic systems or relational systems (Scott, 1995). However, the common denominator in all of Contractor B's projects is Contractor B itself. It therefore seems logical to institutionalize the initiatives as new best practices in the organization of Contractor B. The Production Supervisor of Subcontractor B2 elaborated upon a joint improvement initiative, where Contractor B have attempted to streamline more of their production in order to perform more work on the ground during the assembly phase. This practice has been transferred from an earlier project, and illustrates this very important point - the new best practices are best institutionalized in the organization of Contractor B. How this is done, is however unclear, as there is little evaluation and follow-up on the joint development work.

Since a joint evaluation at the end of projects seems difficult to achieve, the lessons learned are perhaps best recorded as they emerge. The same goes for new best practices. New routines and best practices could be established as they are discovered during the project. As the design and scope of work varies across projects, the new best practices could be recorded in governing documents. It is not certain that Contractor B will even need the discipline supplied by the subcontractor with whom they developed the practices on the next project.

If that is the case, the new best practice could easily be forgotten before the need arises in the future, as Contractor B falls prey to amnesia (Snyder & Cummings, 1998). Then the knowledge generated would only contribute to single-loop learning (Argyris & Schön, 1978), and not to organizational development. Therefore, artifacts (e.g. governing documents, IT-systems, etc.) located in Contractor B's organization seems to be the appropriate knowledge carrier for institutionalizing new best practices and routines developed together with the subcontractors.

Joint organizational development summarized

Contractor B has initiated development work together with their subcontractors, in order to jointly develop the project process. They provide several channels for information flow between the organizations, and platforms in which they can jointly evaluate different initiatives to implement.

Both Subcontractor B1 and Subcontractor B2 have the prerequisites for participating in joint development work, as they seem to be compatible to Contractor B - they have both experience with and a focus on development work. The incentives for participating in the joint development work, lies however not in their contracts with Contractor B. In the contracts lie only the incentive for developing their own operations, as their profit depends on it. The incentive for participating in joint development activities is routed in the project-process itself. Since there are many actors in a project, who are dependent on each other, a development for one actor may result in development for another.

In order to control the power dynamics of the relationship with their subcontractors, they do not operate with a fixed supply chain. However, by operating with framework agreements for some groups of subcontractors and suppliers, they manage to build relations while they also facilitate competition between them. This gives the subcontractors an additional incentive for performing organizational development of their own operations, but it also makes it more difficult to institutionalize new best practices through symbolic or relational systems.

The joint development work takes place next to Contractor B's own development work, even though one of the development initiatives in their development program involves the work flow in the painting hall. The subcontractors are to a little extent involved in Contractor B's development program. However, based on the statements of the subcontractors the concurrent joint development activities seem to work as intended. The question remains however, how should they institutionalize the incremental changes to the operations, when the relationships with the subcontractors are project-dependent? The problem of institutionalizing new best practices seems however not to be constricted to the joint development work, as it is also prevalent in Contractor B's own organizational development

5.3 Case C - single case analysis

5.3.1 How do Contractor C approach organizational development?

Information sharing and openness

According to the informants, it is difficult for employees situated on project-sites to keep up to speed with new routines and procedures developed elsewhere. They are not close enough to the 5S-process, and are therefore not able to 'feel what's going on'. These employees are often outside the yard for years at a time, and are informed of change initiatives and improvements over the intranet.

Gioia and Chittipeddi (1991) argues that middle management has an important role in creating a shared understanding of the created knowledge, in a joint sensemaking process. Klein (1996) also argues that by keeping the first level supervision completely informed about the rationale and the progress of the change initiative, it is likely that the lower levels are also informed. Because none of the informants have been directly involved in the change process, and are only receiving scattered information of the initiative-progress over the intranet, it seems they have difficulties to see how it could be transferred to their individual projects. It is therefore unlikely that they are able to form a unified understanding of the information generated, which according to Flores et al. (2012) is a crucial part of the learning process. It seems that the information shared through the intranet-medium is insufficient in order to update on-site employees on new best practices and routines, both because of the lack of immediate relevance to them, and because it does not provide the surrounding information which enables these employees to put the received information in a broader context.

There is an open and continuous dialog where employees can contribute to the improvement of existing routines. The employees can either take direct contact with the owner of a specific procedure and suggest improvements, or provide feedback through suggestion boxes located on various locations all over the project-site. The health and safety representatives are responsible for the suggestions boxes, where the employees report both positive and negative observations. The initial idea of these boxes was for employees to report improvement suggestions, and have mostly been used to report HSE incidents. These boxes are emptied every day, and the suggestions are addressed in joint meetings. Depending on the nature of the feedback, it is either solved immediately, or the case will be assigned to a person, who addresses them consecutively. The progress of this process can be found in logs in the reception, which is open to everyone. This log identifies the person responsible for the case, the response and the associated actions.

Seeing as the majority of issues are resolved immediately, and often in joint meetings, more people are likely to retain the information and understand it the same way (Gioia & Chittipeddi, 1991). By dealing with the issues in joint forums it is also likely that more information is generated and acquired, which is an important part of the learning process according to Flores et al. (2012). The progress of the remaining issues are disclosed in logs in the reception, which seems to ensure transparency and openness in the process. By having transparent processes, Contractor C are enabling interested employees to update themselves, which is important according to Nevis et al. (1995) in order for the members to be able to question the status quo. The suggestion boxes, the joint meetings and the disclosed logs, forms a feedback system that serves the purpose of generating and acquiring information. Bateson (1972) and Cummings and Worley (2015) do however argue that it is insufficient to generate and acquire information, and states that in order to achieve organizational learning the information should be distributed throughout the organization. Nonaka (1994) states that in order to spread knowledge throughout the organization, the organization must have appropriate channels for distribution of information. It seems that the system's ability to serve as a channel for information distribution might be impaired, as employees must physically go to the reception to update themselves, which might limit the degree of information dissemination in the organization. This could also cause a situation, where Contractor C experiences the alien hand syndrome as the implemented solutions could vary across the organization (Snyder & Cummings, 1998).

Employee participation

After improvement initiatives have been implemented at the yard, they are supposed to become a natural part of the project process, independent of project locations. The 5S principle has been implemented in various departments at the yard, and it is an explicit goal to implement it in the project process. The empirical data suggest however that there is a discrepancy between the stated goal and the actions taken to implement it. There is a perception that management is not sufficiently involving the right employees - those with production experience from projects, and that are able to communicate the rationale. The benefits of the initiative is further questioned, which seems to be related to the lack of involvement in the process.

According to scholars such as D. I. Jacobsen (2012) and Steven (1995), employees who have not been involved in a change process are more likely to resist the change. The empirical data suggests that there were too little involvement in the development phase of the 5S initiative, and that those involved were the wrong people. The informants recognize that in order for the initiative to gain ground on the individual projects, it has to be developed by employees with on-site experience. A stated goal is to implement the 5S initiative in the

individual projects, but it seems there are no formal platforms where the on-site employees can influence the process at the current time. This seems to negatively affect the change readiness of the project-organization, both because the employees fail to see the relevance to the specific project (Klein, 1996), and because the presented initiative might not represent the challenges faced by the employees on-site.

It seems that employees at Contractor C have several forums where they can contribute to organizational development in projects. Both the Health and Safety representatives, and the elected employee-representatives have forums and channels where the employees on site can bring suggestions. The employees are furthermore responsible for the project methodology, and are encouraged to provide suggestions for new best practices and routines based on their experiences.

Flores et al. (2012) found that participative decision-making was the cultural factor that had the greatest impact on the efficiency of the organizational learning process. This corresponds with the findings of Coyle-Shapiro (1999), who found that employees' perception of the participative style of their supervisors prior to the introduction of improvement programs, was connected to their subsequent support. In contractor C, there seems to be a potent culture for safety, and all employees are expected to participate and contribute to the development of new best practices towards this end. The development of the fire-preventive routine is an example that illustrates this point. The employees quickly adhered to the new practice because it was their own initiative. This example further illustrates that Contractor C are able to mobilize their employees, and use the momentum from an incident to develop new routines, which both Cole (2002) and D. I. Jacobsen (2012) identifies as a prerequisite to effectively translate the need for change into organizational action. The employees are furthermore represented by a Health and Service department, and elected employee-representatives, which secures the representation of the operators' viewpoints in the different decision-making forums. It could be argued that the impact of employee-suggestions on the outcome of new routines, depends on the skill and enthusiasm of the individual representatives. The role of the Health and Service department is determined by the Working Environment Act[2], and do in many respects resemble self-managed teams, focusing on improving working conditions. The different Health and Service department-teams can thus serve as what Nevis et al. (1995) calls knowledge creating platforms, for improving HSE routines and practices.

Strategic focus

The empirical data suggests that it has been difficult to realize the potential of 5S because

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[2]Norwegian law ensuring safe working conditions, and equal treatment among workers

of the insufficient focus from management, which has resulted in employees not making it a priority. There is no vision for how the 5S should be implemented in projects, and whether or not the practice is adopted seems to be dependent upon the individual project managers. The perception among the project management team further seems to be that it is not requested, and that they are allowed not to adopt the practice.

According to D. I. Jacobsen (2012) and Huehn-Brown and Murray (2010), management should provide visible leadership and direction, by creating structures and allocating resources to the improvement initiatives. It seems however that implementing 5S on the individual projects has not been raised as a priority by management, even though it has been communicated that this is a goal. According to the informants there is no clear strategy for how the 5S initiative should be implemented across the various project-sites, and there are little incentives for adopting the practice. Whether or not the practice is adopted is dependent on the individual project managers, and there are no repercussions for project managers choosing not to implement it - neither are there any monetary rewards for implementing it (other than the potential increased productivity associated with implementing 5S). It seems as Contractor C are not requesting results, it has become legitimate to choose not to implement 5S. The lack of an overall strategy for how Contractor C should implement 5S in the project execution model, together with the lack of resources allocated to the initiative (both in terms of monetary incentives, and direct labour to execute the initiative), suggests that there is insufficient focus and willingness from management to facilitate the implementation of 5S in the various projects. This is what Flores et al. (2012) calls transformational leadership, which is a prerequisite for efficient organizational learning.

Contractor C have invested in developing the health and service department on the current project, which represents the operators in the various parts of the project-site. The Health and Safety representatives have regular meetings, provide feedback to the project management team located on site, and are actively participating in the forming of new HSE-standards.

The investment in the Health and Service department, together with the continuous follow-up of HSE-requirements, illustrates that Contractor C have a considerable focus on HSE. This assessment is also backed up by the numerous HSE-posters taped on every wall at both the project-site, and at the yard, stating one of Contractor C's core values; zero harm to personnel and material assets - signed by the CEO. These are clear indications of both transformational leadership and commitment from management, and Contractor C's learning orientation towards development and improvement of HSE-standards (Flores et al., 2012). According to Snyder (1996), a criteria for categorizing learning as organizational is that it is done in order to achieve the organizations purpose, by creating a strategic fit between the organization and it's operating environment. The learning orientation and focus

on improving HSE-standards can be traced back to Contractor C's clients, who strive to reduce the number of incidents, and to maintain safe work practices. If Contractor C are delivering a project to a client, they are under contractual obligation to adhere to the client's HSE requirements, which is often substantial. Because of the clients massive focus on HSE-practices, being able to empirically and statistically prove that they are able to execute projects with fewer incidents than their competitors has therefore become an important source for competitive advantage in the industry (Anatan, 2014).

Institutionalization

The focus on HSE standards from management has raised awareness among employees on-site, which has resulted in discussions and development of new HSE-routines. The Health and Service department are also consciously used in publications and on screens on site to develop a safety-culture in the project. The development of HSE-routines seems to be a product of the initiative from the operator-teams on-site, who together with their representatives discover potential solutions and generate information for the project management team (Argyris & Schön, 1978; Flores et al., 2012). The improvement suggestions and lessons learned generated by the operator-teams are institutionalized in best practices by the project management team. As these best practices are a result of a broad mobilization of operators on site, they are likely to become a part of the daily work routines on site, which Cole (2002) argue is a prerequisite for achieving qualitative change. In order to effectively translate lessons learned into effective practices, Cummings and Worley (2015) and Weick (1991) argue that the organization needs a systematic process of organizational development in which patterns of behavioural routines are extended and reinforced. The managements focus on HSE, the project management team's follow-up of incidents and the daily adherence HSE-procedures, and the involvement and participation of the on-site employees in the development of new routines, seems to have a reinforcing effect on each other. The focus on HSE foster discussions on the topic among employees, which in turn is harvested by the project-management team and disseminated through the organization as best practices. This further seems to have increased the organizational awareness and importance of improving HSE-standards, and become part of the best practices[3]. According to Scott (1995) an organization's values, beliefs and norms constitutes a symbolic system, and do in this case, based on the perceived reinforcing effect, seem to serve as a institutional knowledge carrier for the HSE-routines.

Based on the empirical data it seems that Contractor C have good routines for making evaluations after each project, but that they often struggle to bring new best practices to the next project. The experience transfer in the beginning of projects seems to be unsystematic,

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[3]One of Contractor C's core values is zero harm to employees and material assets

as there are large individual variations among project managers for how reports are written, and whether best practices from previous projects are implemented. It seems that Contractor C have partially succeeded to transfer HSE-routines and practices between projects, but are struggling to transfer other improvements and solutions.

The context and the frame-conditions associated with the project-specific sub-organization seems to have implications for the degree of best practice transfer. Because project progress is of the essence when starting a new project, it seems that the main focus from the project management team is to start producing on the project site, rather than spending time reflecting on previous results and lessons learned. Seeing as there is a limited time frame for sharing of experiences, it seems only logical that the experienced shared are those that management are focusing on, and that are part of the organizational culture - HSE-procedures - which might explain why they have partially succeeded to bring these best practices to the next project. The HR Manager further identified governing documents as essential for the transference of new best practices, and stated that in order to anchor lessons learned and best practices from the project evaluations, they had to be written down in governing documents. These documents seem to represent a knowledge carrier between projects, and is used to institutionalize knowledge in Contractor C's organizational memory (Glosvik, 2002). It do however seem that Contractor C are not systematically institutionalizing the best practices in these documents, as they have a coincidental approach to experience transfer. This approach makes the degree of transfer of best practices into new projects largely dependent upon the individual project managers. When the experiences are not transferred between projects, important knowledge could be lost, and Contractor C falls prey to amnesia (Snyder & Cummings, 1998). Failed institutionalization, as when experiences are lost, is one of the main reasons why the learning process fails (Medinilla, 2014).

Because each project has their own system for evaluating lessons learned and best practices, a lot of experience disappears when the project-specific sub-organizations are downscaled, and seems to be a barrier for effective experience transfer between projects. The rapid downscaling, together with the fact that employees are often immediately transferred to other projects - often in different roles - also seems to undermine the development of explicit knowledge. The evaluations are made by the project managers and other higher positions in the completion phase of projects, which seems to illustrate this point.

If lessons learned and other insights are not included in the evaluations, they are not being written down in governing documents, which makes the transfer of this knowledge to future projects dependent upon the individual employee's ability to communicate tacit knowledge. The fact that employees are often transferred to different roles also seems to make it harder to communicate the tacit knowledge, as the best practices and lessons learned might not be

relevant in the new role. The rapid downscaling, the lack of a standardized approach to make project-evaluations, and the fact that employees are often transferred into different roles in new projects, are all elements that seems to be barriers for effective transfer of knowledge and best practices between projects. It seems that having a systematized approach for harvesting the best practices, and appropriate information channels, so that the relevant best practices are easily picked up by the correct employees, becomes ever more important. Nonaka (1994) argues that in order to create knowledge, the organization must offer platforms that facilitate sharing of information, both tacit and explicit. Without information distribution, tacit knowledge will be developed, and the organization is achieving single loop learning, at best (Argyris & Schön, 1978). Today, Contractor C are primarily using the intranet for distribution of information in and between projects, which according to (Scott, 1995) is an artifact serving as an institutional knowledge carrier. The intranet of Contractor C is becoming more systematized, which is a result of the increased focus on systematization of information from the project management office.

Contractor C's approach to organizational development

Contractor C seems more than able to generate information related to HSE throughout the project process. They have implemented suggestion boxes, and invested in an Health and service department, which seems to reinforce the generation of suggestions related to HSE. It seems however that they are less able to distribute the generated knowledge to the employees, both within and between projects. The intranet are used as the main communication channel in Contractor C, and the project management office have increased their focus on making the information more available to the employees in various projects. Our concluding remarks related to Contractor C's ability to institutionalize the generated knowledge, suggests that their focus on HSE have resulted in a learning orientation among the employees related to HSE. It seems reasonable that if they are able to provide the same strategic focus on organizational development within the operations, they are likely to also here be able to develop a learning orientation among the employees.

5.3.2 Approach to joint organizational development

We will in this section study the relations between Contractor C and its subcontractors. We will then assess how these relations affect the knowledge generation process, and the subsequent institutionalization of the generated knowledge [4].

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[4]The structure of this section will deviate slightly from section 5.1 and section 5.2. The empirical data suggests that the relational factors had great influence on organizational development, and we have therefore found it sensible to dedicate more room for analysis on these topics.

Corporate compatibility

Contractor C have an organizational structure which makes a clear distinction and separation between the commercial and the operational functions. This means that contractual designs and issues are handled in separate forums than the operational issues, such as planning and progress. Subcontractor C1 on the other hand do not have a sharp distinction between these functions, and the focus on the commercial aspects seems to be permeating the entire organization, as they have instructed their employees all the way down to the foreman-level to look after their economical interests.

There are also large differences in terms of the organizational hierarchy. Subcontractor C1 have strong hierarchical commando lines, and there are large restrictions on who are allowed to make decisions and provide answers on behalf of the organization. Contractor C are on the other hand enabling the operator teams to make operational decisions on lower levels, which indicates that they have a flatter organizational hierarchy. This organizational difference seems to be related to the separation of the commercial and the operational aspects, and have been a source for frustration throughout the project, and made the collaboration strained at times.

Neither Subcontractor C1 nor Subcontractor C2 are used to taking on the size of projects they are currently on, and are according to the Installation Manager lacking the appropriate systems for serving contracts of these sizes. He also stated Subcontractor C1 are not used to following procedures and writing reports to the degree they are now required to, nor having Contractor C follow them up so closely.

Related to the strategic focus of the three companies, it seems that Subcontractor C1 are heavily invested in maintaining a safe work environment, as good HSE-routines is considered to be a prerequisite for doing business. Contractor C have complemented Subcontractor C1 on their HSE practices, as they have achieved an impressive HSE statistic during the current project. Subcontractor C2 have not previously had the same focus according to the Installation Manager, but are now collaborating closely with Contractor C to develop consistent HSE routines and practices.

All three companies have furthermore implemented lean principles in various parts of their organizations, which illustrates their focus on productivity and efficiency. The 5S principle has however not been implemented in the current project with Subcontractor C1 (even though it is a stated goal), but seems to be a coinciding internal focus area. This could potentially contribute to an easier implementation in the project-specific sub-organization on future projects, as the focus from Contractor C is likely to reinforce the focus from their subcontractors - which has been the case for HSE. There seems to be a consensus among the representatives from Contractor C and Subcontractor C1 that if they are to succeed

with implementing 5S and other improvement initiatives in projects, Contractor C are the ones who must initiate it - by top management putting focus and resources on it, and by establishing a strategy for implementing it in the project execution model. As they all have experience with lean, and the 5S principle in question, it seems there is a potential for an accelerated learning curve, as experience and view points from their subcontractors could provide valuable input to more fully exploit the benefits associated with 5S (Bateson, 1972). Seeing as Contractor C have a large follow-up team at Subcontractor C1's site, there seems to be opportunities for transferring experiences and lessons learned between the organizations.

On Integration between Contractor C and their subcontractors

Contractor C have a strategy of integrating with their module-subcontractors in project sub-organizations, as these subcontractors represent a large portion of the project value. By integrating with their subcontractors they are better able to coordinate activities, and detect problems at an early stage. This is also the rationale for integrating with Subcontractor C1 and Subcontractor C2. Both of these subcontractors are serving an integrated lump sum contract, which means that they are supposed to become embedded in Contractor C's project sub-organization, and will receive a fixed price for their services. Because the current projects are considerably larger than both Subcontractor C1 and Subcontractor C2 are used to, early detection and correction of mistakes is especially important to avoid potential delays and subsequent costs. Contractor C are therefore situated in the same barracks as Subcontractor C1, and have increased their follow-up staff on Subcontractor C2's yard.

According to De Wit and Meyer (2014), the embedded perspective on organizations highlights the advantages of collaboration, as this will increase the total 'wealth pool' for all actors in the supply chain, through specialization and synergy effects (Haines et al., 2004). The discrete view on the other hand advocates caution when collaborating with competitors, as collaboration is perceived to be a zero-sum game, which suggests that the company with a lower relative bargaining power is exposed to opportunistic behaviour (De Wit & Meyer, 2014; Kraljic, 1983). It seems that Contractor C have tried to balance the two perspectives described by De Wit and Meyer (2014), in that they seek to be integrated with their subcontractors in project-specific sub-organizations, and at the same time have them on lump sum contracts describing the work specifications. It do however seem that it is difficult to achieve the desired degree of integration whilst on a lump sum contract, as the objectives of Contractor C and their subcontractors are often conflicting.

The empirical data suggests that achieving the balance between being integrated at the same time as serving a lump sum contract is difficult. Being on a lump sum contract means that subcontractors are dependent on their productivity to earn a profit (Ross & Williams, 2012),

which has been a challenge for Contractor C1 because of the strict permit-to-work system and the increased scope of work. Subcontractor C1 has had to increase it's work force in order to complete the contract on time, which has direct impact on their profitability. It seems that there have been a lack of understanding of the duality of the objectives. On the one hand, Contractor C is interested in the project progress and milestones, whereas Subcontractor C1 who serves a lump sum contract is mainly interested in increasing their internal productivity. Contractor C is providing monetary incentives to their subcontractors, if the project meets the stated milestones. These milestones are perceived to negatively affect Subcontractor C1's productivity, and have been a heated conflict of interest. Seeing as their internal productivity is how they achieve profitability on a lump sum contract, they seem unwilling to comply with activities unless they are specified by contract, or can arguably be shown to increase their productivity.

The statements from Contractor C's on-site representatives show that they initially experienced some hostility from Subcontractor C2, related to the increased follow-up. Their supportive and consulting approach seems however to have turned Subcontractor C2 around, and the on-site representatives are now used as a resource. They are communicating alternative solutions and needs early in the process, which enables Subcontractor C2 to adjust and deliver according to Contractor C's specifications, reducing the amount of variation orders later on. It seems that even though they are integrated in the project, there is a clear understanding of each others roles as subcontractor and customer. Contractor C are careful not to become too involved in their operations, and that they have a clear sense of being the customer - they are suggesting alternative solutions, but are not instructing them. The empirical data suggests that this approach has increased Subcontractor C2's sense of ownership (Levin et al., 2012), and that they have become more capable of solving operational issues as a consequence of the continuous dialogue with Contractor C. They here seem to have found a good balance between the two perspective described by De Wit and Meyer (2014), as they are able to resolve issues on lower levels. This assessment is further supported by the fact that the project is progressing according to plan, which indicates that the collaboration has been successful.

Knowledge generation
Because subcontractor C1 and Subcontractors C2 are included from an early concept and tendering phase, they have the opportunity to suggest alternative solutions and provide input to the development of the execution plan. It seems that the increasing focus on costs as a competitive strategy might reduce the incentive to suggest more expensive solutions, even if they are more appropriate. Subcontractor C1 do however often suggest alternative products, that even though more expensive, are faster to install and have a lower life cycle

cost than other products in the market. By including subcontractors from an early phase they are also able to provide a more accurate price, which reduces the risk for Contractor C. It thus seems like both Contractor C and their subcontractors have an interest in them coming into the project at an early phase of the project process, and that the lump sum contract provides the incentives for the subcontractors to suggest solutions that can improve the project productivity.

The various activities in the fabrication phase are strictly sequenced, which means that all subsequent activities are dependent on the previous activities, and that a delay in an early activity will cause large ripple effects and delays in the entire process (Mello et al., 2015a). It is therefore important to know when a work package is ready and released for the different disciplines. The entire project process is built up in TIPS, where every activity is described in sequence (Mokhatab et al., 2014). The system is open to every one, including the subcontractors, and they here receive information about work releases. It is therefore imperative that the subcontractors are competent in the use of TIPS. The empirical data suggests however that the subcontractors receive varying degrees of training in TIPS, and subcontractor C1 have experienced difficulties with the system.

Whether or not a project is profitable depends on the contractor's ability to deliver on time, which makes project flow extremely important. Seeing as the sequenced activities are described in TIPS, together with the release system stating when the different actors have access to the different areas, it seems that much of the project value hinges on subcontractors' ability effectively manoeuvre in TIPS. It seems however that even though Contractor C operates with an open system, their subcontractors are to varying degrees able to make use of them, which limits the realized benefits associated with information-sharing and transparency, described by Búrca et al. (2005) and Lorenzoni et al. (1995). Subcontractor C1 had little experience with TIPS before the project, and have struggled with the system from the beginning, which has resulted in several disputes on whether work has been released to them or not. Because they were not able to use the system to assess the scope of work actually available, they were neither able to make accurate staffing plans, which further reduced their productivity in many instances.

Most of the issues between Contractor C and Subcontractor C1 seems to be traced back to the challenges of making use of TIPS. While Contractor C argued that Subcontractor C1 had enough work releases according to TIPS, Subcontractor C1 argued that this was not the case. The empirical data shows that TIPS was not always updated, and sometimes released unavailable work, because the various actors using the system was not using it correctly. This issue has been a recurrent topic throughout the project, but was only recently addressed, and illustrates the attitude towards subcontractors. When Subcontractor C1 contended that

they had insufficient releases in the system, they were met with hostility and mistrust, and accused of not delivering on time. This led to contractual disputes where Contractor C were allocating time and resources to prove Subcontractor C1 wrong. According to Ross and Williams (2012), this is a recurrent issue for companies serving a lump sum contract.

It seems that Subcontractor C1's lack of experience with TIPS resulted in an information asymmetry, which was used as a bargaining chip in contract meetings, and that rather than solving the underlying issue - how can we enable them to use the system, so that we are able to maintain project progress? - much energy was spent on contractual disputes, and finding evidence of wrong doings. This assessment of the situation seems to be backed up by the Installation Manager, who stated that because Contractor C were much more familiar with TIPS than Subcontractor C1 'I had 110 % control on them'.

Contractor C only recently recognized that this was a problem for the project progress, and increased support and focus on the issue, which resulted in the development of a new system enabling Subcontractor C1 to retrieve information about the work progress. Both the representatives from Contractor C and Subcontractor C1 stated that the collaboration between them dramatically improved after the new system was developed. As part of the development of the new release system, the operation-room was established, which is a forum with the sole purpose of enabling Subcontractor C1 to complete their contract on time. Most disciplines from Subcontractor C1, together with their counterparts in Contractor C are represented in this forum, and they have meetings every day to resolve issues so that each discipline can move forward. The empirical data suggests that they are now better able to make priorities and have a discussion targeting the real issues. This illustrates that once the problem was recognized, and focus and resources was allocated to development of an appropriate information channel together with a platform for participation, they were able to address the problem and generate solutions.

Subcontractor C2 have recently developed their own project-management system, which might represent a potential risk for coordination issues, which according to Porter (1985) and Anatan (2014) is necessary to achieve alignment and strategic fit. These systems are not communicating, and the interfaces between them has to be carefully monitored in order to avoid surprises. This does however not seem to be a major issue for Contractor C, as Subcontractor C2 are serving an EPC-contract. Subcontractor C1 are responsible for delivering a finished product according to the requirements specified by the contract, which means that there is "two projects within the same project", and that they are less dependent upon having an integrated project management tool. They are furthermore able to coordinate the plans through the system of the client, which communicates with both of their systems.

The empirical data indicates that Contractor C are not accustomed to deal with subcontractors

on an integrated lump sum contract, and the ISS Site leader stated that it seemed to be an attitude related issue. This has been expressed both in words and actions on several occasions; from their lack of training in TIPS - with the implications this has had on project progress - to the perceived lack of influence in various forums. According to the HSE manager there is no co-development of governing documentation for the technical execution of activities together with subcontractors, but rather Contractor C makes adaptions to the requirements from the client's framework. These adaptations are approved by the client, and then further sent to the subcontractors who are expected to comply - 'This is how we do it, and that's how it will be'. Subcontractor C1 are however represented in the planning forums, but have according to the Project Manager at Subcontractor C1 no real influence in these meetings as Contractor C own the plan.

This perceived lack of influence in the decision-making forums seems to explain some of Subcontractor C1's resistance to adhere to the overall project plan (D. I. Jacobsen, 2012; Levin et al., 2012), and seems to be even more problematic because they are on a lump sum contract. Because they are integrated with Contractor C's planner, together with the claim that they have little influence over the plan, makes it likely that they are less in control over their internal operations. According to the Project Manager at Subcontractor C1, 'this is is unacceptable when we're on a lump sum contract'.

Because Contractor C have separate forums for discussing the commercial and the operational aspects, they are not discussing the economical interests associated with the operational issues in meetings with lower-level employees at Subcontractor C1. Subcontractor C1 are on the other hand concerned with their economical interests all the way down to the foreman-level, and often try to bring up their economical concerns related to operational issues in every forum. It seems that these meetings are insufficient for addressing both the operational and commercial perspectives, which has resulted in a great deal of frustration from both parties. The operational nature of these meeting, together with Subcontractor C1's commercial focus, might explain the lacking degree of perceived influence, and the subsequent frustration from both parties. Seeing as Subcontractor C1 are on a lump sum contract, and their incentives are tied to their internal productivity, it seems that operational issues can not be addressed without also assessing the potential need for additional labour from Subcontractor C1. Because the operational issues have potential economical ramifications, subsequent compensation must also be addressed. It seems that a structured approach for effectively dealing with precisely this issue is what has been lacking, and has resulted in delays as Subcontractor C1 must assess the economical consequences in their internal hierarchy, before providing an answer to the operational issue. This discongruence between their objectives is illustrated by their different statements about their joint meetings. Contractor C prefer to have informal meetings where they discuss project progress and

operational issues, whereas Subcontractor C1 wants written records and more structured meetings addressing the economical perspectives.

Contractor C are performing internal evaluations after every project, where the project management team are forming a unified understanding of the best practices and lessons learned throughout the project, which serves as a sense-making process (Gioia & Chittipeddi, 1991). In section 5.3.1 we argued that these evaluations serves as input for the organizational memory, as the final report makes the foundation for anchoring the generated knowledge in governing documents in the base organization. There are however no joint evaluations with subcontractors, which raises the question of whether or not Contractor C's internal evaluations capture the lessons learned and the best practices developed in the interface between them and their subcontractors [5]. If these perspectives are not evaluated, it seems the knowledge generated in the interface between them will remain implicit and be dependent upon the individuals (Nonaka, 1994). Furthermore, because there are no guarantee the subcontractors will be used on the next project, together with the fact that employees are often transferred to different roles from project to project, it seems likely that they will fall prey to amnesia (Snyder & Cummings, 1998), and make the same mistakes on future projects.

The empirical data shows that both Subcontractor C1 and Subcontractor C2 are positive to the idea of joint evaluations, and it seems that by addressing the issues from the project, they would be better able to resolve them in the future. The joint evaluations therefore seems to serve as a platform for generation of knowledge, but also as a way of understanding the others perspectives and establish trust, which in turn could increase the corporate compatibility and the learning capability (Flores et al., 2012; Goh & Richards, 1997). This is supported by the Quality Controller at Subcontractor C2 who argued that such evaluations would be beneficial for developing a long term relationship with Contractor C. This lead us to our next point, which is how and where the knowledge generated in the interface should be institutionalized.

Institutionalization

Seeing as the relations with subcontractors are related to temporary projects, and the employee-roles and team-compositions are changing from project to project, it seems that the generated knowledge need to be institutionalized in the organizational memory (Glosvik, 2002) of the base-organization of Contractor C. Because of the temporary nature of the relations - both external and internal - it seems that the relational system described by Scott (1995) is an inappropriate knowledge carrier. Also the developed routines are project spe-

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[5]such as Contractor C's approach towards subcontractors on an integrated lump sum contract, the appropriateness of subcontractors' incentives and their platforms for participation

cific, which means that in order to institutionalize them they should become part of the final project-report and written down in governing documents. These governing documents represent artifacts, and could be distributed from the base-organization of Contractor C to the relevant forums and disciplines in future projects.

The project-reports do however not seem to be efficiently translated into organizational knowledge, as the empirical data suggests that lessons learned on one project are often not transferred to future projects. This indicates that the institutionalization process of the generated knowledge is impaired. The HSE procedures and routines is what seems to be most effectively transferred between projects, which begs the question: how can Contractor C become more capable of also effectively institutionalizing other solutions and best practices? Artifacts such as governing documents seems to be insufficient by itself, as this is the way they are currently trying to institutionalize best practices. What seems to be separating the HSE practices from other best practices is the massive focus from management, and the cultural values related to HSE among both Contractor C's own employees and their subcontractors' employees. The institutionalization of HSE practices thus seems to be facilitated by a symbolic system, that anchors the practices in the organizational culture of Contractor C (Scott, 1995). One way of increasing the likelihood of institutionalization of best practices and routines, developed in the intersection between Contractor C and their subcontractors, therefore seems to be developing a similar symbolic system.

Contractor C are currently developing in-house capabilities within the ISS-disciplines, in order to become better at managing these subcontracted disciplines in projects. These internal disciplines could potentially serve as a repository for the generated knowledge, and maintain focus on the discipline-specific issues on future projects. The empirical material suggests that by maintaining the focus from management, employees are more likely to prioritize these issues, which is why the development of the internal ISS-disciplines may potentially lead to the creation of a symbolic system for ISS-specific practices. Such a system, taken together with the governing documents, seems to make Contractor C more capable of making changes stick, through an effective translation of lessons learned into organizational knowledge.

Joint organizational development summarized

It seems that both the conflicting incentives of the integrated lump sum contract, together with the differences in organizational structure, seems to have strained the relation between Contractor C and Subcontractor C1. Furthermore, because Subcontractor C1 were not able to use TIPS, they did not have the sufficient prerequisites for addressing the in-depth operational issues. The collaboration dramatically improved after the respective top man-

agements got together, and jointly agreed upon a new release system. This case illustrates that the relational factors are to a great extent affecting the possibilities for joint organizational development, and that care should be taken to provide unambiguous incentives for the subcontractors. It further illustrates that subcontractors need the necessary prerequisites for participating in joint organizational development, and that Contractor C are providing insufficient training in TIPS towards this objective.

5.4 Cross-case analysis

We have structured the cross case analysis in the same way as the three preceding single case analyzes. This means that we will first address research question 1: How do project based organizations approach organizational development? Second, we will address research question 2: How do the relations between project-based organizations and their subcontractors affect the possibility for joint organizational development, in a project-context?

How do Project-based organizations approach organizational development?
All of the case companies have various channels for information sharing and information acquisition, and based on the preceding analyzes it seems that the appropriateness of these channels differ based on three conditions: the organizational structure, the learning orientation among employees, and the strategic focus from management.

Suggestion boxes have been implemented in all of the three case companies, and have in various degrees contributed to generation of suggestions and solutions. It seems that the suggestion boxes is an appropriate channel for knowledge generation for both Contractor B and Contractor C, while this is not the case for Contractor A. This is an assessment based on the degree of feedback received from the three systems, and the systems' effectiveness for bringing suggestions to management's attention. Contractor A received little feedback from the suggestion boxes, and the preferred channel for bringing suggestions to management's attention was the group leaders. It seems that the size of Contractor A, together with their flat organizational structure, made it easier and more effective for the employees to make suggestions directly to the group leaders, or the CEO himself. This seems to explain both the lack of use of the suggestion boxes, and the many suggestions coming in to management via informal channels. Both Contractor B and Contractor C are however receiving a lot of feedback from these systems, which seems to be making it easier for management to address the issues from employees situated in the various areas on project-sites. It seems that there is a greater distance between management and the operators on-site in these organizations, and the suggestion boxes are enabling the employees in the various disciplines to be heard. It therefore seems that the implementation of suggestion boxes in these companies are appropriate channels for information acquisition, as they capture suggestions and feedback from employees, and also because these suggestions might not otherwise have been brought to the managements' attention.

We will however argue that the suggestion boxes are not in themselves sufficient to develop an appropriate channel for information generation and acquisition. Both Contractor B's and Contractor C's suggestion boxes seem to be backed up by the strategic focus from manage-

ment, and the learning orientation of the organization. These elements have been suggested to have a reinforcing effect on each other, and seems to have impact on the content of the suggestions from the employees. Where Contractor B's system seems to be generating solutions and improvement suggestions related to a range of different organizational development-themes, Contractor C's system mainly generates HSE-related suggestions. This suggests that the strategic focus from management, and the involvement of employees in various development activities and improvement groups, are contributing to the engagement among employees and the contents of the suggestions coming in. We are also finding it likely that the monetary incentives provided by Contractor B are contributing to the effectiveness of the system. The appropriateness of a system for information acquisition and knowledge generation thus seems to be conditioned upon the supporting and reinforcing elements in the organization, and should therefore not be expected to increase the organizational learning capability in and of itself.

Even though all of the case companies are able to generate knowledge in their own way, it seems that they are all struggling to spread information out to the operators on projects. This seems to be a characteristic of project-based organizations, and makes institutionalization of the generated knowledge difficult. This seems to be especially hard for Contractor A and Contractor C, who are operating on various project locations, as opposed to contractor B who are operating all of their projects at their own yard. The reason why the distribution of knowledge is difficult seems to be the lack of an effective communication system. An effective communication system would enable employees to receive relevant information, when the information was needed. The different phases of the project require different disciplines, which further seems to complicate this issue, as what is relevant information for one discipline is not relevant for another. This further illustrates the need for a system that directs relevant information to the employees currently in the need of that information.

Contractor A are using several channels for communication, where the information is spread by emails, a closed Facebook group and through the formal line hierarchy. The communication of new routines and best practices has been identified as difficult, and the formal line hierarchy has proved to be the most effective for this purpose. They have no formal evaluations of projects, which have been argued to further reduce their learning capability, as lessons learned and new best practices from projects often remain implicit. Despite the lack of formal evaluations and an effective communication system, it seems that Contractor A have partially succeeded in institutionalizing the A-Standard in a relational system. There are however still individual variations among the operators, which suggests that merely using the relational system as a knowledge carrier for changing the organizational memory is insufficient. It seems that the A-Standard has the potential for serving as an artifact, but is hampered by the operators' and group leaders' limited access to the system.

If the system had been more accessible it could have acted as a base for knowledge for the entire organization, which would increase the potential for organizational learning.

Contractor C are primarily using the intranet for communicating in and between projects, and best practices and routines from improvement efforts are here posted. It seems however that the employees situated on projects have difficulties to encapsulate the information from other projects into their own projects, as they often fail to see the relevance to the context of the specific project. The intranet has however become more systematized, which seems to have resulted in more transference of best practices between projects, as employees are more able to find the information they are looking for. Contractor B have systems for reporting quality deviations and evaluations, but it seems that both systems are inappropriate for distribution of the knowledge generated. The quality deviation system seems to be overloaded, and because the system is not systematized it is difficult for employees to find the information they are looking for. Both Contractor B and Contractor C are making evaluations after each projects, but have not a standardized approach towards this end. We have argued that the lack of a systematic approach for making evaluations makes them susceptible to large individual variations, which represents a barrier for an effective institutionalization of the generated knowledge in artifacts, such as governing documents. These governing documents seem to be essential for making the generated knowledge explicit, and if project specific routines and lessons learned are not part of project-evaluations it seems to have negative impact on the transference of the generated knowledge from one project to the next. It seems however that both Contractor B and Contractor C have been able to successfully institutionalize HSE-related practices throughout the organization through the use of multiple knowledge carriers (i.e. Governing documents and organizational values), and an extensive strategic focus from the project management office.

How do the relations between project-based organizations and their subcontractors affect the possibility for joint organizational development, in a project-context?
In contrast with Contractor A and Contractor C, Contractor B have experience with organizational development in collaboration with their subcontractors. While Contractor B have regular meetings with subcontractors addressing development initiatives and issues relevant to project performance, Contractor A and Contractor C offer no platform with this explicit purpose. On one side, all contractors seek to involve the subcontractors in an early phase in order to construct a more complete project execution plan, as hick-ups during the project can have huge consequences on progress. On the other side, as the project-based organizations operate in a hectic environment, the time that could be spent on planning is limited.

When examining the three project-based organizations and their respective subcontractors,

varying degrees of corporate compatibility between the organizations were found.

Contractor A is compatible with Subcontractor A1 and Subcontractor A2 in terms of a flat organizational structure, little experience with systematic organizational development and a high focus on employee participation. However, while the subcontractors have a case-by-case approach to development work, Contractor A is currently seeking to systematize their approach to a greater extent.

Contractor B is compatible with Subcontractor B1 and Subcontractor B2 in terms of experience with internal organizational development, and focus on employee participation. Contractor B is currently seeking to systematize their development work. While they recognize that organizational development cannot happen without subcontractors, they do however not involve them in their internal system for organizational development.

Contractor C is compatible with Subcontractor C1 and Subcontractor C2 in that they all have experience with internal organizational development. However, the subcontractors have little experience with projects of the size that they are currently serving contracts for. Subcontractor C1 also have a different organizational structure than Contractor C; while Contractor C have a clear distinction between their operational and financial functions, Subcontractor C1 have an economic focus all the way down to the foreman-level. This difference in organizational culture have had negative implications for their collaboration.

While Contractor A and Contractor B do not offer any direct incentives for their subcontractors to contribute to joint organizational development, Contractor C do provide monetary rewards if the project progresses according to certain project-specific milestones. However, as the milestones are perceived to conflict with Subcontractor C1's internal objective of productivity, these incentives cannot be regarded as effective. Lump sum subcontracts are widely used in all of the three project-based organizations, but these seem to only give an incentive for the subcontractors to increase their internal productivity.

The only real incentive for contributing to joint organizational development could be argued to be routed in the self-interest of increasing internal productivity. As the project-context is hectic and complex, where all actors are dependent on each other, an increase in productivity for one actor could positively influence the productivity of another. This incentive can be recognized in all the three cases of this thesis - a development initiative must be perceived to positively influence both parties' productivity in order for them to jointly engage in the initiative. It therefore seems important for the organizations to be able to identify areas within which the parties could increase their joint productivity, for joint organizational development to be possible at all. In case C, we saw that they were not able to do this, as collaborating on the project itself was tough enough.

The development of the relationship between Contractor C and Subcontractor C1 on the current project readily shows that it is imperative for the contractor to understand that a lump sum contract comes with certain preconditions. As a fixed price puts pressure on the subcontractor's productivity, anything preventing productivity will also impact the subcontractor's profit. As Contractor C attempted to control Subcontractor C1 to a certain extent in the early phases, in order to reach their own milestones, Subcontractor C1 suffered from a decrease in productivity. This has also had implications for the collaboration - and if the parties cannot collaborate on project-related issues, how can they collaborate on joint organizational development? The contractor needs to understand how the subcontractor makes decisions based on the type of contract they are serving, in order to give the right incentives for contributing to development work. Judging by the empirical data, Subcontractor A1 had a similar problem with Contractor A in the past, and perceived Contractor A to be overly controlling and preoccupied with their own progress. Contractor B has given the impression that this understanding is imperative to achieve a successful collaboration with their subcontractors.

The lump sum contracts were found to give little incentives for contributing to joint organizational development in themselves. However, they do have an important function for determining the power balance in the relationships between the contractors and their subcontractors. The short-term and project-specific nature of the contracts facilitate competition on price and quality among the subcontractors, as they are not guarantied a contract for the next project. In order to win new contracts, they need to outperform their competitors. This fact seem to give an additional incentive for internal organizational development among the subcontractors, but it also has implications for the joint organizational development.

Short-term contracts do not facilitate long-term and strategic relationships, which is a prerequisite to jointly develop capabilities in the supply chain, and could thus be seen to undermine the possibilities for joint organizational development. In order to develop relations to their subcontractors, all of the three project-based organizations do however apply the strategy of pooling subcontractors. That is, they have a few subcontractors within different disciplines to choose from. Contractor B also utilize framework agreements in order to ensure more long-term relations. By approximating long-term relationships in this way, they are to a greater extent enabled to achieve joint organizational development. The question does however remain, how should the jointly created knowledge and new practices be institutionalized?

As the relationships are project-specific, and therefore short-term, it seems hard to institutionalize new best practices through relational systems or symbolic elements - unless the contractor possesses in-house competences within the disciplines of the subcontractor

in question. These elements are fluid and project-specific, and if the relationship is not transferred to the next project, the project-based organizations risk falling pray to amnesia. Further, the new knowledge has to be incorporated into the organizational memory of the contractors, as the contractors seem to be the only certain common denominator in all projects. The logical institutional knowledge carriers to apply, therefore seem to be either artifacts such as governing documents, or new best practices.

The problems related to the dissemination of new best practices throughout the organization of Contractor A, suggest that in order for a new best practice to be accepted and truly institutionalized, it must be perceived as relevant by the employees. This further suggest, that if the subcontractor, with whom a new practice has been developed, represents a discipline which is not used in every project, it could be difficult to incorporate the practice as a best practice in the organizational memory of the contractor. The fact that the practices often are project-specific makes it difficult to directly incorporate them as new best practices in the overall organizational memory. The remaining knowledge carrier is thus governing documents.

As argued, the most important input for governing documents seems to be project evaluations. As none of the contractors conduct joint evaluations on projects with their subcontractors, they all risk to lose information on jointly created knowledge - they lose some of the information from the interface between contractor and subcontractor, as the subcontractors' viewpoints are not included as part of the evaluation. This further complicates the institutionalization of jointly created knowledge on projects with subcontractors. The problems related to evaluations have been recognized to be a direct effect of the project context, which inflicts an intense focus on progress.

Contractor B and Contractor C have succeeded in achieving a high degree of compliance to HSE-routines, and these routines are subject to constant development. As argued earlier, this seems largely to be because of the focus directed towards it by the project management office. It has become a core value, and the focus on it is now permeating both Contractor B, Contractor C and their respective subcontractors. It therefore seems that if the project management office of the contractors could provide the appropriate pressure for and focus on organizational development, the organizations could succeed to a greater extent in both internal and joint development activities.

Chapter 6

Conclusion and implications

Initially, we raised two research questions about organizational development in the project industry. We will now present our findings, and answer the research questions raised in the introduction, one by one. Finally, we will answer the main question of this thesis: *How do project-based organizations manage organizational development in collaboration with their subcontractors?*

Approach to organizational development

The first research question was: *How do project-based organizations approach organizational development?* In the preceding analyzes, we have argued that the effectiveness of project-based organizations' approach to organizational development is related to the organizations' learning capabilities. The learning process in project-based organizations seems to consist of two phases: knowledge generation in projects, and subsequent institutionalization of the generated knowledge. We will here present our findings for project-based organizations' approach towards these two phases, which will answer research question 1.

We have found that the organizations' ability to generate knowledge to be connected to three interdependent factors: first, the appropriateness of their systems for acquiring suggestions and solutions from the employees in the various disciplines. Second, the degree of involvement of employees in organizational development activities, and third, the strategic focus from management. The focus from management has been found to have great impact on priorities made by employees, and the extent and direction of the organizational development activities. In the project industry there is a considerable amount of pressure towards developing HSE-routines and practices, and the strategic focus from management have largely contributed to the safety culture found in these organizations. It further seems that the organizations that are focusing on a limited number of organizational development

themes, are better able at creating awareness for the development activities in the organization. Where the employees have been broadly included in the development activities, it further seems that the organizations have managed to create enthusiasm and endorsement among employees. This seems to have generated more feedback.

Our research suggests that the organizations' ability to institutionalize the generated knowledge are dependent upon two factors: first, their ability to anchor new routines and best practices in the organizational memory, and second, the employees access and ability to retrieve the information from the organizational memory. Related to the first factor, we have found that applying a combination of institutional knowledge carriers is likely to increase the effectiveness of the institutionalization of new best practices. It seems that artifacts (i.e. governing documents) is the most prevalent knowledge carrier used in the project industry. Evaluations have been found to be the primary source for anchoring project-specific changes in governing documents, which in turn makes the foundation for new best practices on future projects. We have however found that the lack of a standardized approach towards carrying out these evaluations poses a risk for failed institutionalization, which seems to reduce the degree of transference of knowledge between projects. This finding illustrates the appropriateness of combining multiple institutional knowledge carriers for achieving successful institutionalization of new best practices. Related to the second factor, we have found that the employees' access to the organizations' systems for storing the governing documents, and the systematization of information in these systems, are indicators of whether the best practices and lessons learned are transferred to future projects. The communication of new best practices to employees have been identified as a major challenge for project-based organizations. This is both because employees often are situated at geographically dispersed project-locations, and because they often are in different phases of the projects. The employees that are not immediately affected by the changes, are in many instances found to perceive the information as irrelevant. This illustrates the importance of providing accessible, easy to use systems, where employees can receive and find information when they need it.

Approach to joint organizational development

The second research question was: *How do the relations between project-based organizations and their subcontractors affect the possibility for joint organizational development, in a project-context?* Our research suggests that the two most prevalent relational factors affecting joint organizational development are: the challenges associated with coordinating the many actors involved, and the short term nature of the subcontractor relationships. We will now present our findings for how these two characteristics affect joint organizational development, which will answer research question 2.

First, projects are complex, as they consist of many subsequent and path-dependent activities. As there are many actors involved, they are mutually dependent on each other's performance in order to ensure project progress. There is a tendency in the project industry to give subcontractors project-specific lump sum contracts, where profit is a direct result of productivity. The lump sum contracts give the subcontractors an incentive for internally developing their operations and capabilities. However, our findings suggest that they do not necessarily provide an incentive for contributing to progress of the project, and that they could potentially create local optimums, conflicting with the overall objective of project progress. The contractor's understanding of the rationale behind their subcontractors' decision making processes is found to be important in order to provide unambiguous incentives, which are in line with the overall objective of project progress.

Our research further shows that in addition to providing appropriate incentives, the contractors should also provide the necessary prerequisites for the subcontractors to contribute to achieving the predetermined project milestones. In order to provide these prerequisites, the contractors need to share sufficient information about the project-process and project-tools. Our findings suggest that the contractor's understanding of their subcontractors' decision making processes, together with the provision of appropriate incentives and necessary prerequisites, are the most prevalent indicators for a successful collaboration. By providing the right incentives for all actors on a project to pull in the same direction, they are also better equipped for finding areas that could be subject for development activities, which could yield benefits for all parties.

Second, the short-term nature of the subcontractor relations does also have implications for the institutionalization of jointly created knowledge. Our findings suggest that it is necessary for the contractor to take responsibility for the institutionalization process, and that the most appropriate knowledge carrier seems to be governing documents. Seeing as one of the most important information-sources for governing documents are evaluations, the lack of joint evaluations between contractor and subcontractors is alarming. Joint evaluations could potentially capture important information from the many interfaces between contractor and subcontractor, and thus provide a more complete picture - providing a better foundation for new best practices. The hectic nature of the project-process must take some of the blame for the lack of joint evaluations, and evaluations in general. The different subcontractors exit the project at different points in time, an it is therefore a challenging task to conduct joint project-evaluations.

Organizational development in collaboration with subcontractors
Initially in the introduction, we raised the following main question: *How do project-based*

organizations manage organizational development in collaboration with their subcontractors? Based on the answers we have provided on the research questions, we can now summarize our findings to the main question, in two parts.

First of all, the project-based organizations are in various degrees able to manage internal organizational development. Most companies are able to generate knowledge in the project process, and especially related to HSE, which has become part of the entire industry culture. They are however lacking an effective and systematic approach for institutionalizing the new best practices and lessons learned from the individual projects, into the organizational memory. The lack of a standardized approach for making evaluations, and the lack of a system for effectively storing and retrieving information, has been found to be the two most important barriers for organizational learning. This negatively affects the organizations' ability to manage organizational development.

Second, the challenge of institutionalization has been found to be more prominent when talking about knowledge generated in collaboration with subcontractors. A key finding is that few project-based organizations have a systematic approach for joint organizational development with their subcontractors. Lessons learned are often not transferred to future projects, which indicates that the institutionalization is impaired. We have further found that because the objectives of the contractors and their subcontractors are often perceived to be conflicting, the collaboration is often complicated by contractual disputes. As a result of these difficulties, our findings indicate that identifying joint development areas with subcontractors is difficult, unless it directly influences both parties' productivity. Organizational development in collaboration with subcontractors is therefore largely based on sporadic events, and the generated knowledge often remains implicit. Systematization of the approach towards joint organizational development has been a neglected area by project-based organizations in the past, and should receive greater focus in the future.

Implications for theory, future research and practitioners

This research has implications for theory, research, and practice. While there exist a plethora of literature on the topic of systems for developing capabilities in mass-producing organizations, our research shows that there is a lack of systematic approaches to organizational development in the project industry. This thesis contributes to the literature on organizational development in the context of the project industry. The thesis does further show that project-based organizations are in the process of developing systems for organizational development, and that subcontractors should be involved in the development work. This raises several questions for further research:

1. How do the multiple interfaces between contractors and subcontractors impact corpo-

rate compatibility, and the companies' ability to identify areas for joint organizational development?

2. How does the great extent of hired labor affect organizational development in project-based organizations?

3. What is the optimal way to conduct project evaluations in order to weigh up for the possible loss of information from contractor-subcontractor interfaces?

4. How can project-based organizations best approximate long-term relationships with their subcontractors, while balancing the power-dependency?

While these and other questions most certainly will arise in future research, our thesis will function as a springboard into the field of organizational development in the context of the project industry. Our research also shows that both the lack of literature within this field of research, and the increasing actuality of the topic in the industry, inflicts a need for researchers to further explore these topics.

Further research will also need to explore some of our overall findings. For example, we did not succeed with finding the specific impact of corporate compatibility on joint organizational development. The conclusion that corporate compatibility does not have an impact on organizational development, should however not be drawn, as our findings did suggest that corporate compatibility increases with experience of working together. By having a better initial corporate compatibility, it seems that the actors are better able to identify joint improvement areas at an earlier stage in the project. How corporate compatibility affects the collaboration, and possibilities for joint organizational development, should however be subjected to a more refined analysis.

At a practical level, this research has important implications for project-based organizations. As many of these organizations are in the process of developing systematic approaches to organizational development, this thesis can provide valuable insights into areas which could prove difficult to maneuver. A key finding which has implications for practitioners, is that the focus from the project management office is vitally important for understanding how priorities are made by the employees. The focus on HSE has resulted in a safety culture permeating both the organizations and the entire industry. This suggests that a similar focus on development activities could result in not only a safety culture, but also a culture for organizational development, in a broader sense of the word.

CHAPTER 6. CONCLUSION AND IMPLICATIONS

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Appendices

Appendix A: Report to Norwegian Centre For Research Data

MELDESKJEMA

Meldeskjema (versjon 1.4) for forsknings- og studentprosjekt som medfører meldeplikt eller konsesjonsplikt
(jf. personopplysningsloven og helseregisterloven med forskrifter).

1. Intro		
Samles det inn direkte personidentifiserende opplysninger?	Ja ● Nei ○	En person vil være direkte identifiserbar via navn, personnummer, eller andre personentydige kjennetegn. Les mer om hva personopplysninger. NB! Selv om opplysningene skal anonymiseres i oppgave/rapport, må det krysses av dersom det skal innhentes/registreres personidentifiserende opplysninger i forbindelse med prosjektet.
Hvis ja, hvilke?	■ Navn □ 11-sifret fødselsnummer □ Adresse □ E-post □ Telefonnummer □ Annet	
Annet, spesifiser hvilke		
Skal direkte personidentifiserende opplysninger kobles til datamaterialet (koblingsnøkkel)?	Ja ● Nei ○	Merk at meldeplikten utløses selv om du ikke får tilgang til koblingsnøkkel, slik fremgangsmåten ofte er når man benytter en databehandler
Samles det inn bakgrunnsopplysninger som kan identifisere enkeltpersoner (indirekte personidentifiserende opplysninger)?	Ja ○ Nei ●	En person vil være indirekte identifiserbar dersom det er mulig å identifisere vedkommende gjennom bakgrunnsopplysninger som for eksempel bostedskommune eller arbeidsplass/skole kombinert med opplysninger som alder, kjønn, yrke, diagnose, etc.
Hvis ja, hvilke		NB! For at stemme skal regnes som personidentiserende, må denne bli registrert i kombinasjon med andre opplysninger, slik at personer kan gjenkjennes.
Skal det registreres personopplysninger (direkte/indirekte/via IP-/epost adresse, etc) ved hjelp av nettbaserte spørreskjema?	Ja ○ Nei ●	Les mer om nettbaserte spørreskjema.
Blir det registrert personopplysninger på digitale bilde- eller videoopptak?	Ja ○ Nei ●	Bilde/videoopptak av ansikter vil regnes som personidentifiserende.
Søkes det vurdering fra REK om hvorvidt prosjektet er omfattet av helseforskningsloven?	Ja ○ Nei ●	NB! Dersom REK (Regional Komité for medisinsk og helsefaglig forskningsetikk) har vurdert prosjektet som helseforskning, er det ikke nødvendig å sende inn meldeskjema til personvernombudet (NB! Gjelder ikke prosjekter som skal benytte data fra pseudonyme helseregistre). Dersom tilbakemelding fra REK ikke foreligger, anbefaler vi at du avventer videre utfylling til svar fra REK foreligger.

2. Prosjekttittel		
Prosjekttittel	Supplier development in Project-based industries	Oppgi prosjektets tittel. NB! Dette kan ikke være «Masteroppgave» eller liknende, navnet må beskrive prosjektets innhold.

3. Behandlingsansvarlig institusjon		
Institusjon	NTNU	Velg den institusjonen du er tilknyttet. Alle nivå må oppgis. Ved studentprosjekt er det studentens tilknytning som er avgjørende. Dersom institusjonen ikke finnes på listen, har den ikke avtale med NSD som personvernombud. Vennligst ta kontakt med institusjonen.
Avdeling/Fakultet	Fakultet for økonomi (ØK)	
Institutt	Institutt for industriell økonomi og teknologiledelse	

4. Daglig ansvarlig (forsker, veileder, stipendiat)		

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Fornavn	Hanne	Før opp navnet på den som har det daglige ansvaret for prosjektet. Veileder er vanligvis daglig ansvarlig ved studentprosjekt.
Etternavn	Finnestrand	
Stilling	Førsteamanuensis	Daglig ansvarlig og student må i utgangspunktet være tilknyttet samme institusjon. Dersom studenten har ekstern veileder, kan biveileder eller fagansvarlig ved studiestedet stå som daglig ansvarlig.
Telefon	99024720	
Mobil		Arbeidssted må være tilknyttet behandlingsansvarlig institusjon, f.eks. underavdeling, institutt etc.
E-post	hanne.finnestrand@ntnu.no	
Alternativ e-post	hanne.finnestrand@ntnu.no	NB! Det er viktig at du oppgir en e-postadresse som brukes aktivt. Vennligst gi oss beskjed dersom den endres.
Arbeidssted	NTNU	
Adresse (arb.)	Alfred Getz veg 1	
Postnr./sted (arb.sted)	7034 Trondheim	

5. Student (master, bachelor)

Studentprosjekt	Ja ● Nei ○	Dersom det er flere studenter som samarbeider om et prosjekt, skal det velges en kontaktperson som føres opp her. Øvrige studenter kan føres opp under pkt 10.
Fornavn	Magnus	
Etternavn	Werenskjold	
Telefon	95065527	
Mobil		
E-post	magnuswerenskjold@gmail.com	
Alternativ e-post	magnuskw@stud.ntnu.no	
Privatadresse	Klæbuveien 52	
Postnr./sted (privatadr.)	7030 Trondheim	
Type oppgave	● Masteroppgave ○ Bacheloroppgave ○ Semesteroppgave ○ Annet	

6. Formålet med prosjektet

Formål	Hvordan kan selskaper i prosjekt basert industri lykkes med kontinuerlig forbedring i leverandørkjeden? RQ1: Hvilke forutsetninger har ETO-selskapene for å drive kontinuerlig forbedring? RQ2: Hvilke forutsetninger har de respektive leverandørene til å bidra i forbedringsprosjekter? RQ3: Med bakgrunn i de to foregående spørsmålene: Hvordan kan potensialet for forbedringsarbeid i relasjonene mellom hovedbedrift og underleverandør realiseres?	Redegjør kort for prosjektets formål, problemstilling, forskningsspørsmål e.l.

7. Hvilke personer skal det innhentes personopplysninger om (utvalg)?

Kryss av for utvalg	□ Barnehagebarn □ Skoleelever □ Pasienter ■ Brukere/klienter/kunder ■ Ansatte □ Barnevernsbarn □ Lærere □ Helsepersonell □ Asylsøkere ■ Andre	
Beskriv utvalg/deltakere	Tre prosjektbaserte bedrifter, og et utvalg av underleverandørene deres.	Med utvalg menes dem som deltar i undersøkelsen eller dem det innhentes opplysninger om.

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Rekruttering/trekking	Dette har blitt gjort i samarbeid med SINTEF og veileder med NTNU, samt de intervjuede hovedbedriftene.	Beskriv hvordan utvalget trekkes eller rekrutteres og oppgi hvem som foretar den. Et utvalg kan trekkes fra registre som f.eks. Folkeregisteret, SSB-registre, pasientregistre, eller det kan rekrutteres gjennom f.eks. en bedrift, skole, idrettsmiljø eller eget nettverk.
Førstegangskontakt	SINTEF opprettet førstegangskontakt, og masteroppgaven er et bidrag inn til eksisterende prosjekter ved SINTEF.	Beskriv hvordan kontakt med utvalget blir opprettet og av hvem. Les mer om dette på temasidene.
Alder på utvalget	□ Barn (0-15 år) □ Ungdom (16-17 år) ■ Voksne (over 18 år)	Les om forskning som involverer barn på våre nettsider.
Omtrentlig antall personer som inngår i utvalget	15	
Samles det inn sensitive personopplysninger?	Ja ○ Nei ●	Les mer om sensitive opplysninger.
Hvis ja, hvilke?	□ Rasemessig eller etnisk bakgrunn, eller politisk, filosofisk eller religiøs oppfatning □ At en person har vært mistenkt, siktet, tiltalt eller dømt for en straffbar handling □ Helseforhold □ Seksuelle forhold □ Medlemskap i fagforeninger	
Inkluderes det myndige personer med redusert eller manglende samtykkekompetanse?	Ja ○ Nei ●	Les mer om pasienter, brukere og personer med redusert eller manglende samtykkekompetanse.
Samles det inn personopplysninger om personer som selv ikke deltar (tredjepersoner)?	Ja ○ Nei ●	Med opplysninger om tredjeperson menes opplysninger som kan spores tilbake til personer som ikke inngår i utvalget. Eksempler på tredjeperson er kollega, elev, klient, familiemedlem.

8. Metode for innsamling av personopplysninger

Kryss av for hvilke datainnsamlingsmetoder og datakilder som vil benyttes	□ Papirbasert spørreskjema □ Elektronisk spørreskjema ■ Personlig intervju □ Gruppeintervju □ Observasjon □ Deltakende observasjon □ Blogg/sosiale medier/internett □ Psykologiske/pedagogiske tester □ Medisinske undersøkelser/tester □ Journaldata (medisinske journaler)	Personopplysninger kan innhentes direkte fra den registrerte f.eks. gjennom spørreskjema,intervju, tester, og/eller ulike journaler (f.eks. elevmapper, NAV, PPT, sykehus) og/eller registre (f.eks.Statistisk sentralbyrå, sentrale helseregistre). NB! Dersom personopplysninger innhentes fra forskjellige personer (utvalg) og med forskjellige metoder, må dette spesifiseres i kommentar-boksen. Husk også å legge ved relevante vedlegg til alle utvalgs-gruppene og metodene som skal benyttes. Les mer om registerstudier her. Dersom du skal anvende registerdata, må variabelliste lastes opp under pkt. 15
	□ Registerdata	
	□ Annen innsamlingsmetode	
Tilleggsopplysninger		

9. Informasjon og samtykke

Oppgi hvordan utvalget/deltakerne informeres	□ Skriftlig ■ Muntlig □ Informeres ikke	Dersom utvalget ikke skal informeres om behandlingen av personopplysninger må det begrunnes. Les mer her. Vennligst send inn mal for skriftlig eller muntlig informasjon til deltakerne sammen med meldeskjema. Last ned en veiledende mal her. NB! Vedlegg lastes opp til sist i meldeskjemaet, se punkt 15 Vedlegg.
Samtykker utvalget til deltakelse?	● Ja ○ Nei ○ Flere utvalg, ikke samtykke fra alle	For at et samtykke til deltakelse i forskning skal være gyldig, må det være frivillig, uttrykkelig og informert. Samtykke kan gis skriftlig, muntlig eller gjennom en aktiv handling. For eksempel vil et besvart spørreskjema være å regne som et aktivt samtykke. Dersom det ikke skal innhentes samtykke, må det begrunnes.

10. Informasjonssikkerhet

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Hvordan oppbevares navnelisten/ koblingsnøkkelen og hvem har tilgang til den?	Transkriberte intervjuer ligger lokalt lagret på en PC, mens navnelisten vil bli lokalt lagret på en annen PC. Bare jeg og medforfatter (Asgeir Bråten) har tilgang til koblingsnøkkel.	
Oppbevares direkte personidentifiserbare opplysninger på andre måter?	Ja ○ Nei ●	
Spesifiser		NB! Som hovedregel bør ikke direkte personidentifiserende opplysninger registreres sammen med det øvrige datamaterialet.
Hvordan registreres og oppbevares personopplysningene?	□ På server i virksomhetens nettverk □ Fysisk isolert PC tilhørende virksomheten (dvs. ingen tilknytning til andre datamaskiner eller nettverk, interne eller eksterne) □ Datamaskin i nettverkssystem tilknyttet Internett tilhørende virksomheten ■ Privat datamaskin □ Videoopptak/fotografi ■ Lydopptak □ Notater/papir ■ Mobile lagringsenheter (bærbar datamaskin, minnepenn, minnekort, cd, ekstern harddisk, mobiltelefon) □ Annen registreringsmetode	Merk av for hvilke hjelpemidler som benyttes for registrering og analyse av opplysninger. Sett flere kryss dersom opplysningene registreres på flere måter. Med «virksomhet» menes her behandlingsansvarlig institusjon. NB! Som hovedregel bør data som inneholder personopplysninger lagres på behandlingsansvarlig sin forskningsserver. Lagring på andre medier - som privat pc, mobiltelefon, minnepinne, server på annet arbeidssted - er mindre sikkert, og må derfor begrunnes. Slik lagring må avklares med behandlingsansvarlig institusjon, og personopplysningene bør krypteres.
Annen registreringsmetode beskriv		
Hvordan er datamaterialet beskyttet mot at uvedkommende får innsyn?	Lokalt lagret på to separate PCer, med antivirus programmer. Begge PCene er beskyttet med brukernavn og passord, og oppbevares på låsbart kontor.	Er f.eks. datamaskintilgangen beskyttet med brukernavn og passord, står datamaskinen i et låsbart rom, og hvordan sikres bærbare enheter, utskrifter og opptak?
Samles opplysningene inn/behandles av en databehandler (ekstern aktør)?	Ja ○ Nei ●	Dersom det benyttes eksterne til helt eller delvis å behandle personopplysninger, f.eks. Questback, transkriberingsassistent eller tolk, er dette å betrakte som en databehandler. Slike oppdrag må kontraktsreguleres.
Hvis ja, hvilken		
Overføres personopplysninger ved hjelp av e-post/Internett?	Ja ○ Nei ●	F.eks. ved overføring av data til samarbeidspartner, databehandler mm.
Hvis ja, beskriv?		Dersom personopplysninger skal sendes via internett, bør de krypteres tilstrekkelig. Vi anbefaler for ikke lagring av personopplysninger på nettskytjenester. Dersom nettskytjeneste benyttes, skal det inngås skriftlig databehandleravtale med leverandøren av tjenesten.
Skal andre personer enn daglig ansvarlig/student ha tilgang til datamaterialet med personopplysninger?	Ja ○ Nei ●	
Hvis ja, hvem (oppgi navn og arbeidssted)?		
Utleveres/deles personopplysninger med andre institusjoner eller land?	● Nei ○ Andre institusjoner ○ Institusjoner i andre land	F.eks. ved nasjonale samarbeidsprosjekter der personopplysninger utveksles eller ved internasjonale samarbeidsprosjekter der personopplysninger utveksles.

11. Vurdering/godkjenning fra andre instanser

Søkes det om dispensasjon fra taushetsplikten for å få tilgang til data?	Ja ○ Nei ●	For å få tilgang til taushetsbelagte opplysninger fra f.eks. NAV, PPT, sykehus, må det søkes om dispensasjon fra taushetsplikten. Dispensasjon søkes vanligvis fra aktuelt departement.
Hvis ja, hvilke		
Søkes det godkjenning fra andre instanser?	Ja ○ Nei ●	F.eks. søke registereier om tilgang til data, en ledelse om tilgang til forskning i virksomhet, skole.
Hvis ja, hvilken		

12. Periode for behandling av personopplysninger

Prosjektstart	22.02.2017	Prosjektstart Vennligst oppgi tidspunktet for når kontakt med utvalget skal gjøres/datainnsamlingen starter.
Planlagt dato for prosjektslutt	11.06.2017	Prosjektslutt: Vennligst oppgi tidspunktet for når datamaterialet enten skal anonymiseres/slettes, eller arkiveres i påvente av oppfølgingsstudier eller annet.

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Skal personopplysninger publiseres (direkte eller indirekte)?	□ Ja, direkte (navn e.l.) □ Ja, indirekte (bakgrunnsopplysninger) ■ Nei, publiseres anonymt	NB! Dersom personopplysninger skal publiseres, må det vanligvis innhentes eksplisitt samtykke til dette fra den enkelte, og deltakere bør gis anledning til å lese gjennom og godkjenne sitater.
Hva skal skje med datamaterialet ved prosjektslutt?	■ Datamaterialet anonymiseres □ Datamaterialet oppbevares med personidentifikasjon	NB! Her menes datamaterialet, ikke publikasjon. Selv om data publiseres med personidentifikasjon skal som regel øvrig data anonymiseres.Med anonymisering menes at datamaterialet bearbeides slik at det ikke lenger er mulig å føre opplysningene tilbake til enkeltpersoner. Les mer om anonymisering.

13. Finansiering

Hvordan finansieres prosjektet?		

14. Tilleggsopplysninger

Tilleggsopplysninger		

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Appendix B: Approval from Norwegian Centre For Research Data

Hanne Olofsson Finnestrand
Institutt for industriell økonomi og teknologiledelse NTNU

7491 TRONDHEIM

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 20.02.2017. Meldingen gjelder prosjektet:

53144	*Supplier development in Project-based industries*
Behandlingsansvarlig	*NTNU, ved institusjonens øverste leder*
Daglig ansvarlig	*Hanne Olofsson Finnestrand*
Student	*Magnus Werenskjold*

Personvernombudet har vurdert prosjektet og finner at behandlingen av personopplysninger er meldepliktig i henhold til personopplysningsloven § 31. Behandlingen tilfredsstiller kravene i personopplysningsloven.

Personvernombudets vurdering forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvernombud/meld_prosjekt/meld_endringer.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 11.06.2017, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Kjersti Haugstvedt
                                        Ida Jansen Jondahl

Kontaktperson: Ida Jansen Jondahl tlf: 55 58 30 19

Vedlegg: Prosjektvurdering

190   *Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.*

Kopi: Magnus Werenskjold magnuswerenskjold@gmail.com

Personvernombudet for forskning

Prosjektvurdering - Kommentar

INFORMASJON OG SAMTYKKE

Ifølge prosjektmeldingen skal utvalget informeres muntlig om prosjektet og samtykke til deltakelse. For å tilfredsstille kravet om et informert samtykke etter loven, må utvalget informeres om følgende:

- hvilken institusjon som er ansvarlig
- prosjektets formål / problemstilling
- hvilke metoder som skal benyttes for datainnsamling
- hvilke typer opplysninger som samles inn
- at opplysningene behandles konfidensielt og hvem som vil ha tilgang
- at det er frivillig å delta og at man kan trekke seg når som helst uten begrunnelse
- dato for forventet prosjektslutt
- at data anonymiseres ved prosjektslutt
- hvorvidt enkeltpersoner vil kunne gjenkjennes i den ferdige oppgaven
- kontaktopplysninger til forsker, eller student/veileder.

INFORMASJON OG SAMTYKKE

Personvernombudet legger til grunn at student og veileder følger NTNU sine rutiner for datasikkerhet. Dersom personopplysninger skal lagres på privat pc/mobile enheter, bør opplysningene krypteres tilstrekkelig.

DOKUMENTASJON MANGLER

Intervjuguide til underleverandører mangler. Intervjuguiden skal sendes til personvernombudet@nsd.no før utvalget kontaktes.

PROSJEKTSLUTT OG ANONYMISERING

Forventet prosjektslutt er 11.06.2017. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lydopptak

Appendix C: Interview guide for the contractors

Innledende:

Takk for at du tar deg til å snakke med oss. Vi er masterstudenter ved Industriell økonomi og teknologiledelse ved NTNU, og vi er en del av et forskningsteamet SIMPLEX på SINTEF. Masteroppgaven vår tar sikte på å bidra inn mot dette forskningsprosjektet, og tar sikte på å undersøke hvordan man kan drive kontinuerlig forbedring i komplekse leverandørkjeder i prosjektindustrien. I dette intervjuet kommer vi til å stille deg noen spørsmål, som kommer til å være ganske åpne, og gi rom for at du kan utbrodere om utfordringer og muligheter ved å drive forbedringsarbeid i denne industrien.

Er det greit for deg at vi tar opp samtalen? Det vil gjøre det enklere for oss i etterkant av intervjuet. Det er bare vi som kommer til å bruke opptaket, og det vil bli slettet etter at det er blitt transkribert. Vi vil også informere om at det er mulig å trekke intervjuet når som helst frem til innlevering av masteroppgaven 11. juni.

Intervjuobjekt:

- Navn:
- Alder:
- Selskap:
- Stilling og arbeidsoppgaver:
- Tid i stillingen, og evt. tidligere stillinger i selskapet:

Om organisasjonen/forretningsmodell:

1. Kan du beskrive hva dere driver med?

2. Hvordan foregår prosessen fra anbud til ferdigstilt produkt?

   (a) Hva er utfordringene med denne prosessen?

   (b) Kan du gi et eksempel på et prosjekt der noen av disse utfordringene har vært spesielt fremtredende?

   (c) Når inkluderes leverandører første gang i prosessen? Hvilken opplæring får de i deres metodikk på prosjekter?

3. Hvilke rutiner har dere for å evaluere prosjekter?

   (a) Hvem er involvert i disse evalueringene?

   (b) Hvordan tar dere med dere lærdom fra et prosjekt til det neste?

   (c) Kan du gi et eksempel der dere har videreført en god praksis fra et prosjekt til det neste?

Om markedet:

4. Hvem er kundene deres, og hvilke krav stiller de til produktet dere leverer?

5. Hvem er de største konkurrentene, og hvordan opererer de i forhold til dere? (Pris, ledetid, og kvalitet, og hvorfor?)

   (a) Hvor stor er deres markedsandel i forhold til konkurrenter?

6. Hva mener du er deres konkurransefortrinn?

7. Hvordan utvikler markedet seg, og hvordan responderer dere på denne utviklingen?

Kultur/organisering:

Nå har vi snakket litt om hvordan prosessen fungerer. Vi ønsker nå og stille deg noen spørsmål rundt hvordan bedriften er organisert.

8. Forskjellige fagområder er representert i bedriften?

   (a) Ser du noen utfordringer knyttet til dette?

   (b) Hvilken grad av samarbeid og informasjonsflyt eksisterer på tvers av avdelinger/fagområder innad i bedriften?

9. Legger dere til rette for at de ansatte kan bidra til å forbedre rutiner? Hvordan?

   (a) Har du et konkret eksempel der de ansatte har bidratt til forbedringsarbeid?

   (b) I hvilken grad tar ansatte initiativ til å forbedre rutiner?

   (c) Gjennomføres det ansattundersøkelser/stemningsrapporter?

      i. Hvor ofte?

      ii. Hva måles?

      iii. Hva viser resultatene?

      iv. Hvordan brukes disse?

Forhold til underleverandører:

Da har vi fått et litt klarere bilde av hvordan bedriften fungerer, og vi ønsker videre å stille deg noen spørsmål om leverandørene deres.

10. Kan du beskrive sammensetningen av leverandører?

(a) Hvor langvarige relasjoner har dere til de enkelte?

(b) Hva er forskjellene i samarbeidet med de leverandørene dere har en langvarig relasjon til, og de dere bruker av og til?

   i. Hvilke utfordringer ser du med de leverandørene dere bruker av og til?

   ii. Hva slags utfordringer ser du med de leverandørene dere har en langvarig relasjon til?

I resten av intervjuet vil vi fokusere på leverandører dere har en langvarig relasjon til (de underleverandørene som vi skal intervjue).

11. Finnes det en leverandør det er lettere å samarbeide med enn andre?

(a) Hva kjennetegner denne leverandøren?

(b) I hvilken grad deler dere informasjon om interne prosesser, kundespesifikasjoner og strategi med denne leverandøren? Hvorfor/hvorfor ikke?

Endring:

Vi ønsker å stille noen spørsmål relatert til forbedringsarbeid både internt og i samråd med leverandører.

12. Hvilke erfaringer har dere med tidligere forbedringsprosjekter med leverandører?

(a) Kan du nevne et eksempel?

(b) Hva dreide dette seg om, og hva var bakgrunnen for forbedringsprosjektet?

(c) Kan du beskrive hvordan denne prosessen foregikk? (Hvem var initiativtaker, og på hvilket nivå foregikk forbedringsarbeidet? Hvorfor akkurat den leverandøren?)

(d) Hvor vellykket vil du si at forbedringsprosjektet var?

(e) Hvilke utfordringer opplevde dere?

(f) Hvilke kriterier ble brukt til å evaluere forbedringsprosjektet?

(g) Hvordan nyttegjør dere dere av slike evalueringer? Kan du gi et konkret eksempel?

(h) Hva mener du må til for å få til et vellykket forbedringsprosjekt sammen med leverandører?

(i) Hvilke insentiver har leverandører til å bidra på forbedringsprosjekter?

Kommentar: Hvis lite erfaring, still spørsmåklet under. Ellers hopp videre til spørsmål 14.

13. Hvilke leverandører tror du hovebedriften kunne fått til et forbedringsprosjekt sammen med, og hvorfor?

(a) Hva mener du må til for å få til et vellykket forbedringsprosjekt sammen med leverandører?

(b) Hvilke insentiver må til for at leverandører kan bidra på forbedringsprosjekter?

14. Hvilke erfaringer har dere med forbedringsprosjekter internt?

15. Kan du fortelle litt mer om et forbedringsintiativ som du/dere husker godt?

(a) Hva dreier denne seg om, og hva var bakgrunnen for forbedringsprosjektet?

(b) Hvor vellykket vil du si at dette forbedringsprosjektet er?

(c) Hvilke kriterier blir brukt til å evaluere forbedringsprosjektet?

(d) Hvilke utfordringer opplever dere?

(e) Hvordan måler dere fremgangen underveis i forbedringsprosjektet?

(f) Hva mener du må til for å få til et vellykket forbedringsprosjekt?

(g) Hvilken rolle ser du for deg at leverandører kan ha i dette forbedringsprosjektet

(h) Har dere erfaring med Lean-prinsipper?

16. Hvilken rolle har de ansatte i dette forbedringsprosjektet?

    (a) Hvordan blir forbedringsprosjektet formidlet til de ansatte i bedriften?

    (b) Hvilke utfordringer opplever de ansatte?

    (c) Hvordan blir fremgangen i forbedringsprosjektet formidlet til de ansatte?

    (d) I hvilken grad har de ansatte mulighet til å påvirke hvilke forbedringsprosjekter som blir iverksatt?

17. Hvordan blir erfaringer fra tidligere forbedringsprosjekter brukt i dette forbedringsprosjektet?

    (a) Hvordan blir erfaringer fra dette forbedringsprosjektet videreført?

Avslutningsvis:

18. Hva er dekningsgraden i prosjekter?

Da har vi nådd slutten av intervjuet. Takk for gode svar og for at du tok deg tid til å stille opp. Vi kommer nå til å sette oss ned og transkribere intervjuet, og bruke denne innsikten vi har fått her i dag til å se om den litteraturen vi har på området er dekkende, eller om vi må lete etter ny litteratur. Er det mulig for oss å kontakte deg/dere hvis det er noe som skulle være uklart?

Appendix C: Interview guide for the contractors

Innledende:

Takk for at du tar deg til å snakke med oss. Vi er masterstudenter ved Industriell økonomi og teknologiledelse ved NTNU, og vi er en del av et forskningsteamet SIMPLEX på SINTEF. Masteroppgaven vår tar sikte på å bidra inn mot dette forskningsprosjektet, og tar sikte på å undersøke hvordan man kan drive kontinuerlig forbedring i komplekse leverandørkjeder i prosjektindustrien. I dette intervjuet kommer vi til å stille deg noen spørsmål, som kommer til å være ganske åpne, og gi rom for at du kan utbrodere om utfordringer og muligheter ved å drive forbedringsarbeid i denne industrien.

Er det greit for deg at vi tar opp samtalen? Det vil gjøre det enklere for oss i etterkant av intervjuet. Det er bare vi som kommer til å bruke opptaket, og det vil bli slettet etter at det er blitt transkribert. Vi vil også informere om at det er mulig å trekke intervjuet når som helst frem til innlevering av masteroppgaven 11. juni.

Intervjuobjekt:

- Navn:
- Alder:
- Selskap:
- Stilling og arbeidsoppgaver:
- Tid i stillingen, og evt. tidligere stillinger i selskapet:

Om markedet:

1. Hvem er kundene deres, og hvilke krav stiller de til produktet dere leverer?

2. Hvem er de største konkurrentene, og hvordan opererer de i forhold til dere? (Pris, ledetid, og kvalitet, og hvorfor?)

    (a) Hvor stor er deres markedsandel i forhold til konkurrenter?

3. Hva mener du er deres konkurransefortrinn?

4. Hvordan utvikler markedet seg, og hvordan responderer dere på denne utviklingen?

Kultur/organisering:

Nå har vi snakket litt om hvordan prosessen fungerer. Vi ønsker nå og stille deg noen spørsmål rundt hvordan bedriften er organisert.

5. Legger dere til rette for at de ansatte kan bidra til å forbedre rutiner? Hvordan?

    (a) Hvilken opplæring/kursing tilbyr dere de ansatte?

    (b) Har du et konkret eksempel der de ansatte har bidratt til forbedringsarbeid?

    (c) I hvilken grad tar ansatte initiativ til å forbedre rutiner?

    (d) Gjennomføres det ansattundersøkelser/stemningsrapporter?

        i. Hvor ofte?

        ii. Hva måles?

        iii. Hva viser resultatene?

        iv. Hvordan brukes disse?

Forhold til hovedbedriften:

6. Kan du fortelle litt om hvordan dere arbeider med hovedbedriften på prosjekter?

   (a) Hva vil du si er de største utfordringene?

   (b) Kan dere komme rett inn i prosjekter, og gjøre jobben? (eller er det behov for opplæring, og koordinering med andre aktører på prosjektet?)

   (c) Ser dere utfordringer med kommunikasjon mellom dere og andre aktører på prosjektet?

      i. Hva kunne eventuelt bli gjort bedre?

   (d) Hvilke rutiner har dere for å evaluere prosjekter?

      i. Finnes det en felles evaluering sammen med hovedbedriften?

      ii. Hvordan tar dere med dere lærdom fra et prosjekt til det neste? (Hvordan viderefører dere en god praksis? Blir det forankret i organisasjonen?)

      iii. Har du/dere et konkret eksempel på en gang der dere tok med dere en god praksis fra et prosjekt til det neste?

7. I hvilken grad deler hovedbedriften informasjon om interne prosesser, kundespesifikasjoner og strategi?

   (a) I hvor stor grad har dere nytte av denne informasjonen?

   (b) Eventuelt: Hva slags informasjon skulle dere gjerne hatt?

8. Hvordan er det å samarbeide med hovedbedriften kontra andre kunder? (Hvis respondenten trenger hjelp, bruk svar fra spm. 6 og 7)

Endring:

Vi ønsker å stille noen spørsmål relatert til forbedringsarbeid både internt og i samråd med kunder.

9. Hvilke erfaringer har dere med tidligere forbedringsprosjekter med med kunder (spør spesifikt om hovedbedriften)?

   (a) Kan du nevne et eksempel?

   (b) Hva dreide dette seg om, og hva var bakgrunnen for forbedringsprosjektet?

   (c) Kan du beskrive hvordan denne prosessen foregikk? (Hvem var initiativtaker, og på hvilket nivå foregikk forbedringsarbeidet? Hvorfor akkurat den kunden?)

   (d) Hvor vellykket vil du si at forbedringsprosjektet var?

   (e) Hvilke utfordringer opplevde dere?

   (f) Hvilke kriterier ble brukt til å evaluere forbedringsprosjektet?

   (g) Hvordan nyttegjør dere dere av slike evalueringer? Kan du gi et konkret eksempel?

   (h) Hva mener du må til for å få til et vellykket forbedringsprosjekt sammen med kunder?

   (i) Hvilke insentiver har dere til å bidra på forbedringsprosjekter?

Kommentar: Hvis lite erfaring, still spørsmåklet under. Ellers hopp videre til spørsmål 11.

10. Hvordan kan man få til forbedringsarbeid med kunder? (f.eks. effektivisering av prosesser/prosjekter?)

   (a) Hva mener du må til for å få til et vellykket forbedringsprosjekt sammen med kunder?

(b) Hvilke insentiver må til for at dere kan bidra på forbedringsprosjekter med kunder?

(c) Hvordan kunne dere bidratt i et forbedringsprosjekt med hovedbedriften?

11. Hvilke erfaringer har dere med forbedringsprosjekter internt?

12. Kan du fortelle litt mer om et forbedringsintiativ som du/dere husker godt?

(a) Hva dreier denne seg om, og hva var bakgrunnen for forbedringsprosjektet?

(b) Hvor vellykket vil du si at dette forbedringsprosjektet er?

(c) Hvilke kriterier blir brukt til å evaluere forbedringsprosjektet?

(d) Hvilke utfordringer opplever dere?

(e) Hvordan måler dere fremgangen underveis i forbedringsprosjektet?

(f) Hva mener du må til for å få til et vellykket forbedringsprosjekt?

(g) Har dere erfaring med Lean-prinsipper?

13. Hvilken rolle har de ansatte i dette forbedringsprosjektet?

(a) Hvordan blir forbedringsprosjektet formidlet til de ansatte i bedriften?

(b) Hvilke utfordringer opplever de ansatte?

(c) Hvordan blir fremgangen i forbedringsprosjektet formidlet til de ansatte?

(d) I hvilken grad har de ansatte mulighet til å påvirke hvilke forbedringsprosjekter som blir iverksatt?

14. Hvordan blir erfaringer fra tidligere forbedringsprosjekter brukt i dette forbedringsprosjektet?

(a) Hvordan blir erfaringer fra dette forbedringsprosjektet videreført?

Avslutningsvis:

15. Hva er dekningsgraden i prosjekter?

16. Hvor stor del av omsetningen deres er prosjektrelatert?

17. Hvor stor andel av prosjektrelatert omsetning representeres av hovedbedriften?

Da har vi nådd slutten av intervjuet. Takk for gode svar og for at du tok deg tid til å stille opp. Vi kommer nå til å sette oss ned og transkribere intervjuet, og bruke denne innsikten vi har fått her i dag til å se om den litteraturen vi har på området er dekkende, eller om vi må lete etter ny litteratur. Er det mulig for oss å kontakte deg/dere hvis det er noe som skulle være uklart?

Appendix E: Information flyer for informants

Informasjon om intervju

Dette intervjuet blir brukt som en del av masteroppgaven vår med midlertidig problemstilling:

Hvordan drive kontinuerlig forbedring i komplekse leverandørkjeder i prosjektindustrien?

Masteroppgaven skal bidra inn mot Simplex-prosjektet ved SINTEF, og tar sikte på å belyse ovennevnte problemstilling.

Intervjuet blir tatt opp med lydopptaker for å bli transkribert i etterkant. Lydopptaket vil bli slettet når transkripsjon er gjennomført. Videre vil informanten og bedriften bli anonymisert, slik at det som fremkommer fra intervjuet ikke kan kobles direkte til person eller bedrift.

Informanten er herved informert om at han/hun kan trekke sitt intervju frem til 11. juni 2017, som er da masteroppgaven skal leveres. Dersom informanten ønsker å trekke intervjuet bes denne kontakte en av følgende:

Magnus K. Werenskjold
Tlf: 95065527
E-post: magnuswerenskjold@gmail.com

Asgeir S. Bråten
Tlf: 97508793
E-post: asgbra@gmail.com

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Informantens underskrift